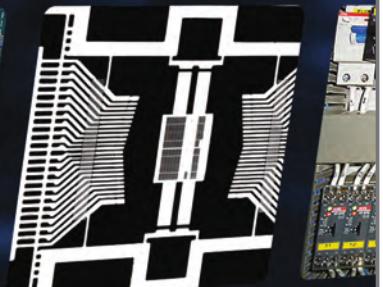
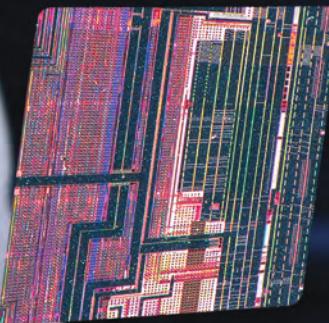
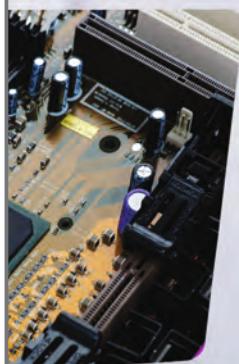
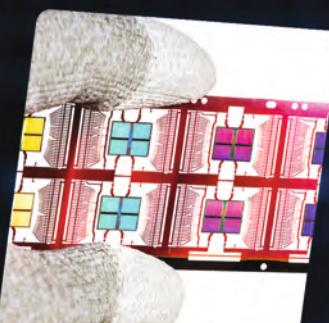
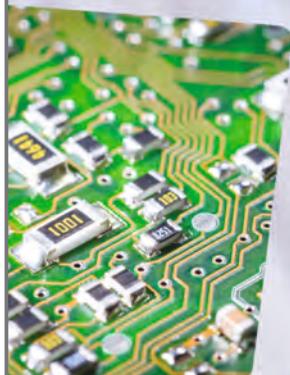


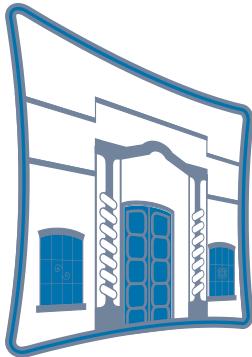


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12 de Octubre de 2018.

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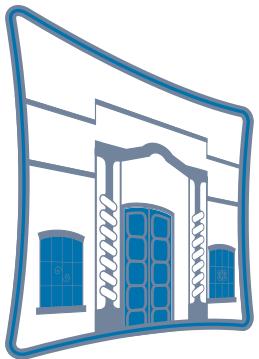
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A DEVS-based Simulation Model for Biogas Generation for Electrical Energy Production

Autores:

Beccaria, Ezequiel; Bogado, Veronica; Palombarini, Jorge A

Abstract:

Renewable energies have a significant role to solve the energy problems in a substantial way in the years to come. In this context, an integral preventive planning regarding the generation and use of different types of renewable energy in environments with variable energy consumption requirements is necessary. This work presents a model based on Discrete Event System Specification (DEVS) to simulate the generation and storage of biogas produced from organic waste. Furthermore, the use of the generated biogas to produce electrical energy in a supply and demand environment is also addressed with the aim of validating different scenarios of generation and consumption and allowing a better decision-making process to improve the production and use of biogas. Finally, the achieved results show that the approach is able to provide a reliable way to analyze the biogas production and consumption process with respect to several significant process variables. In addition, the proposed model could be implemented to control the operation and planning of biogas production without relying on computationally intensive mathematical optimization models.

A Low Cost Environmental Ionizing Radiation Detector Based on COTS CMOS Image Sensors

Autores:

*Galimberti, Clara Lucia; Bessia, Fabricio Alcalde; Perez, Martin; Berisso, Mariano Gomez;
Haro, Miguel Sofo; Sidelnik, Ivan; Blostein, Jeronimo; Asorey, Hernan; Lipovetzky, Jose*

Abstract:

We present the development of a system for the detection of ionizing radiation based on the Omnivision OV5647 Commercial Off The Shelf image sensor. The data is read and processed in real-time using a Raspberry Pi 3 computer. The amount of charge and geometrical characteristics of the cluster of pixels exited when a particle interacts with the sensor is recorded and used to identify the type of incoming particle, distinguishing between alpha particles and X-ray or gamma photons. The software was programmed in C using the OpenCV library. The system was tested with ^{137}Cs and ^{241}Am radiation sources.

A Modular Battery Management System for Electric Vehicles

Autores:

Carlacho, Ignacio

Abstract:

In electric vehicles the energy storage provided by the batteries is of utmost importance: it provides autonomy to the vehicle. However rechargeable batteries cannot operate alone, a Battery Management System is needed to provide safe operation conditions, monitor its state and balance its charge. In this article a Battery Management System is developed for applications in electric vehicles and autonomous robotics. We design the system in a modular way to give flexibility and allow portability to different type of battery packs. Low-cost microcontrollers were used for the system providing also communication with the vehicle's on-board computer. A passive balancing scheme is chosen as a way of battery balancing. The proposed system was tested using a battery pack demonstrating its balancing capabilities.

A multi-subject serious game as an education tool: Analysis from the teacher's perspective

Autores:

Vintimilla-Tapia, Paul E; Penafiel-Vicuna, Cristian J; Bravo-Torres, Jack F; Gallegos-Segovia, Pablo L; Yuquilima-Albarado, Ivan F; Ordonez-Morales, Esteban F

Abstract:

In recent years, the constant technological development has created different forms of learning which aim to improve the education of students. The formal and centralized academy model, managed some years ago, has evolved allowing new forms of informal and centralized models in the students, breaking down the barriers of time and space reflected in the classroom. Knowledge can be accessed in different ways, depending on each person's requirements and preferences. On the other hand, the characteristics of video games are opening up a place in the field of education: serious games. Due to their nature of competitiveness, sociabilization and training, they influence the increase of motivation during learning. This paper presents the design of a multi-subject serious game focused on different undergraduate careers, which seeks to improve academic performance. As part of its validation, prior to its use in students, teachers from different scientific areas are surveyed, obtaining satisfactory results.

A New Ground Power Unit (GPU) Supply for Aircraft Applications

Autores:

Rivera, M; Faundez, D; Kolar, J; Wheeler, P; Besoain, F; Riveros, J A

Abstract:

Nowadays, electrical energy is the alternative to supply aircraft systems. In this paper a new converter for ground power units supply in aircraft applications is proposed. The topology consists of a rectifier with an active current injection circuit linked to a three level neutral point clamped converter. The design procedure is detailed in this paper showing the principal requirements for the safe operation of the converter. Simulation results validate the satisfying performance of the proposed system.

A robotic assistant to support the social and cognitive development of children from low-income families

Autores:

Parra-Astudillo, A; Robles-Bykbaev, V; Barros-Ponton, M; Robles-Bykbaev, Y; Pesantez-Aviles, F; Lopez-Sojos, F; Calle-Arevalo, L

Abstract:

According to latest estimates of the UNESCO, 38% of children leave primary school without learning how to read, write and do simple arithmetic operations. In the same way, approximately 124 million children and adolescents are denied opportunities to enter and complete school. In light of the above, in this paper, we present a robotic assistant aimed at supporting the development of social and cognitive skills in children of low-income families. This robotic assistant is part of the educational program "Sciences classroom for children" that is aimed at providing an educational and fun space where children can learn several concepts organized in 5 interactive ludic micro-worlds: electricity, magnetism, digital electronic, ecology, and robotic. To determine the real feasibility of the robotic assistant, we have conducted a pilot experiment with 68 children of low-income families, and the results achieved shows high levels of acceptance by children.

A Spatial Signal Processing Review for Practical GNSS Antenna Arrays

Autores:

Marranghelli, Ezequiel A

Abstract:

The performance of an isolated antenna compared with itself but embedded (in-situ) in an array is not the same mostly due to the influence of mutual coupling and electromagnetic diffraction. Although signal processing techniques have been widely spread in literature for antenna arrays of elements with same physical properties and same performance, there is not enough mention regarding antennas with dissimilar behaviors. The usual way of avoiding this problem is by means of some kind of compensation that can reduce the differences but not always eliminate them, unless the information of the active radiation pattern of the antennas in array and wideband compensation techniques are used. A great advantage of employing adaptive methods for processing with antenna arrays is that it ensures good performance even without requiring this complete information. However, the distortions incorporated to the acquired signals by such processing step added to the improper characterization of the antenna array degrades the precision of the received signal parameters measurements. In this paper we analyze the need of using compensation techniques in GNSS applications when the performance of the array of antennas is properly characterized. The degrading effects of using adaptive antenna arrays on acquired GNSS signals and how to avoid them are also evaluated. Simulated results that involve an array of microstrip antennas for GNSS are presented.

Aceleración de Rastreador Ocular en Sistemas Híbridos Reconfigurables

Autores:

Roberto, Ariza Carlos; Soledad, Molina Romina

Abstract:

This work presents the development and implementation of an eye tracker in a reconfigurable hybrid system (SoC), accelerating its performance. For this, a hardware/software co-design is carried out taking as a decision criterion the results obtained from performing a dynamic (profiling) analysis of the system. Once the hardware with which the programmable logic (PL) of the SoC is configured, the software to be executed in the processor (PS) is encoded and everything is integrated under an embedded Linux operating system.

Adaptive Delay-Tolerant Robust Predictive Current Control

Autores:

Echeverría, Noelia I; Fischer, Jonatan R; Hidalgo, Roberto M; González, Sergio A

Abstract:

This paper presents an Adaptive Delay-Tolerant Robust Predictive Current Controller based on a QRD-RLS identification technique. This control can be applied to both single and three phase grid-tie voltage source inverters. The control strategy, based on an extended model that include delays (integer computational delay plus effective delay), employs full state feedback, a predictions observer and an identification algorithm in order to obtain a true dead-beat ripple free response. Due to its adaptive capability, this control has a great robustness to parametric variations and presents low steady-state current error. Simulations results were carried out in order to asses the proposed technique.

Aero-Freno Regenerativo en Planeador a Radio Control

Autores:

Catuogno, Carlos; Blanco, Ibel; Catuogno, Guillermo

Abstract:

This work proposes an aero-brake for gliders to Radio Control (RC), it consists of using the electric drive motor as a generator during the braking period. The advantage of this aero-brake to the spoilers commonly used, it is possible to use the energy generated to charge the model's battery. In addition, the parts that make up the glider are classified and experimental flights are carried out to validate the present proposal.

Aircraft to Low Orbit Satellite L Band-Link Characterization

Autores:

Martin, J P; Marengo, B; Prina, J P; Lopez, P; Folonier, M; Podesta, M; Riolfo, M; Gonzalez, G

Abstract:

Specific factors affecting the satellite reception of messages transmitted by civil aircraft are analyzed. A kinematic model of the system, and a study for the link budget calculation are proposed, to then quantify the effects that alter the performance of the system. Finally, a model of an L-band radiocommunication system for the operating conditions of low-orbit satellites is characterized.

Algoritmo de clasificación de eventos de tensión trifásicos basado en la transformada de Fortescue

Autores:

Strack, J L; Carugati, I; Donato, P G; Maestri, S; Orallo, C M; di Mauro, G F

Abstract:

One of the main problems in the electrical networks is the occurrence of voltage disturbances as dips, swells and interruptions, commonly identified as events. In order to generate statistical indexes to assess them, it is necessary to be able to detect and classify them. Three algorithms for classifying voltage events stand out from the specific bibliography. They classify voltage events correctly under ideal conditions. However, they fail under the presence of phase jumps and phase rotations, due to the impedance characteristics of the network, load and fault, and as result of the sensitivity of the fixed classification thresholds to deviations of the pre-fault voltage from the nominal value. In order to reduce these errors of classification, a new algorithm is proposed. It is demonstrated that presents an adequate performance in the classification of events affected by the disturbances previously described. Unlike the other algorithms in the bibliography, it does not use fixed thresholds, so it is better adapted to the normal changes in the pre-fault voltage produced in the network, as well as to the variations in the phase angles during the occurrence of the event.

An expert system based on rules and mobile apps to support the evaluation of auditory function in children from 3 to 6 years

Autores:

Leon-Pesantez, A; Robles-Bykbaev, V; Oyervide-Rios, J; Quito-Naula, P; Robles-Bykbaev, Y; Calle-Lopez, D

Abstract:

Nowadays, approximately 34 million children present different grades of hearing loss. This situation can affect their intellectual, psychological and emotional development. For these reasons, it is fundamental having tools based on Information and Communication Technologies (ICTs) and intelligent systems that provide support during the initial screening and assessment of auditory function in children. However, in developing countries - especially in South America -, currently there does not exist enough informatics tools to support the labor of Speech-Language Therapists (SLTs). For these reasons, in this paper, we present an expert system that relies on rules and mobile applications to support the evaluation of auditory function in children from 3 to 6 years. To determine the real feasibility of our proposal, we have carried out a pilot experiment with a team of 30 experts SLTs. The achieved results show high levels of acceptance by SLTs and children side.

An expert system to support the provisioning of staff with disabilities in industry

Autores:

Rodas-Tobar, M; Bernal-Bravo, C; Andres-Romero, M; Pinos-Figueroa, A; Vidal-Mogrovejo, P; Leon-Pesantez, A; Robles-Bykbaev, V; Pesantez-Aviles, F

Abstract:

The World Health Organization (WHO) claims that currently in developing countries, 80% to 90% of persons with disabilities of working age are unemployed, whereas in industrialized countries the estimation points values between 50% and 70%. In developing countries, it is common employing persons with disabilities only with the aim of complying the state regulations. These persons commonly perform tasks for which they are overqualified. For these reasons, in this paper, we present a prototype of an expert system to support the provisioning of staff with disabilities. Our proposal considers the following elements to provide support in decision making: a set of the most common positions in the industry, the skills required to cover these positions, the disabilities with higher prevalence, and the complex relations among these elements. The prototype system has been validated with the support of a team of experts and has achieved excellent results (more than 78% of precision).

An interactive educational platform based on data mining and serious games to contribute to preservation and learning of the Can~ari indigenous cultural heritage in Ecuador

Autores:

*Robles-Bykbaev, Y; Galan-Montesdeoca, J; Segarra-Vanegas, V; Robles-Bykbaev, V;
Pesantez-Aviles, F; Vinanzaca-Padilla, E*

Abstract:

According to latest estimates of the UNESCO between 350 and 500 million of persons that belong to indigenous peoples live currently in the world. These peoples have created and the share of the world's almost 7000 languages. In Ecuador coexist 18 indigenous peoples, and 14 have different traditions and cosmovision. However, due to several social, cultural, and economic factors, the cultural heritage of these peoples is slowly disappearing nowadays. For these reasons, in this paper, we present an interactive platform aimed at the cultural rescue of one of the most representative indigenous people of Ecuador: the Can~aris. Our platform has the aim of providing an interactive environment where children can play educational games and access to the multimedia content of the Can~ari cultural heritage. The platform includes a data mining module to automatically analyze the activity of its users to suggest and educational areas that must be reinforced. Our proposal was put to test with 30 children that speak Spanish and Kichwa and has achieved encouraging results.

Análisis de las características de Antenas-lente en microondas mediante método full-wave

Autores:

Gross, Patricio; Vernieri, Julieta; Vico, Felipe; Bava, J Alberto; Bataller, Miguel Ferrando

Abstract:

This work applies a new full-wave electromagnetic simulation code [1], to evaluate the performance of large-diameter lens antennas used in the microwave band. This code has great advantages over commercial software, which have great limitations when trying to simulate this type of lens antennas with a standard personal computer. Two types of lens antennas were analyzed, one with an hyperbolic profile and the other with an elliptical profile. The simulations results allowed to obtain the parameters that characterize the antennas, among them gain, beam width, etc. and compare the performance of both antennas.

Análisis y Diseño de Controladores para Inversores Trifásicos de Cuatro Piernas para Desacoplar los Canales d y q

Autores:

Oggier, Elias; Oggier, Germán

Abstract:

An average model of the three-phase four leg inverter in the synchronous referential dq0 presents a coupling between the channels d and q that produces a negative influence on the performance of the system. In this work a model averaged in discrete time is obtained to analyze the coupling and establish guidelines for the design of an internal loop of current control that allows to attenuate the coupling between channels d and q. A robustness analysis allows to verify that the system is stable for a variation of the parameters of the filter comprised from 20% to 180% of its nominal values. An external voltage control loop is designed considering channels d and q as independent SISO systems and its performance is satisfactorily verified by simulations, for different load conditions, verifying that the decoupling achieved by the internal loop was adequate.

Analíticas de Aprendizaje en Serious Games: una revisión sistemática de la literatura

Autores:

Massa, Stella Maris; Kühn, Franco D

Abstract:

The Learning Analytics is an emerging field of study, which is focused on the study of students' behavior in relation to the educational content presented to them. The key in these technologies is to look for a standardization of the obtained data, being this task particularly difficult, since the collection generates diverse ranges of data. This study is based on reviewing the technologies already implemented by various authors, and presenting the most important topics already developed in the area, both in private and educational areas to find solutions to these problems. Both theoretical methodologies and tools implemented in software that are available for review are reviewed.

Analysis of accuracy of pedestrian inertial data obtained from camera's images

Autores:

Konrad, S Gerling; Masson, F R; Nebot, E

Abstract:

Wearable devices have inertial sensors that provide useful information to estimate and predict pedestrian motion and intention, which is of fundamental importance in ITS applications. These devices are usually placed in the limbs, such as wrist, ankles and feet and they provide rotation rate and acceleration information. This information is essential for the successful development of systems capable of inferencing pedestrian intentions. Unfortunately these devices do not have the capabilities to broadcast information to all vehicles in proximity and require all pedestrian to be retrofitted with such capability. This is the fundamental reason why all existing approaches are based on sensing installed directly in the vehicles. Intelligent vehicles have different types of sensors to perceive the environment in proximity, the most common being cameras. This work demonstrates that vision from cameras is capable of obtaining pedestrian dynamics with similar accuracy of wearables devices. It compares rotation ratios and acceleration obtained with wearables installed in pedestrian wrists with similar information obtained by vision. The vision dynamic information is obtained using robust methods that combine skeleton representation with semantic information. The experimental results presented demonstrate the strong correlation between the wearable measured and vision observed rates and acceleration information. The outcomes of this work will enable the solution of one of the fundamental issues in pedestrian safety that is inference of intent.

Analysis of nonlinear companding techniques for short range DMT optical links

Autores:

Zoireff, Gustavo; Caso, Pablo A Costanzo; Rossini, Laureano A Bulus

Abstract:

Discrete Multitone, like any multicarrier communication system, presents an important issue which degrades its performance when a nonlinear device is located at the transmitter: a high Peak-to-Average Power Ratio. Many approaches were proposed to solve this problem, of which nonlinear companding techniques are a good choice, especially when low computational cost and low power consumption are sought. In this work, a comparative analysis of four representative kinds of nonlinear companding methods is presented. Simulations are performed to analyze the different techniques when they are applied in a short range DMT optical fiber link which employs direct modulation of a laser diode current on the transmitter.

Analysis of supply costs in buses of the National Interconnected System of Paraguay under uncertainty

Autores:

Oscar Santa Cruz; Daniel Ríos; José Ojeda; Gerardo Blanco

Abstract:

This paper proposes a method for addressing the transmission expansion plan by means of analyzing the system congestion. For this purpose, the marginal supply cost in each bus of the system is used as the indicator of congestion, obtained through computing an Optimal Power Flow AC (OPF AC). The applicability of the proposed method is verified by adopting the National Interconnected System of Paraguay as a case study. Likewise, it is considered that demand develops an uncertain growth, thus such growth is described by means of the Brownian Motion stochastic process and Monte Carlo realizations. The long-term system expansion is assumed to follow the Plan of Infrastructure of the National Electricity Administration (ANDE) of Paraguay. In addition, new investments are incorporated in order to assess the impact on the prevailing congestion level of the system. Finally, a stochastic discounted cash flow is applied in order to value if the tariff perceived by ANDE is sufficient for covering the capital costs of future investments, given the resulting congestion levels.

Approach to Verify Radio Frequency Compatibility on a Satellite Platform

Autores:

Belcaguy, Pablo Marino; Carrizo, Ricardo Colpari

Abstract:

The increasing complexity and the size constraints of smaller designs for aerospace vehicles make the radio frequency compatibility more relevant due to the risk of interference between equipment. This work proposes an approach to verify the Radio Frequency Compatibility between the transmitters and receivers on board of complex autonomous platforms, such as satellites. The proposed approach is applied to a satellite platform designed for a typical Low Earth Orbit mission. First of all, some typical approaches to tackle this problem are mentioned: The modelling of transmitters, receivers, antennas, the modelling of the structure and the estimation of the interference levels with simple formulas or with a solver selection: This is driven by the satellite size and the frequencies, a simulation software such as Altair FEKO® is used for this analysis. The passive intermodulation (PIM) products analysis are also analysed, but first it is necessary to identify all the transmitting frequencies on the satellite, and check if any of the resulting combinations could fall in the frequency band of a receiver, when an intermodulation frequency is identified as risky, the intermodulation power analysis is needed, which will be done with a simplified worst case analysis. The scope of this approach is to calculate the general system margins achieved on selected victim equipment and therefore verify the status of compliance to radiated susceptibility or PIM requirement to ensure radio frequency compatibility.

Asignación de Potencias No-Gestionables Máximas en una Red Eléctrica con Restricciones de Calidad

Autores:

Loyarte, Ariel S; Clementi, Luis A; Vega, Jorge R

Abstract:

This work proposes a strategy for the implementation of a Particle Swarm Optimization (PSO) algorithm used for determining the maximum injection of non-dispatchable power (normally obtained from renewable sources) at a previously selected set of buses of an electrical network. The parametrization of the method, the designed ad-hoc algorithms for the swarm initialization and the constraint handling procedure are specified. In this last case, real and reactive power balances (including power losses) are considered. Special emphasis is placed on related power quality constraints: voltage magnitudes and voltage fluctuation due to the rapid variation of climate conditions, which affect the incorporated non-dispatchable generation.

Assessment of the Potential Evapotranspiration MODIS Product Using Ground Measurements in the Pampas

Autores:

Degano, M Florencia; Rivas, Raúl E; Sánchez, Juan M; Carmona, Facundo; Niclòs, Raquel

Abstract:

Evapotranspiration is the hydrological variable of greatest relevance in the Argentina Pampas Region (APR). The estimation of potential evapotranspiration (PET) in this area becomes essential since primary productivity is directly linked to water availability. In order to evaluate the MOD16_A2 product of evapotranspiration (ET), a comparison with in situ measurements was conducted. We used ET data provided by the Oficina de Riesgo Agropecuario, corresponding to 24 stations placed in the region covering all seasons for the years 2012 to 2014. Results show an overestimation of 86% and 52% in Autumn-Winter and Spring-Summer, respectively. Mean Absolut Error (MAE) range between ± 0.9 and ± 2.1 mm day $^{-1}$ in Autumn-Winter, and between ± 1.6 and ± 2.6 mm day $^{-1}$ in Spring-Summer, with R² values close to 0.7 for both data sets, with no seasonal differences at this point. Overestimation in PET was found to be partly due to the empirical model used in the MOD16_A2 product to determine the downward longwave radiation (RL) term. A specific application in our study sites showed that the term of RL produces an overestimation of 1 mm day $^{-1}$ in the calculation of PET. Although further research is still required to find out the reasons for these discrepancies, these results advice to be cautious when using PET data of the MOD16_A2 product in the APR.

Automatic Generation of Rescheduling Knowledge in Socio-technical Manufacturing Systems using Deep Reinforcement Learning

Autores:

Palombarini, Jorge A; Martínez, Ernesto C

Abstract:

The generation of rescheduling knowledge for handling unforeseen events has become a key element of any real-time disruption management strategy, to ensuring a highly efficient production in increasing dynamic conditions without sacrificing cost effectiveness, product quality and on-time delivery, which are key competences in modern socio-technical manufacturing systems characterised by a diminishing predictability of environmental conditions at the shop-floor. In this work, a real-time rescheduling task is modelled and solved resorting to the integration of a schedule state simulator with an artificial agent that can learn successful schedule repairing policies directly from high-dimensional sensory inputs. The rescheduling knowledge is stored in a deep Q-network, which can be used reactively to select repair actions in order to make progress toward a goal schedule state. The network is trained using deep Q-learning with experience replay over a variety of simulated transitions between schedule states using the schedule visual images and negligible prior knowledge as input. Finally, an industrial example is discussed showing that the approach enables learning successful rescheduling policies and encoding task-specific knowledge that can be understood by human experts.

Automatizing the generation of a virtual tour of an architecture model through an information system

Autores:

Grandon, Natalia; Peldoza, Hector; Besoain, Felipe

Abstract:

One of the main problems that the AEC industry (Architecture, Engineering, and Construction) faces is how to approach the client regarding the AEC process, helping them understand different artifacts and instruments. Some companies, with the purpose of delivering a quality service to their clients and partners, have incorporated the BIM method (Building Information Modeling) and Virtual Reality experiences into their design processes. In this project, we explore the design and development of a standard protocol that allows users to generate a Virtual Tour in two formats: PC and a Virtual Reality experience for Android devices. This process has been automatized through: a web service, a game engine, and an information system. The main contribution of this work is the design of a pipeline with a scalable solution for improving the communication with clients through virtual tours with a standard protocol.

Autonomous Vehicles for Outdoor Multidomain Mapping

Autores:

Garberoglio, Leonardo; Moreno, Patricio; Mas, Ignacio; Giribet, Juan I

Abstract:

In the last years, progress has been made attempting to replace a unique, complex and expensive vehicle equipped with several sensors such as LIDAR, RGB cameras, thermal sensor, etc. with a group of small vehicles, each of them carrying one sensor. There are several advantages of these segmented architectures, for instance this allows a reduction in the cost of the vehicles (several small vehicles can be less expensive than one big vehicle), the flexibility to choose for a mission only those vehicles with the appropriate sensors, the robustness of the system since it can acquire information even if one vehicle fails, among others. The advantage of segmented architectures is even more noticeable if the vehicles carrying those different sensors, have different characteristics or environments for operations, e.g. aerial, terrestrial or aquatic vehicles. In this work, we present the experimental results obtained with an ASV (Autonomous Surface Vehicle) and a UAV (Unmanned Aerial Vehicle) that cooperate to obtain a topographic survey of the terrain. The ASV is equipped with a LIDAR, meanwhile the UAV is equipped with a monocular RGB camera. The data acquired is post-processed in order to obtain a detailed map of the coastline of a creek and the surrounding area.

AVATAR: Contribution to Human-Computer interaction processes through the adaptation of semi-personalized virtual agents

Autores:

Guerrero-Vásquez, Luis F; Landy-Rivera, Dennys X; Bravo-Torres, Jack F; López-Nores, Martín; Vintimilla-Tapia, Paúl E

Abstract:

In this article a process of animation of 3D models is proposed to transform them into virtual agents or avatars with the possibility of being used in Human-Computer interaction processes. The resulting virtual agents have been adapted as tools that serve as a starting point for the development of real-time interaction algorithms. The characteristics of the generated tools allows to deepen in techniques of machine learning and artificial intelligence, endowing to the virtual agents of movements with natural and real characteristics. It is possible to use them as puppets, capturing the movements of a person and transferring them to the animation; it is also possible to program specific sequences whose interaction processes are completely determined. Finally, the idea of developing algorithms involving artificial intelligence combined with human intelligence to improve interaction processes is proposed.

Bayesian enhanced ensemble approach (BEEA) for time series forecasting

Autores:

Rivero, Cristian Rodríguez; Pucheta, Julián; Otaño, Paula; Juárez, Gustavo; Franco, Leonardo; Velazco, Raoul

Abstract:

We propose a new ensemble forecasting method, Bayesian enhanced ensemble approach (BEEA), to model neural networks for time series forecasting. Motivated by looking to get better prediction algorithms, our proposed algorithm can effectively integrate the data from different methods modified by Bayesian learning. A dataset of univariate time series (seasonal and non-seasonal) is used to forecast short-long prediction horizons, mainly 3 and 18 out-of-sample. Comparative simulations of our method with ten existing linear and nonlinear forecasting approaches, namely, Energy associated to series (EAS), Energy associated to series modify by Renyi's entropy (EASmod), Bayesian approach (BA), Bayesian enhanced (BEA), Bayesian enhanced modified by Renyi's entropy (BEMA), Bayesian enhanced modified by relative entropy (BEAmode.) is presented. Relative advantages and limitations of the ensemble approach in contrast with some reported in the literature illustrates the effectiveness of the Bayesian enhanced ensemble approach (BEEA) through different forecasting horizons in both, the learning process and the validation test using the MASE, SMAPE and RMSE forecast error metrics to highlight the performance and limitations of the BEEA approach.

Benchmarks y profiling del modelo Weather Research and Forecasting (WRF) dentro del Observatorio Hidro-Meteorológico de la Provincia de Córdoba

Autores:

Martina, Agustín; Lighezzolo, Andres; Zigaran, Gonzalo; Viscardi, Dardo Ariel Vinas; Lio, Estefanía Nievias; Rodriguez, Andres; Montamat, Ignacio A; Saffe, Jorge N; Poffo, Denis A; Caranti, Giorgio M; Comes, Raul; Ingaramo, Ricardo

Abstract:

The Government of the Province of Córdoba, together with the National Meteorological Service (SMN), the National Commission of Space Activities (CONAE), the National University of Córdoba (UNC), the National Institute of Agricultural Technology (INTA) and the INVAP, formed the Hydro-Meteorological Observatory (HMO) of the Province of Córdoba [1]. The generation of short-term forecasts with high spatial resolution is one of the objectives of the HMO, given that they are a fundamental tool for the prediction of severe hydro-meteorological events that produce negative socioeconomic impacts in the region. The HMO uses the Weather Research and Forecast (WRF) model for research and operationally. That is why the need to find the optimal hardware and software requirements for model execution was raised. With this objective, in this work we analyzed the execution performance of the WRF model in different computer scenarios. Although this work is presented within the framework of the HMO of the Province of Córdoba, what is analyzed contemplates the different realities of different institutions with the same initiative. Then the results are presented, taking into account the user's computation needs, in order to define an optimal system in the computing / cost relation.

Caracterización Magnética de Materiales: una Alternativa para Transformadores

Autores:

Ruschetti, Cristian; Meira, Matias; Verucchi, Carlos

Abstract:

This paper presents an alternative to characterize the material of magnetic circuit of an existing transformer. The proposal aims to generate an alternative to standardized methods (IEC 60404-2: 2008 and IEC 60404-3: 2009) in those cases in which a sample of material is not available. The magnetic flux density (B) and the magnetic field (H) are mathematical modeled from electrical variables. Experimental results show that the presented technique is adequate to characterize magnetic materials.

Characterizing the kinetic energy spectrum of the Parana River streamflow near the Itaipu dam

Autores:

Aveiro, D.; Rios, D. ; Blanco, G.; Sauer, C.

Abstract:

This work use a method for characterizing the kinetic energy spectrum of the streamflow of the Parana River near the Itaipu dam, shared by Paraguay and Brazil. In that sense, streamflow data collected daily over 90 years is analyzed. Then, a technique based on applying the Fast Fourier Transform (FFT) is used in order to estimate the power spectral density of the observed time series for a range of frequencies between around 1 cycle / 2 days and 1 cycle / 42 years. Results synthesize the contribution of different frequencies to the variance of the streamflow. Thus, it is verified that the kinetic energy spectrum shows the highest peak for frequencies of around 1 year, but also contains a relevant contribution from lower frequencies. Finally, results of this work might be useful for simulating the production of the Itaipu hydropower plant based on samples of streamflow time series that account for the seasonality of the primary resource.

Clasificación de gestos a partir de señales EMG

Autores:

Giordano, Lucas S Bualo; Moiola, Franco

Abstract:

The measurement of electromyographic (EMG) signals generated by the muscles is used to monitor their activity, allowing the identification of movements that is the objective of this work. To that end, three EMG signals were acquired with surface electrodes, which were located on the forearm. The measurements were taken from four individuals that repeated several times nine simple hand gestures; a database of the different movements was constructed using these signals. Each movement's dataset was characterized using the energy of its Discrete Wavelet Transform (DWT) levels. These sets were used to train the two classification algorithms; one based on Artificial Neural Networks (ANN) and a second one using Ensembles with Bagging. In order to evaluate their performances and to improve them, the amount of training data was changed observing an impact on the efficiency. Changing the parameters of the algorithms significantly improved the results, that were represented employing confusion matrixes. When using supervised training, the accuracy reached values over 80%. This work shows the potential application of electromyography in human machine interfaces through easy gestures.

Comparación de Aceites Dieléctricos Minerales y Vegetales en Relación a la Producción de Gases

Autores:

Meira, Matias; Álvarez, Raúl; Catalano, Leonardo; Ruschetti, Cristian; Verucchi, Carlos

Abstract:

In the manufacture of power transformers, mineral oils distilled from petroleum have traditionally been used as liquid insulation. Oil is one of the essential components for the correct operation of a power transformer. Its functions are to ensure the isolation between active parts, evacuate the heat, and protect other insulators (such as paper) from moisture. Moreover, the analysis of insulating oil provides a diagnosis of the state of the transformer without removing it from service. In recent years have begun to use dielectric oils of vegetable sources. These new oils are biodegradable; improve the cooling of the transformer and have a high fire and flash point compared to mineral oils. However, its high cost and low evaluation in service (performance), still limit its application. For mineral oils, there is a clear link between each type of fault and the gases generated. This is due to the fact that there is a large database obtained from the study of numerous cases over many years. On the contrary, the limited field data related to vegetable oil compared to mineral oils, makes the analysis of dissolved gases unreliable. Some preliminary studies attempt to determine the differences between each type of oil. This paper presents a review of the difference between the gases formed in mineral and vegetable oils as result of the most common faults in transformers.

Comparison of Canopy Emissivity Parametric Models With TES Emissivity Measurements

Autores:

Pérez-Planells, Lluís; Niclòs, Raquel, Valor; Enric, Coll, César; Puchades, Jesús; Campos-Taberner Manuel; Degano, María Florencia; Rivas, Raúl Eduardo

Abstract:

Canopy temperature is a key factor in many studies, such as evapotranspiration and heat fluxes estimation. To retrieve it accurately, it is needed a precise characterization of the emissivity in the thermal infrared spectral range. Several parametric models are proposed to retrieved effective emissivity at different observation angles, from the previous knowledge of the vegetation and soil emissivities. The present work compares some of these models with emissivity measurements obtained with Temperature-Emissivity Separation (TES) method. For that, FR97, Mod3 and Rmod3 parametric models have been compared with radiometric measurements. Emissivity measurements were done for 7 different observation angles, from 0° to 60° in steps of 10°, and were repeated for six values of leaf area index (LAI) varying from 0.5 m²/m² to 2.8 m²/m². For high LAI values (more than 1.5 m²/m²), differences between TES and models emissivities are from +0.011 to -0.009, being positive for the FR97 model and negative for the Mod3 and Rmod3 models. Very little variation in emissivity is shown at high observation angles in all models at high LAIs. The measured emissivities are shown constant against observation angles, without any decreasing for high angles. For low LAI values (less than 1.5 m²/m²), these differences vary from -0.002 to -0.024. In this case, the FR97 model values show a good agreement with the TES emissivity measurements. Therefore, for high LAI values, the TES emissivity measurements are closer to those of the Mod3 and Rmod3 models. However, the TES emissivity measurements are closer to those given by the FR97 model at lower LAI values.

Comparison of monthly means daily UVA from CERES with ground-based measurements.

Autores:

Orte, Facundo; Wolfram, Elian; Bali, Juan Lucas; Carmona, Facundo; Lusi, Anabela; D'Elia, Raúl; Liberteli, Claudio

Abstract:

The importance to monitor surface UVA solar radiation is mainly associated with its consequences over the human health as well as plants growth. High-quality groundbased measurements of UVA present better accuracy with respect to satellite retrievals. On the other hand, satellite data allows a better spatial coverage, something of great importance on areas with lack of ground-based monitoring points as in Argentina. Thus, the use of satellite products validated with ground-based measurements allows to geographically extending the analysis to regions without terrain instruments. The aim of this work is to evaluate the monthly mean of daily UVA product from CERES (CERES_SYN1deg) by mean of comparisons with ground-based measurements from UVA radiometers in four sites of the SAVER-net along Argentina for different periods, depending on the available ground-based dataset. The CERES monthly mean daily UVA presents very good correlation with respect to ground-based instruments for all sites with correlation coefficients higher than 0.98. The maximum mean bias error reaches ~21% in the worst case. Although it is needed longer ground-based datasets to validate satellite data, we can conclude that the monthly daily mean UVA from CERES presents good agreement with respect to ground-based measurements. Finally, monthly climatology was calculated and maps of these parameters were developed to analyse the seasonal variability along Argentina.

Compensación de dispersión mediante filtrado digital en sistema óptico con modulación OOK

Autores:

Pascual, Juan Pablo; Estrada, Yanet; Morbidel, Leonardo

Abstract:

In this work an optimal linear filter in the sense that minimizes the mean square error between its output and a desired signal is presented. The objective is to mitigate the chromatic dispersion of an optical communications system with an intensity modulation scheme such as on-off keying (OOK), where direct detection for demodulation reduces the receiver complexity. The proposed equalizer operates in the electrical domain of the system, after the photodetector. The mathematical model is presented and the expressions to calculate the filter coefficients are derived. Finally, as a measure of its performance, the probability of bit error of the system is evaluated through numerical simulations.

Control de una micro-red de DC aislada con carga de potencia constante.

Autores:

Magaldi, Guillermo L; Serra, Federico M; Fernandez, Lucas L Martin; Larregay, Guillermo O

Abstract:

A passivity-based non-linear control for an isolated microgrid system is presented in this paper. The microgrid consists in a photovoltaic array and an auxiliary battery bank that feeds a DC-Link, and a constant power load is connected to the system. The purpose of this control strategy is to keep the output voltage in the reference value under load variations. The system is represented in a state space averaged model and the proposed controller is designed using the Interconnection and Damping Assignment strategy, which allows obtaining controller parameters while ensuring the closed-loop system stability. The behavior of the proposal control strategy is validated with simulation and experimental results.

Control Droop con Lazo de Impedancia Virtual Capacitivo para Paralelismo de Inversores Monofásicos

Autores:

Carballo, Roberto E; Botterón, Fernando; Oggier, Germán G; García, Guillermo O

Abstract:

This work proposes a droop control strategy with a capacitive virtual impedance loop, with the aim to achieve parallel operation of single-phase double conversion UPS inverters. A comparison is made between different output impedance characteristics, demonstrating that capacitive output impedance achieves for the same value of circulating current, better voltage regulation than inductive or resistive output impedance characteristics. Experimental results from two single-phase 2-kVA inverters connected in parallel are presented in order to validate the practical application of the proposal..

Control en Tiempo Discreto de Inversores Monofásicos para Aplicaciones en UPS's Utilizando un Referencial Síncrono.

Autores:

Astrada, Juan Carlos; Oggier, German Gustavo; Garcia, Guillermo Oscar

Abstract:

This paper presents the implementation of a discrete-time controller of the voltage and current output of a single-phase inverter in order to meet the performance requirements for UPS's indicated in the international power quality standards IEC62040-3 and IEC61000-2-2 and limit the value of the current in a short circuit. The proposal consists in the generation of a synchronous reference frame through a Phase Locked Loop (PLL) based on a Generalized Second Order Integrator (SOGI), with the purpose of achieving the follow-up of a sinusoidal voltage reference. The validity of the proposal is analyzed considering the requirements of the standards in relation to the transitory response, individual harmonic content and harmonic distortion, in numerical simulation and through of an experimental 2kVA prototype.

Control Predictivo Generalizado de Inversor Fuente de Tensión conectado a Red con Filtro LCL

Autores:

Judewicz, Marcos G; Martinez, Juan F; Fischer, Jonatan R; Gonzalez, Sergio A; Carrica, Daniel O

Abstract:

In this work, an inverter-side current control strategy for grid-connected VSI with LCL filters is proposed based on a generalized predictive control (GPC). The controller is designed taking into consideration harmonic distortion limits and robustness against filter component variations. To this end, a complete three-wire LCL filter model is obtained and impedance sensitivity to each component variation is analyzed. Finally, its performance is evaluated by means of simulations and compared with a predictive deadbeat (PDB) controller.

Controlador Digital Parametrizable Embebido en FPGA de un Convertidor de Potencia de CA a CC para Prácticas Docentes

Autores:

*María de los Ángeles Gómez López; Guido Nicolás Gómez; Marcos Fabián Paz;
Humberto Aglianó*

Abstract:

This paper introduces the design and implementation of a parametrizable digital embedded FPGA controller for an AC/DC power converter commanded by the controlled-activation triggering of a thyristor bridge. The rectifier was developed modularly, destined to teaching practice in the "Industrial Electronics and Automatization" orientation of the careers Electronic Engineering and Electric Engineering of the Universidad Nacional de Tucumán. By the digital control implemented in a FPGA device that is connected to a 4x20 LCD display and a 4x4 matrix keyboard it is possible to parameterize the operation of the converter. It is adopted the type of rectification (single-phase, two-phase or three-phase), the mode of rectification half-wave or full-wave, firing angle of the thyristor bridge with an accuracy of +/- 1% of the period of the alternating voltage and the firing mode (step type, single pulse or pulse train). The complete system tests are implemented, in three-phase full-wave mode, measuring the output signal in a resistive load of $75\Omega / 100W$. It is made a sweep of the trigger angle from 0° to 90° in 5° steps and the average and effective voltage in the load is measured. Also, the effective voltages of the harmonic components of the load signal is measured. As a result, an output signal is obtained with a THD% (Total Harmonic Distortion) that varies from 5.5% to 16.5% depending on the firing angle and without contemplating the filtering stage.

Desarrollo de un Sistema de Monitoreo Remoto Volcánico Basado en la Técnica DOAS

Autores:

Raponi, Marcelo; Arboleas, Hugo; Vilar, Osvaldo; Inzunza, Rodrigo Fuentes; Bianchetti, Juan; Otero, Lidia; Ristori, Pablo; Salvador, Jacobo

Abstract:

The extreme conditions of the volcanic environment and the high risk associated with measurements in the field make remote sensing techniques an essential tool for gaseous geochemical monitoring. This paper presents the design and development of an optoelectronic system called scanning-DOAS, which allows monitoring the emission of sulfur dioxide (SO₂) of volcanic origin, from a safe distance. The instrument performs a scan of the plume, measuring the scattered UV solar radiation that arrives at the detector. From these solar spectra, the SO₂ concentration in the cross section of the plume is determined, applying the DOAS (Differential Optical Absorption Spectroscopy) technique. If we have information about the plume's altitude and speed, it is possible to determine the SO₂ flow. There is evidence that an increase in SO₂ flows could be associated with an increase in volcanic activity, hence the importance of carrying out systematic monitoring. The work highlights the system's constructive characteristics and describes the technique used to obtain the aforementioned data. The system's design incorporates substantial improvements based on the results obtained using a first prototype, during the monitoring campaign carried out in the Planchón-Peteroa volcanic complex, Malargüe, Mendoza province, in January 2017. The SO₂ flow variability observed during these measurements are in the order of magnitude of what was expected and agrees (very good correlation) with the information provided by the Observatorio Vulcanológico de los Andes del Sur (OVDAS), Servicio Nacional de Geología y Minería de Chile (SERNAGEOMIN), in its reports of volcanic activity. The results obtained indicate a very low SO₂ emission rate, typical of the activity of this volcanic complex.

Desarrollo de una Estación para Medición de Parámetros Hidrometeorológicos en Grandes Reservorios de Agua

Autores:

Reyes, González

Abstract:

This work deals with the development of a station for measuring hydro-meteorological parameters from large water reservoirs. It allows data to be collected, stored and automatically transmitted to a web server. These data is needed to calibrate numerical models that help in the characterization of the different lakes of the Province of Córdoba, Argentina; today under increasing eutrophication risk. The station measures meteorological parameters on the lake's surface using sensors for wind speed and direction, temperature, humidity, atmospheric pressure and solar radiation. Under water, in the first prototype, it is possible to measure temperature at different depths using a chain of thermal sensors, with the goal of determining the presence of vertical gradients of temperature, thermal stratification, thermocline depth, upwelling, vertical mixing, etc. It is foreseen for the evolution of the system to include dissolved oxygen, pH, conductivity, ORP, and total dissolved solids sensors. The telemetry system is a GSM/GPRS device that uses the local cellular network. In addition, there is an alternative wireless device for backup in case of failure of the primary telemetry system or unavailability of the cellular network. The station is self-powered by a photovoltaic and battery system. This work presents preliminary results obtained in laboratory tests, prior to the installation of the prototype.

Descripción de un Marco de Diseño de la Gamificación

Autores:

Antonio, Álvarez-Cedillo Jesús; Patricia, Pérez-Romero; Teodoro, Álvarez-Sánchez

Abstract:

The use of the game as a learning tool has worked because it allows to develop the ability to teach and reinforce knowledge, develop skills, solve problems, develop skills and encourage teamwork. Games have the power to motivate because they use mechanisms to encourage people to participate in them, and generates addiction given the possibility of winning. Gamification consists of the use of mechanical elements and game design techniques in a nongame context that involves users to solve problems of everyday life. In this article we show an integral structure for the application of gamification in the following aspects: commitment with the client, employee performance, advanced education, personal development and innovation and with the common elements a conceptual framework of development for general purpose was formed.

Design of an Augmented Reality-based Application for Quito's Historic Center

Autores:

Alulema, Darwin; Simbaña, Betsabe; Vega, Christian; Morocho, Derlin; Ibarra, Alexander; Alulema, Verónica

Abstract:

The following paper presents an application for Android devices which involves Augmented Reality. This application shows the user data and information regarding heritage buildings of Quito's Historic Center, which can be useful to tourists that visit the city. Moreover, the application is compatible with Android devices running 3.0 Honeycomb version or later, and it was developed on the programming languages JAVA and HTML. The information is collected through a database using a web service. To work with Augmented Reality the SDK Wikitude was used, because it allows the development of applications based on geolocation and benefits such as student licenses. The interfaces were developed using the programming languages JavaScript and HTML. Finally, a series of tests were done to validate the application's functions like memory, mobile data consumption and Wi-Fi.

Design of an optoelectronic sensor for beam displacement measurements: application to laser triangulation

Autores:

Vazquez, Patricia M E; Riobo, Lucas M; Garea, María T; Veiras, Francisco E

Abstract:

In this work, different configurations of optoelectronic systems are designed and studied to be used as displacement measurement systems. They consist in a discrete array of photodetectors which estimate the position of an incident beam that can be applied for laser triangulation. The output of the detection system is obtained by means of the discrete elements that form the array. We propose to make a linear combination of the outputs of the photodetectors to generate a signal that is proportional to the displacements. For this purpose, we develop a numerical calculation in order to estimate the optimum weights of the different outputs. We consider two topologies of four photodetectors: one formed by a single line of discrete elements, and the other, formed by two rows. In order to analyze the performance of the detection system, we simulate the behavior of the array considering different incident beam diameters and the two topologies. Therefore, we design detection systems that provide adequate results for different beam diameters and are tolerant to the shape of the beam profile.

Design, Modeling and Control of a Reaction Wheel Balanced Inverted Pendulum

Autores:

Belascuen, Gonzalo; Aguilar, Nahuel

Abstract:

This paper presents the mechatronics design, modeling, simulation, implementation and control of an inverted pendulum by applying controlled torques to a reaction wheel. We present a method for finding an optimal mechanical design of the pendulum and reaction wheel for a given electric motor and wheel diameter that maximizes the recovery angle. This paper also describes which parameters to look for during the electric motor selection as well as a method for simulating and comparing the performance of different motors. Finally the real system implementation is described and its performance is compared with simulation. The final design is 34 centimeters tall and can stabilize after being released from an angle of 26 degrees from the vertical. This work was carried out within an undergraduate course on Digital Control Systems at Instituto Tecnológico de Buenos Aires.

Detección de cortocircuitos en espiras del estator de motores de inducción mediante inyección de señales

Autores:

Otero, M

Abstract:

This paper presents a strategy for detecting stator inter-turn faults in induction motors (IM), by using a zero sequence high-frequency signal injection. The derivatives of the motor currents are analyzed. The subsequent signal processing allows us to study how these signals change its value as a consequence of stator inter-turn faults. A feature of the strategy is that the zero sequence high-frequency signal is generated by a standard space vector modulation of the IM drive. Experimental results are presented, validating the fault detection strategy.

Detección de Quema de Biomasa en Comodoro Rivadavia y Trelew el 1 de Marzo de 2015

Autores:

Otero, Lidia Ana; Ristori, Pablo Roberto; Ferreyra, María Fernanda García; Aguirre, Daniel; Raponi, Martín; Salvador, Jacobo Omar; D'Elia, Raúl; Martorella, Evangelina; Fabiana, Andrea; Vilar, Osvaldo; Brusca, Silvina; Herrera, Milagros Estefanía; Bali, Juan Lucas; Quel, Jaime

Abstract:

A major forest fire occurred in the province of Chubut at the beginning of 2015. The fire started on February 15 at the Cholila area and lasted until the arrival of rains in early April. An area of approximately 41 000 hectares of virgin Patagonian forests was affected.

Dense smoke plumes were carried by the winds covering an important part of the Patagonian region. The objective of this work is to study the aerosol transport generated by this event and its characterization. The measurements recorded at the cities of Trelew ($43^{\circ} 15' 00''$ S $65^{\circ} 18' 32''$ W, 15 m asl) and Comodoro Rivadavia ($45^{\circ} 47' 31''$ S $67^{\circ} 27' 46''$ W, 49 m asl) are presented. Sunphotometers belonging to the AERONET - NASA network are installed in both cities. These passive instruments detected on March 1st, 2015 high values of aerosol optical depth for the region, (0.2 in the visible region), an Ångström coefficient between 1.5 and 2, and a dominant finemode particle size distribution, with a radius between 0.1 and 1 μm . All the values of these measurements are consistent with the presence of smoke. At Comodoro Rivadavia, in addition, an active remote-sensing system called lidar is installed, which has registered the passage of smoke plumes at the city. The equipment has a vertical resolution of 7.5 m and a temporal resolution of 10 s. The measurements reveal aerosol layers between 1.5 and 7 km. The land records had been crosschecked by TERRA and AQUA satellite images, by backwardtrajectories obtained from NOAA HYSPLIT MODEL and by wind-circulation patterns in the region from NOAA / ESRL (NCEP / NCAR).

Detección y monitoreo de plumas de cenizas de incendios de biomasa utilizando el Radar Meteorológico Argentino (RMA)

Autores:

Saffe, Jorge; Ferreyra, M Fernanda Garcia; Poffo, Denis; Caranti, Giorgio M; Comes, Raul A; Rodriguez, Andres; Martina, Agustín

Abstract:

An important number of biomass fires annually affect the Province of Córdoba, Argentina, destroying native forest, plantations, pastures, etc; affecting the air quality and producing important material damages. This research addresses the detection and monitoring of the debris plume generated by a biomass fire using the Argentine Meteorological Radar 1 (RMA1), a double polarimetric Doppler Weather Radar located in Cordoba City. The fire under study affected a surface of 51,12 ha (roughly) located close to Laguna Larga City, Province of Córdoba. The debris plume core reached an average height of 2000 m during a good part of the event, the expulsed particles were displaced by wind, during the measurement period, more than 60 km from the focus of the fire and up to a registered maximum height of 5250 m. The particle characterization is done using different polarimetric variables, allowing to discriminate the debris particles from atmospheric hydrometeors and so, making possible the detection and tracking of them..

Differences in RCS of Shaped Vs Spherical Raindrops Through Simulations

Autores:

Guillermo Daniel Rodriguez; Juan Pablo Ciafardini; Ezequiel García; José Alberto Bava; Miguel Ferrando Bataller

Abstract:

In this work we study the radar cross section (RCS) of a raindrop using electromagnetic simulation software. Particularly we compare the response of two models of singular raindrops: the first one is a real raindrop shape model proposed by Pruppacher and Pitter and the other is a spherical model that contain the same water volume and is used to extract the meteorological parameters from the RCS, assuming that the RCS is the same of the real raindrop. We make this study for several raindrop sizes and for the most common frequency bands used for weather radars. We analyse here the difference of the RCS for both shapes and so on, the errors that could be occur by the assumption made.

Diseño y construcción de una Órtesis Tobillo-Pie con bloqueo anti-equino

Autores:

*Ignacio, Calle Siguencia John; Paul, Torres Diaz Cristian; Patricio, Moncayo Matute
Freddy; Alejandro, Reinoso Zhindon Daniel*

Abstract:

Currently in the Ecuadorian national market there are fixed orthoses AFO (Ankle Foot Orthosis) and SWOT (Dinamyc Ankle Foot Orthosis) for people who have evolutionary deformation of equine foot, the mountains are at a disadvantage in the recovery of the ankle mobility. At international level, these problems have been solved with the use of safety measures, which allow the control of movement in the cycle of the march, but present the disadvantage that they require a great physical effort by the weight of the device. Therefore, the present document shows the design and construction of a theory of the equilibrium division that helps to stop and counteract the evolutionary deformation of the equine foot, besides contributing to the progress of an adult person suffering from spastic quadriplegia, say, a deformation that does not allow the person to have total control over the movements of the ankle. The design is based on a passive AFO reason of being with an implementation of a load compensation system in the articulation, thus providing active orthosis qualities, because this device allows to perform a stable march; this mechanism will work as "anti-equine" at rest, limiting the angle of plantar flexion. The orthosis is designed for use with normal footwear.

Diseño de Firewall IPv6

Autores:

Federico H. Lutz; Javier I. Bilbao; Carlos Albaca Paraván; Sergio D. Saade; Agustín Anzorena Ostengo; Ana P. Ruiz

Abstract:

The goal of this project is the design of a firewall by software for the IPv6 protocol that can be installed and put into operation in any distribution of Linux Operating System. The observations derived from the IPv6 protocol are taken into account for the design of the firewall as for example the possibility of having multiple IP address per host and the essential role played by the ICMPv6 protocol. The Scrum research methodology has been applied, so in each cycle, a threat to the security of the international network is analyzed and the measures necessary to mitigate it are applied. As a result we have obtained a firewall by software that complies with the basic security measures, taking into account the eventualities and changes of the new IP version. In conclusion this project have investigated threats adapted to the new IPv6 protocol, founding that some new threats have appeared while some others have disappeared due to the new functionalities of IPv6

Ecualización de desbalances en el fotodetector de un sistema óptico con modulación DPSK

Autores:

Pascual, Juan Pablo; Tosi, Mauricio; Estrada, Yanet

Abstract:

Modern high-capacity communication systems that use differential phase-shift keying (DPSK) over optical fiber compromise their performance due to front-end stage imperfections at the receiver. In this work we present a compensation strategy to mitigate the distortion produced by the responsivity mismatch and the temporal imbalance in the balanced photo-detector, for a optics communication system with DPSK modulation. We develop the mathematical model for the signals, taking into account imperfections and the system noise. Based on this model we deduce the equalizer as a Wiener filter and study the performance under different situations by means of numeric simulations. We also compare the bit error probabilities of the ideal, the uncompensated and the equalized DPSK receivers. Finally, we analyze the optimal number of filter coefficients taking into account the relation between performance and computational load.

Educación Basada en Competencias en la Asignatura Protocolos de Comunicación

Autores:

Paraván, Carlos Albaca; Saade, Sergio D; Lutz, Federico H

Abstract:

The university education governed by models based on a conception of contents as primary learning objectives is being modified, due to the accelerated change of knowledge and, consequently, its provisory nature. Higher education should address a way of training that adjusts to changing circumstances and problems in a varied and effective manner, being the Competency-Based Education (EBC) an optimal alternative. This paper describes the process of migration to EBC of the subject TCP / IP Communication Protocols, the results obtained and the plan for its improvement.

Efecto de Reactores Series Distribuidos en la Coordinación de Protecciones

Autores:

Sánchez, E

Abstract:

Distributed Series Reactor (DSR) is a new smart grid technology intended to control power flows in the transmission network. A DSR dynamically controls power flows by modulating line impedance on demand. Because of that, DSRs may adversely impact operation and coordination of distance relays. This paper presents an analysis of the potential effect of DSR technology on the protection system. The analysis is conducted on a realistic power system model representing a regional transmission network of the Argentinean interconnected transmission system. The power system simulation software PSS®SINCAL is used to for the analysis of distance relays operation and settings.

El Juego Proyecto Aplicado en la Formación Final de Estudiantes de Ingeniería Electrónica

Autores:

Norberto DALMAS DI GIOVANNI

Abstract:

During the process of training of Electronics Engineers, students go through different stages of learning and acquisition of knowledge. These stages include theoretical, experimental training and field work. However, it could be said that a great part of the work they do is located on a table, with some electronic components and a personal computer and, sometimes, with the assistance of some measurement instruments. The problem detected in students who start working or in recent graduates, is how complex is for them to be inserted in a real world, where interpersonal relationships, contextual problems and even particularities of each working environment, impose greater challenges on the graduate than those of the specific technical issues to be developed. In this context, the "Electronic Facilities" course is developed, as a work plan based on the application of the Project Game technique, so that the student is confronted with real problems within the conception of the classroom as a "protected area". Two applications of this method are presented, which gave rise to a work of assistance to an expedition of geologists and to the development of a spatial nursery, the latter linked to a professorship project aligned with the spatial area. The learning obtained by the work teams and possible future actions are detailed.

Electrical Energy Supply Alternatives Analysis for an Isolated Community – Pozo Hondo, Paraguayan Chaco

Autores:

Morínigo, Luis; Romero, Carlos; Ríos, Richard; González, Arturo; Blanco, Gerardo

Abstract:

This investigation aims to propose a solution to the lack of electricity supply to the city of Pozo Hondo, a community belonging to the Paraguayan Chaco. A financial analysis is carried out for the proposal of a system that supplies the electric power to the town. Additionally, a multicriteria analysis was carried out with the following evaluation criteria: the cost of energy, levels of greenhouse gas emissions and feasibility or political decision. The premise applied in the analysis of the projection of the electric power demand of the village was based on historical data from villages of similar characteristics within the country. The energy supply alternatives considered were: thermal (diesel), renewable (wind and solar) and an extension of the distribution line (23kV). In order to find the best alternative, the HOMER Pro® software was used, which in the simulation process obtains optimum system arrangements as results. With the optimized models, the Monte Carlo methodology is applied so as to introduce fluctuations in the price of diesel fuel into the financial analysis in such a way as to contrast the thermal generation with the generation based on renewable energy. Finally, the Analytic Hierarchy Process (AHP) is applied to obtain the most convenient alternative, taking into account multiple criteria. The research concludes that the optimal supply solution, considering multiple criteria would be that of a hybrid system (thermal and solar).

Elicitación en Serious Game

Autores:

Tomas, Spinelli Adolfo; Maris, Massa Stella

Abstract:

This article describes the cycle of activities of an elicitation mechanism for Serious Game and its application in a specific case: the game "Power Down of zombies". The stages of the elicitation process are described, the involved processes and generated documents are detailed. The article focuses on the elicitation of pedagogical objectives. Well, that aspect without ruling out other factors, differentiates a Serious Games from a common video game. The video game industry, where the Serious Games are included, has had an explosive growth, although the consolidation of its development processes is a pending task. For this reason, as a contribution, the Grupo de Investigación en Tecnologías Interactivas (GTI) of the Facultad de Ingeniería de la Universidad Nacional de Mar del Plata has developed the Modelo de Proceso para el Desarrollo de Serious Game (MPDSG), of which the described in this article. The obtained results allowed to obtain in an early form, the pedagogical objectives and basic elements of gameplay and immersion. It should be noted that it is necessary to validate this mechanism with other Serious Game to consolidate its robustness.

Epilepsy seizure onset detection applying 1-NN classifier based on statistical parameters

Autores:

*Zorgno, Ivanna; Blanc, María Cecilia; Oxenford, Simon; Garbagnoli, Francisco Gil;
D'Giano, Carlos; Quintero-Rincon, Antonio*

Abstract:

Epilepsy is a disease caused by an excessive discharge of a group of neurons in the cerebral cortex. Extracting this information using EEG signals is an ongoing challenge in biomedical signal processing. In this paper, a new method is proposed for onset seizure detection in epileptic EEG signals based on parameters from the t-location-scale distribution coupled with the variance and the Pearson correlation coefficient. The 1-nearest neighbor classifier achieved a 91% sensitivity (True positive rate) and 95% specificity (True Negative Rate) with a delay of 4.5 seconds (on average) in the 45 signals analyzed, which suggests that the proposed methodology is potentially useful for seizure onset detection in epileptic EEG signals.

Estimación de Área Cubierta de Nieve Húmeda con Datos SAR en la Cuenca del Río Tupungato, Mendoza, Argentina

Autores:

Teverovsky, Sofia A; Pascual, Ignacio G; Notarnicola, Claudia; de Salmuni, Graciela Salinas

Abstract:

The data coming from remote sensing, in particular Synthetic Aperture Radars (SAR), have great potential in the study of snow since they provide information regardless of weather conditions. In this work, the capacity of the C band in wet snow detection is investigated, in the Tupungato river basin, province of Mendoza, Argentina. To this scope, Sentinel 1 images were used, processed following the methodology developed by Nagler and Rott (2000), which adopts a change detection technique by considering an image taken as a reference, in a snow-free or dry snow condition. This algorithm requires the adaptation of parameters according to the particular characteristics of the study area. The analysis carried out in this basin indicates that the optimal threshold to identify wet snow is -2dB. The results were validated indirectly by using information of surface temperature and snow cover area, obtained with LANDSAT 8 optical images. In this way, it was verified the correct classification with SAR of pixels corresponding to wet snow. Wet snow maps generated with SAR data are very useful to nourish hydrological models for the forecast of flow in mountain areas dominated by snow regime.

Estimación de Curvas de Carga de Transformadores de Distribución Utilizando RNA

Autores:

Báez, Eduardo; Duarte, Rodrigo; Buzarquis, Enrique; Gardel, Pedro

Abstract:

El objetivo principal del presente trabajo es desarrollar un modelo computacional mediante Redes Neuronales Artificiales capaz de estimar la demanda de energía eléctrica o curva de carga a corto plazo de un determinado puesto de distribución con determinado número de clientes asociados, teniendo en cuenta incertidumbres como factores sociales, ambientales y económicos.

Estudiando el concepto de variograma para series temporales de datos puntuales, aplicado a muestreos de ovitrampas

Autores:

Lanfri, Sofia; Espinosa, Manuel; Lanfri, Mario; Abril, Marcelo; Scavuzzo, Carlos M

Abstract:

Aedes aegypti is a mosquito of domiciliary habits that breeds in small containers of clear water. This vector transmits several arboviruses in the tropical regions of the planet. Particularly in Argentina, it is responsible for the transmission of Dengue, Chikungunya and Zika and, therefore, it represents an important threat from the point of view of public health. Within this context, Mundo Sano Foundation has been carrying out periodic surveys of immature stages of the vector in several cities of northern Argentina. This paper analyzes a series of two years of weekly oviposition data in 25 sites with ovitraps distributed in the urban area of a small city in northern Argentina. Through this study we try to understand how the relationship between the measurements in each site varies considering its relative position in the city, for different time windows of analysis. To do this, different similarity measurements between curves and graphic representations of these relationships are explored. Among these, the innovative use of polar graphs, a tool commonly used in the analysis of changes in satellite images, is explored. Thus, the work means a contribution both in the methodological and in the epidemiological sense since the understanding of the interaction between the spatial and temporal scales of the problem will help decision makers responsible of the control actions.

Estudio de la correlación mensual entre AOD obtenido de imágenes MODIS y material particulado para una ciudad costera

Autores:

Represa, Natacha Soledad; Vázquez, Jesús Palomar; Port, Andrés Atilio; Sarría, Alfonso Fernández

Abstract:

Remote sensing applied to the study of air quality has provided new tools for assessing the spatial and temporal distribution of atmospheric pollutants. One of the main satellite parameters used is the optical density of aerosols (AOD), which allows quantifying the attenuation of solar radiation in the presence of aerosols within an atmospheric column. This study evaluated the correlation between the average monthly ODA levels recorded by the MODIS sensor on the Terra and Aqua platforms (products MYD04_3k and MOD04_3k), and the average monthly concentrations of PM10 and PM2.5 measured at 5 continuous monitoring stations in the city of Valencia, Spain, over an 8-year period. Correlation was analyzed in each station, excluding those where the correlation was not significant. Thus a ratio of 0.31 ($p < 0.01$, $n=87$) was obtained for PM10 and 0.49 ($p < 0.001$, $n=74$) for PM2.5. Based on this, the generated linear models were analyzed and maps of particulate matter were made. These results were similar to those reported in the literature, showing that it is feasible to use these products to assess the spatial distribution of atmospheric pollutants.

Estudio de las Interacciones Subsincrónicas en Parques DFIG Mediante la Técnica de Análisis Selectivo de Modos

Autores:

Costa, Nicolas E; Revel, Gustavo; Alonso, Diego M

Abstract:

In this paper, the selective modal analysis method (SMA) is used for studying subsynchronous control interactions (SSCI) between wind farms based on DFIG wind turbines and capacitive series compensated transmission lines. The SMA method uses a reduced number of state variables for reproducing the modes of interest, and its effectiveness depends heavily on an appropriate selection of these variables. It is shown that this task is not straightforward when is used for studying the SSCI phenomenon. A guide for selecting the correct set of variables is presented. In addition, a procedure based on a state transformation is used for reducing significantly the number of variables required to reproduce the modes associated to the SSCI.

Evaluación de la Emisión de Gases de Efecto Invernadero para la República del Paraguay – Prospectiva Energética entre los años 2013 a 2040

Autores:

Buzarquis, Enrique; Domaniczky, Juan; Barboza, Marcelo

Abstract:

The aim of this article is the presentation of the obtained results from the assessment of greenhouse gases emission, as part of the project for the elaboration of the Energy Prospective for The Republic of Paraguay at year 2040. The main goal of this project was to show projections of long-term demand and energy requirements of the national socio-economic system, and the corresponding supply before the alternative of two contrasting socio-economic scenarios and their respective energetic scenarios.

Evaluación del Impacto de la Aplicación de Refactorings del Modelo de Presentación en Sitios de Comercio Electrónico

Autores:

Paraván, Carlos Albaca

Abstract:

E-commerce is now a growing reality on the Web because continuous field studies carried out in these confirm the growing use of them to make purchases. In this context, it is essential to analyze the different models that define a web application in order to improve the usability of each one in order to provide a better user experience to the clients of the sites.

Evaluación del Producto Satelital del Sensor OMI/AURA para el Análisis de Dióxido de Nitrógeno en la Provincia de Buenos Aires

Autores:

Represa, Natacha Soledad; Ojeda, Silvia; Abril, Gabriela; Ferreyra, María Fernanda García

Abstract:

Air pollution is currently one of the world's main environmental problems, both because of its impact on climate change and because of the risks it poses to public health. High concentrations of nitrogen oxides are an indicator of poor ambient air quality, with vehicle transport as the main source of emissions. To complement the information provided by monitoring networks, recent studies have begun to include satellite information in regional assessments of air pollutants. In this sense, this paper evaluates the correlation between the concentrations of nitrogen dioxide (NO_2) measured in ground stations placed at the Province of Buenos Aires and the Autonomous City of Buenos Aires and the levels detected by the OMI sensor on board of the Aura satellite platform (NASA) for the period 2012-2016. Spearman's correlation factor between the daily values and the monthly mean and median values was analyzed. The results show a weak correlation for the daily data ($0,15$, $p<0,001$, $n=808$) and a moderate correlation for the monthly averages ($0,36$, $p<0,05$) and medians ($0,45$, $p<0,01$, $n=48$) in Buenos Aires City. Based on the literature consulted, these correlation factors are expected for the OMI satellite product and therefore can be incorporated as descriptive variables into air quality models for this region. Distribution maps of tropospheric NO_2 in the Province of Buenos Aires are shown as well.

Evaluación por Equipos - Experiencia en la Implementación de Interfaces Gráficas

Autores:

Nieto, Luis E; Sánchez, Mariana

Abstract:

The traditional methodology of teaching, guided by what you want to teach, has proven to be an effective tool in the learning process of students in the past, but not in the present, where you have a different society, and therefore different students.

Competency-based teaching means starting with a clear idea of what is important for students to be able to do, and then planning courses and assessments based on what students want to learn so that such learning actually occurs. In this work a sequence of activities is exposed to deal with competencies related to performance in an effective way in teams and to communicate effectively using group work, the results obtained in a first experience and the plan of improvements made to it.

Evaluation of Substation Ezeiza's load shedding automatism logic using dc power flow

Autores:

Barochiner, D; Carletti, L; Pintar, F

Abstract:

The continuous power demand growth and the subsequent development of the Argentinian power grid require Substation Ezeiza's traditional operational scheme to be changed in the near future. That will imply rendering its current load shedding automatism operating principle obsolete. Among the different operational schemes expected to be used, the one connecting two groups of two 500/220kV transformers each, connected to each other through the 132kV network, is especially complex: on the one hand, when a transformer is tripped, its pre-trip flow is not equally distributed among the other three; on the other hand, when a load shedding command is issued, it has only a partial relief effect on the most overloaded transformer. The determination of the adequate amount of load to be curtailed is necessary for the automatism to serve its purpose.

Evolución Mensual y Tendencia del O₃, NO₂, CO y AOD en el Área Metropolitana de Buenos Aires a partir de Observaciones Espaciales

Autores:

Tur, Verónica M; Carnero, José A Adame; Díaz, José A Dueñas

Abstract:

Air quality in large cities is one of the two biggest atmospheric problems facing today's society, along with climate change. Both phenomenon, in turn, are interconnected. The objective of this work is to analyze nitrogen dioxide (NO₂), carbon monoxide (CO), aerosols through the AOD parameter and ozone (O₃) in the metropolitan area of Buenos Aires, during the 2005-2015 period. For this, it is proposed to use registered observations with several instruments on satellites, in order to cover the lack of information that exists in general in South America.

Experiences in Teaching Basics of Quantum Mechanics with Scientific Applications in the Electronics Engineering Program: When Modern Physics Reinforces Capabilities in Third-Year Students to Understand Novel Technologies Applied in Physics

Autores:

Nieto-Chaupis, Huber

Abstract:

We reviewed experiences in teaching principles and applications of Quantum Mechanics (QM in short) in students of the electrical engineering program. Essentially we focused on the applicability of the electronics in the developing of others fields concretely in the field of quantum physics of particles commonly known as particles physics detectors and the role of DAQ systems. This paper presents experiences on the applied methodology which was used to provide to the students basic knowledge on the main principles of the quantum mechanics targeting that the student acquires capabilities to make a coherent connection between the electronics engineering contribution as a crucial component to the development of the basic sciences. Essentially this paper aims to describe the principles of QM and how it is the starting point to involve engineers students in research related to cutting edge technologies through the demonstration of the basic principles of the quantum theory in the lab. Here "lab" would denote a possible experiment for testing advanced QM models. We provide an illustrative example based on the role of the electronic engineering in the detection of subatomic particles in ongoing projects of elementary particles detection. Emphasis is paid in the role of the electronics engineering to design and built high resolution detectors.

Experimental study on the selection of access point for localization in indoor environments

Autores:

Soto-Cordova, Martin M; Manco-Vasquez, Julio C

Abstract:

Nowadays, the popular adoption of smart phones has enabled the development of several location-based applications such as indoor localization for shopping centers, airports, hospitals, among others. Typically, these services are based on Wireless Local Area Networks (WLANs), where the selection of access points (APs) plays an important role for the localization accuracy. In this paper, we evaluate different criteria of AP selection as well as the number of required APs, the impact of AP power transmission and the usage of different frequency bands. The results are obtained by means of experimental evaluations that provide more realistic comparisons. Finally, we provide novel guidelines for the design of improved indoor positioning systems.

Experimentos de sensibilidad del modelo WRF a cambios en entornos computacionales

Autores:

Lighezzolo, Andres; Martina, Agustín; Zigaran, Gonzalo; Viscardi, Dardo Ariel Vinas; Lio, Estefanía Nievias; Rodriguez, Andres; Montamat, Ignacio A; Saffe, Jorge N; Poffo, Denis A; Caranti, Giorgio M; Comes, Raul; Ingaramo, Ricardo

Abstract:

Numerical weather prediction models are a fundamental tool for the prediction of severe hydrometeorological events that, as is known, they produce negative socioeconomic impacts. Moreover, its application has expanded to several branches of science and technology. Currently it is possible to find a great variety of numerical weather prediction models, one of these models is the Weather Research and Forecasting Model (WRF). One of the benefits of this model is that it allows its execution from personal computers to high performance systems (HPC). It also allows you to choose a wide range of parametrizations to represent the physics of the model. The model is sensitive in its final results to changes in parametrizations as many authors have shown. In this work was executed the WRF model, at 4km of horizontal resolution, in order to detect and quantify possible changes in the forecasts due to different computational environments, always executing the same test case. The differences found for the same simulation were compared with the differences produced by a change in a parametrization. The results show the existence of differences between the forecasts calculated in the different platforms, which in some cases can be comparable with those generated by a change in a parametrization.

Filtrado de clutter terrestre en radar meteorológico con intervalos de repetición de pulsos alternados

Autores:

Rosell, A Collado; Areta, J

Abstract:

In weather radar applications, Doppler processing techniques are used to determine parameters of interest from atmospheric phenomena, such as the average power of the signals that produce their reflections and their average speed. In the present work a technique of reconstruction of the digital spectrum was implemented from a set of data acquired at different sampling rates, which was used in conjunction with the adaptive processing algorithm based on the Gaussian model (GMAP) to determine the spectral moments of the reflections produced by atmospheric phenomena. Both methods were implemented and their joint performance was evaluated through numerical simulations. In particular, two different sampling rates were considered and as a measure of performance, the mean and the standard deviation of the estimated moments were used. The results show that the combination of these two algorithms present a performance comparable to that of GMAP with uniformly spaced samples.

Gender Recognition using 3D Human Body Scans

Autores:

Pablo, Navarro; Bruno, Pazos; Celia, Cintas; Virginia, Ramallo; Rolando, Gonzalez-Jose; Claudio, Delrieux

Abstract:

Requirements of 3D information about the shape of the human body are growing rapidly, not only in ergonomic studies or design, but also in health-related applications. For this, a basic step is automatic gender determination. This represents an essential feature during measurement and interpretation of the data, both to perform various analyses (for example, to establish the somatotype or to assess the proportion and distribution of fat and other tissues), as well as for the appropriate diagnosis of medical conditions (evaluation of overweight, detection of malformations, etc.). Most related works deal with gender recognition by means of supervised learning based on different datasets in order to automate this task. Some focus on the analysis of facial measurements, while others focus on the processing of real-time images of silhouettes. In this work we propose a gender classifier based on analysis of 3D meshes of the human body. We describe the pre-processing techniques used, along with the supervised learning algorithms that allow solving the classification task. Finally a comparison is made between the results obtained with two different learning models: support vector machines (SVM) and decision trees.

Generador de Inducción Autónomo Alimentando Cargas no Lineales y Desequilibradas

Autores:

Benítez, Aldo J; Botteron, Fernando; García, Guillermo

Abstract:

Is propose an excitation system for autonomous induction generators that feeds non-linear and unbalanced loads. The generator is composed of an induction machine (IM) of the squirrel cage type, the excitation system has a capacitor bank and a four-wire converter connected in parallel with the IM. The control algorithm of the excitation system is based on the Instantaneous Reactive Power theory, which allows the converter to inject the reactive power required for the excitation and voltage regulation of the IM; also it allows to compensate the harmonics and imbalances introduced by the loads. In this way, the voltages and currents that circulate through the IM will be sinusoidal and balanced, reducing losses and torque oscillations, increasing the performance and useful life of the generation system. Simulation results are presented that demonstrate the viability of the proposal.

Generalización espacial de modelos epidemiológicos basada en el concepto de Distancia Ambiental Normalizada NED

Autores:

Scavuzzo, J M; Espinosa, M; Fino, E A Di; Abril, M; Peralta, G; Scavuzzo, C M

Abstract:

Landscape epidemiology is a discipline that tries to find answers to epidemiological issues, based on a holistic and spatial view of the problem. This is usually used in air, water and vectors borne diseases, as is the case of Dengue whose vector is a mosquito. Models of these relationships are constructed from a set of field data and variables derived from satellites. The problem appears basically because the number of places where field data are available is usually limited. In this work we propose to redefine the concept of "closeness" or more generally "distance" to move from a geometric or geographical fact to evaluating as an eco-epidemiological feature. Thus we define the Normalized Environmental Distance (NED) as a multidimensional distance based on environmental variables relevant to the problem under study. We show how to calculate this distance, based on information derived from satellites, and how use it in the context of models for dengue.

Gestión de la Propiedad Intelectual en Serious Games

Autores:

Zapirain, Esteban Aitor; Massa, Stella Maris

Abstract:

The aim of this work is to perform an analysis on Technology Transfer strategies for the development of Serious Games at Public National Universities. The results can be extrapolated to other research topics and institutions.

Hacia la Implementación Operativa del Índice de Peligro de Incendios FWI Basado en el Modelo WRF de Alta Resolución

Autores:

Rodriguez, Hernan; Lighezzolo, Andres; Martina, Agustin; Zigaran, Gonzalo; Viscardi, Dardo Ariel Vinas; Rodriguez, Andres; Baudo, Fernando; Scavuzzo, Carlos M; Bellis, Laura M; Arganaraz, Juan P

Abstract:

Wildfires represent an important issue in Argentina and their management strongly depends on the possibility of having all the resources ready to be used at the right time. To this purpose, the availability of fire danger indices becomes essential. In previous work, the authors implemented the Australian index FFDI (Forest Fire Danger Index) for the Southern Cone, based on a weather forecast model at 16 km of spatial resolution. In the present paper we present the design of a platform for the generation of a fire danger forecast, based on the Canadian index FWI (Fire Weather Index), which is the one used by the Federal System of Wildfire Management of Argentina. Through this platform, FWI is automatically estimated based on the weather forecast of 24 and 48 hs of the Weather Research and Forecast (WRF), run at 4 km spatial resolution for the central region of Argentina. Data of temperature, wind, air relative humidity and rainfall of the previous 24 hs are necessary to calculate FWI. Even though the system is in an experimental phase, preliminary results show good ability of our FWI product to identify areas with higher probability of wildfires. The system will include a component of visualization, automatically exporting raster outputs to web pages (PNG format) and webgis servers (Geotiff format) available at the institutions involved in this project, where the product will be available to download.

Impacto de la Utilización de Bancos de Baterías en una Red Eléctrica con Alta Penetración de Generadores Basados en Energías Renovables

Autores:

Sanseverinatti, Carlos I; Loyarte, Ariel S; Clementi, Luis A; Vega, Jorge R

Abstract:

This work investigates the impact of battery banks on the optimal power dispatch of electrical networks with high penetration of wind power and photovoltaic generators. The work aims at determining the performance of storage systems in terms of their capacity for improving the voltage profiles in all network nodes. Several network configurations were analyzed, either in absence of battery bank or with banks of different sizes and locations. The results show that the inclusion of an energy storage system of adequate size and distribution contributes to improve the voltage profiles in the network nodes.

Implementación de un Método Combinado para la Eliminación de Ruido en un Sistema de ECG de 12 Derivaciones Basado en el Módulo Computacional Intel Edison y un ADS1298

Autores:

R. Huamani R. , Jorge Rendulich Talavera and Nelly M. D'avilaz

Abstract:

Electrocardiogram (ECG) is a record which it represent the electrical activity of the heart and is a non-invasive and fast method for cardiovascular diseases diagnosis (CVDs). The ECG signal can be represented by 12 leads which are necessary for a correct diagnosis. Due to the low amplitude the ECG signal is susceptible to various kinds of noises, mainly muscle artifacts (MA), power line interference (PLI) and baseline wander (BLW). In this paper we implement a combined method based on Intel Edison computer module and an ADS1298 integrated circuit (IC). The embedded noise filtering was in real-time combining; the subtraction-procedure-based method for removal PLI and an improved integer coefficients Infinite Impulse Response (IIR) filter for removal BLW. We performed experiments in MATLAB using the Physionet MIT BIH ECG database to compare the signal to noise ratio (SNR), root-mean-square error (RMSE) and time response with different noise amplitudes. The results obtained validated the combined method, allowing its implementation on Intel Edison computer module.

Implementación de un Seguidor del Punto de Máxima Potencia en un Aerogenerador con DsPIC

Autores:

Gaston, R; Maximiliano, E

Abstract:

This paper presents the implementation of a tracking system for the maximum power point with a fixed-step perturbation and observation algorithm and a variable-step one, applied to a wind turbine isolated from the network. The system has a permanent magnet generator, a DC-DC converter and a resistive load. The validation of the proposed system is done experimentally through the proposed system and a wind emulator.

IMPLEMENTACIÓN Y DESARROLLO DE UN MÉTODO HOLOGRÁFICO DIGITAL PARA LA DETERMINACIÓN DE SUPERFICIES DE NIVEL

Autores:

Bertoluzzi, Leandro; Spector, Mario Pablo; Brühl, Sonia P; Vincitorio, Fabio Miguel

Abstract:

Stainless steel is widely used in the chemical, medical, food, automotive, hydraulic, oil and gas industries. This metal presents good resistance to wear and corrosion. Their properties depend essentially on the surfaces, which are exposed to wear, friction, corrosion and combined phenomena. To improve the surface properties without affecting the mass properties, plasma-assisted techniques such as ionic nitriding can be used. These techniques are constantly evolving, so in the research processes it is necessary to have characterization tools. Among the most used are confocal microscopy, electron microscopy, optical surface analysis, etc.

Implementation of a Gamified Puzzle Based on Pro-origami Protein Structure Cartoons: an Experience in Virtual Reality

Autores:

Besoain, Felipe; Jego, Liza; Arenas-Salinas, Mauricio

Abstract:

The use of technology in the classroom enhances the learning process of students. In biology, several complex processes cannot be explained in an easy way in the classroom or in a wet laboratory experience. One alternative to this issue is the use of in silicon simulations. The Pro-origami software allows users to represent complex protein fold structures using 2D topology diagrams. This makes it easier to understand the role of 3D structures in the function of a protein or in a drug interaction. This 2D representation can be the base for the development of an interactive experience for undergraduate students to understand complex interactions between proteins and other molecules. We developed a virtual reality experience with game concepts for the HTC VIVE device designed for students, allowing them to participate in the building of protein folds using the topology representation for several main proteins (e.g. HIV). To test the software, we performed usability tests with 8 Bioinformatic students in order to evaluate the usability and user experience. The results indicate that the virtual reality platform is effective and efficient, and it helps for an easy understanding of complex protein structures.

Improvement of a system for 2-D optoacoustic imaging using a deconvolution filter

Autores:

Gonzalez, M G; Rocca, P Massaro; Brazzano, L Ciocci; Acosta, E; Santiago, G

Abstract:

The detection system for optoacoustic tomography (OAT) usually employs broadband piezoelectric sensors based on polymeric materials. Polyvinylidene fluoride (PVDF) and its copolymers are amongst the most popular ones. Within our knowledge, the existing reconstruction algorithms for OAT neglect the electrical and mechanical relaxation processes of the polymeric material. In a previous work, it was found that the ultimate limits of the polymeric sensor performance are given by the material properties. In this work a deconvolution filter, that minimizes the distortions introduced by the sensor, was developed based on a parametric model. This filter was used in a reconstruction algorithm based on the backprojection method with simulated signals from an 2-D OAT. The results show that it is possible to obtain a remarkable improvement in the resolution of the image.

Improving Energy Costs of a Water Treatment Plant through Optimal Energy Management

Autores:

Alemany, Juan Manuel; Donolo, Pablo; Angelo, Cristian De; Magnago, Fernando

Abstract:

We propose efficient control strategies for deciding the amount of energy that water pumps need to be scheduled overtime with the objective of minimizing the Peak Charge and the Energy Charge components of the water treatment plant electricity bill. We consider first the case where the plant power demands throughout the whole billing cycle are known and we present an optimal peak shifting control strategy. We then propose an efficient control strategy when we only know predictions of the electricity demand in a short duration in the future. Several comparative studies are conducted based on real traces from a Water Treatment Plant in order to validate the proposed techniques.

Improving the selection of IQF raspberries in processing lines: a Virtual Reality approach for training and selecting personnel

Autores:

Cervera, Manuel; Grandon, Natalia; Rivera, Marco; Besoain, Felipe

Abstract:

The global agro-industry represents one of the fastest growing industries in the automation of process plants. However, there are some processes that still are done by hand in the process line. In this context, the IQF berries selection for exportation faces different problems related to the performance and the quality selection in the production lines. These problems happen mainly because the personnel is training on the go, generating a reduction of 15% of the production and an error of classification of 10%. Using virtual reality technology as a tool for generating immersive experiences, we design and develop a serious game prototype for the training of personnel for the correct classification of IQF raspberries in a process line. In this work, we will describe the process, as well as the architecture, models, and technology used during the development of the software with a local company.

Indoor Positioning based on RSSI of WiFi signals: how accurate can it be?

Autores:

Campeon, J P Grisales; Lopez, S; Moldovan, H; Parisi, D R; Fierens, P I

Abstract:

There is abundant literature on positioning systems based on WiFi signals. Most of the systems with off-the-shelf hardware use RSSI measurements. In this paper, we try to determine the highest achievable accuracy of such systems. Instead of resorting to a theoretical analysis, e.g., Cramér-Rao or Ziv-Zakai bounds, we apply state-of-the-art localization algorithms to measurements in a well-controlled experimental setup. We conclude that an accuracy of less than 1 meter seems unrealistic.

Integración de Bases de Datos Relacionales en la toma de decisiones éticas para vehículos autónomos terrestres

Autores:

Juarez, Gustavo E; Caceres, Marta Yélamos; Menendez, Franco D; Lafuente, Cristian; Franco, Leonardo; Perez, Jorge O; Rivero, Cristian Rodriguez

Abstract:

The present work is part of the integral evaluation of contents of the subject Databases of the Computer Engineering career, Department of Electronics, Electrical and Computer Science of the Faculty of Exact Sciences and Technology of the National University of Tucumán, which is based on two fundamental axes: the first one considers the modification of the curricula based on students' skills and the second requires the integral use of concepts such as data abstraction, database modelling, code implementation, and elementary concepts of expert systems from the Artificial Intelligence subject. The inclusion of ethical concepts in rules within the knowledge bases, with a high impact factor when making decisions, corresponds to a change of paradigm that is incorporated into this practice in engineering education.

Interfaz de Realidad Virtual Basada en Unity3D para Rehabilitación con Sistemas BCI por Imagería Motora

Autores:

Claucich, Catalina; Carrere, L Carolina; Tabernig, Carolina B

Abstract:

An approach to rehabilitation therapy of stroke patients is to promote neuronal plasticity by providing users with information that allows them to re-learn motor skills. To this mean, systems combining Brain Computer Interface based on motor imagery (MI-BCI) with virtual reality (VR) have been developed. These systems translate the user's motor intention detected in the electroencephalography recording into a control signal, which activates a feedback module. This module should provide patients with visual feedback in realtime immersive environments, in order to motivate them during therapy and make them feel part of the virtual environment. This article describes the design and development of a VR interface, which could be used as visual feedback in a MI-BCI system during the upper and lower limbs rehabilitation of stroke patients. In order to design the VR feedback interface, characteristics that would promote the patients neuronal plasticity were considered: (a) a motivating and attractive VR interface presenting an avatar that resembles to the patient; (b) the possibility of executing functional tasks related to the skills that need to be rehabilitated; (c) real time communication between the user and the virtual environment. In addition, technical design requirements were considered: (a) real time communication between the MI-BCI system and the VR interface; (b) a VR interface that could be used in a computer device with limited resources. As a result, the VR interface, which was developed using Unity3D and satisfied the design requirements, is presented.

Linear and Non-Linear Compensation in High Capacity Optical Communication Systems

Autores:

Battocchio, Evelin; Morrone, Juan L Moreno; Rossini, Laureano A Bulus; Pascual, Juan Pablo; Caso, Pablo A Costanzo

Abstract:

The objective of this work is to present and analyze different digital signal processing methods oriented to compensate and mitigate the effects of chromatic dispersion (CD) and nonlinearities affecting the performance of high capacity optical communication systems. The approach was to perform the equalization using the Digital Backward Propagation (DBP) and Volterra filters methods. Offline processing routines were developed. Simulations were performed for different optical communications links scenarios with frequencies up to 100 Gbps and lengths between 800 y 2400 km. The methods were compared according to their performance and computational complexity.

Linear piezoelectric sensor for optoacoustic tomography: electroacoustic characterization

Autores:

Gonzalez, M G; Abadi, B; Brazzano, L Ciocci; Sorichetti, P

Abstract:

In previous work we presented the implementation and electric characterization of a broadband piezoelectric polymer sensor with linear geometry, based on a thin film of polyvinylidene fluoride. In this paper we performed the electroacoustic characterization of the same sensor through the measurement of its response to short acoustic pulses (<50 ns), using a parametric model. We determined the polymer properties (relaxation time and acoustic attenuation), the reflexion coefficients of the waterpolymer and polymer-substrate interfaces, the ultrasonic beam pattern and the sensitivity of the detector. The results of this work show that the implemented sensor is suitable for optoacoustic tomography detection systems.

Mapeo de Superficies Agrícolas en Base a Datos Espectrales y de Referencia a Campo no Contemporáneos

Autores:

Nolasco, Miguel; Bocco, Mónica; Scavuzzo, Carlos Marcelo

Abstract:

Collecting statistics from agricultural areas is a significant challenge. The mapping of land covers by using satellite images reaches very good accuracy indexes, nevertheless its dependence of reference field data limits the generation of maps in suitable time. The objective of this work was to explore the identification of areas cultivated with soybeans and corn, using reference data from other campaigns. To this end, we used Landsat 7 and 8 satellite images, the Meanshift segmentation algorithm, and the Support Vector Machine classification algorithm. As a result, we obtained a very well supported classification product, evidencing the convenience of considering the phenological stages in the determination of the classes to be used in the classification process. The contrasting morphological characteristics between soybean and corn plants, determined a key relationship between the canopy and the radiation in the near infrared spectrum, which possibly contributed to improve their discrimination.

Mapeo Sistemático de Técnicas de Aprendizaje Automático aplicadas en la Ingeniería de Requerimientos de Software

Autores:

Gramajo, María Guadalupe; Ballejos, Luciana; Ale, Mariel

Abstract:

In recent years, Machine Learning (AA) has shown potential for the development of better tools and software products. In relation to this situation, there are several proposals in the literature that demonstrate the application of AA techniques to address the activities and challenges that arise in Requirements Engineering (ER). This paper presents a systematic mapping of the literature in order to provide a comprehensive review of research detailing the uses and applications of AA for new perspectives and solutions to the problems present in ER. The results obtained highlight encouraging proposals mainly oriented to the prediction of failures and classification of requirements. However, they still need further empirical validation to be widely accepted and applied in software development environments. Consequently, this situation denotes the need to continue researching and deepening the possible applications of AA techniques in the area of ER.

Metaheurísticas aplicadas a la optimización del tráfico vehicular en el microcentro de Posadas

Autores:

Pegels, Santiago; Pegels, Sebastian; Olivera, Ana Carolina

Abstract:

The automobile has become an indispensable element in the daily life of people. In cities, the automotive fleet increases its number each year. In this context, an adequate programming of the traffic light cycles helps to reduce fuel consumption and improve traffic flow. In this paper we present the use of metaheuristics to solve the problem of the programming of the traffic light cycles in the downtown of Posadas in Misiones, Argentina. For the calculation of the origin-destination matrix of the vehicles, a methodology for its assembly with incomplete data is introduced. An analysis is made of the current situation of the traffic lights in front of the use of metaheuristics obtaining satisfactory results.

Metodología de diseño y desarrollo de Sistemas Embebidos y Reactivos Basados en Redes de Petri

Autores:

Dr. Ing. Orlando Micolini; Ing. Luis Orlando Ventre; Ing. Mauricio Ludemann

Abstract:

This paper proposes a methodology for the design and development of this kind of systems, uncoupling the logic, the fire policy and the actions, which causes the final system to be modular, simple, maintainable, formal and flexible. This makes possible the formal verification of the logic in earlier stages of development. The system's logic is modeled using the generalized state equation, which makes it possible for the resultant logic model to be executable using a monitor. The generalized state equation allows computing the non-autonomous Petri Nets' states with different kind of arcs and temporal semantics. The monitor integrates the Petri Net, the policy, and the actions, making a heterogeneous system, adding the capability to verify the system with the mathematics formalisms of the used model. In addition, a case is addressed where it becomes clear the advantages of applying the proposed methodology to the design of a pacemaker, an embedded, critical and reactive system.

Metodologías para Estimación de la Constante de Inercia de un Sistema Eléctrico

Autores:

Leiva, D A; Mercado, P E; Suvire, G O

Abstract:

Instantaneous power contribution is an intrinsic behavior of conventional Electrical Power Systems (EPS). Immediately after a disturbance, whole set of generators and motors deliver their kinetic energy stored in their rotating masses (inertial response). However, incorporation of distributed generation imposes new challenges related to reliability and stability of EPS. Replacement of conventional generators by those connected by power electronics leads to a decrease of system's rotational inertia. Reduction of the Inertia Constant (IC) mainly influences on frequency stability, resulting in faster and less damped frequency deviations than in conventional networks that could lead to EPS collapse. One way to counteract this issue is by providing virtual inertia controlling the DC / AC converters of the non-conventional generators. For covering the initial lack of power it is necessary to provide an instantaneous power reserve, generally coming from Energy Storage Systems (ESS). For dimensioning both, the power reserve and the ESS capacity, it is essential to know the system's IC and estimate how much additional inertia should be provided to prevent the system from collapsing in the face of future contingencies. This paper reviews different existing methodologies for estimation of IC of electrical networks, studying their characteristics and accuracy of their results. This analysis is aimed at having the bases to establish a methodology for sizing the necessary power reserve.

Mobile System for the Acquisition of Georeferenced Visual Information in Urban Environments

Autores:

Bussi, Ulises; Arroyo, Sebastián I.; Safar, Félix; Oliva, Damiány

Abstract:

In this work, a prototype of a system that can be mounted in a generic vehicle fleet is developed in order to automatically acquire photographs of georeferenced points of interest previously indicated by an operator. For this: 1) The OpenStreetMap tool is used as a geographic information system; 2) Different strategies for state estimation using particle filter are analyzed through computer simulations; 3) A GPS is used for position measurement and its information is merged with an IMU to increase the robustness of the positioning against losses of the GPS signal. 3) Free hardware and software tools are used to implement the positioning and image acquisition system; 4) The performance of the real system is analyzed.

Modeling the Anomalous Flux of Proteins in the Human Kidney with the Diffusion Equation

Autores:

Nieto-Chaupis, Huber

Abstract:

One of the first signals of the so-called diabetic nephropathy is attributed the anomalous flux of albumin through the zone of urine formation. This can be sustained on the hypothesis that the glucose's dipole moment would cancel the negative charges located over the inner layers of the renal glomerulus, leaving theses areas unprotected for stopping proteins and other charged compounds. In this paper, the diffusion's equation treated in cylinder coordinates is used to calculate the albumin excretion rate (AER) considering numerical inputs that feature those patients whose diagnosis of type-2 diabetes was done in more than 10 years. Our estimate is in agreement with the ones obtained with standard techniques commonly used in nephrology, with a 7% of error of model and numerical approximations.

Modeling the Bit Error Rate for Accessing Hybrid: Quantum and Classical Networks in Scenarios of the Internet of Things in Middle-Size Smart Cities

Autores:

Nieto-Chaupis, Huber

Abstract:

We estimate the Bit Error Rate for a hybrid network composed by a classical network working together to a QuantumKey-Distribution-based (QKD) network, for the concrete scenario of Internet of Things networking. Essentially we performs calculations of the probability of success call completion (PSCC) in the case where a high user mobility is performing e-banking by which is assumed that the end user requires a high confidence to carry out transactions without any risk to be monitor by external hackers or eavesdroppers. It clearly requires to achieve handover by using both classical and quantum key distribution (QKD) networks resources. We follow the fundamental sequence established by (i) probability for requesting a cell in the nearest Base Station (BS), (ii) probability for engaging a IoT network during the hysteresis time, (iii) probability of being not blocked due to a high number of calls requests given by the services that offers a IoT network, and (iv) probability for being engaging again to a BS. We assume that the QKD network oveys the scheme based on the Bennett-Brassard protocol (BB84) by guaranteing a high QKD hardware efficiencies.

Modelo Híbrido para la Predicción de la Radiación Solar, Considerando los Vientos Zonda, Norte y Sur en San Juan – Argentina

Autores:

Raffán, Luis Carlos Parra; Romero, Andrés; Martínez, Maximiliano

Abstract:

This paper presents a hybrid method to predict a day-ahead solar irradiation curve, under extreme meteorological phenomena (Zonda, North, South winds), existing in the province of San Juan -Argentina. The proposed method is based on an Artificial Neuronal Network (ANN) which is trained with a data-set filtered by the environmental variables that characterize the mentioned phenomena. A previously calculated ideal solar irradiation curve is modified from the forecasts generated by the ANN. This is a blended method between statistical learning methods and Numerical Weather Predictions methods (NWP) typically used to improve upon the raw forecast of a NWP model. A reduction of the uncertainty on the planning of photovoltaic plants dispatch in the province of San Juan while the meteorological phenomena take place, can be achieved with the results of this forecasting method.

Modelo Optimizado para la Estimación de Puntos de Borde en Imágenes SAR Polarimétricas

Autores:

Monferran, Daniel; Sartarelli, Andres

Abstract:

The Polarimetric Synthetic Aperture Radar is a special type of radar widely used in remote sensing since it allows capturing high resolution long-range terrestrial images. PolSAR images contain a large volume of information and are also contaminated with speckle noise which is neither Gaussian nor additive, for this reason the automatic interpretation of PolSAR images is a very difficult task. The characteristics of this noise make it necessary to use statistical methods for processing and digital analysis in this type of images. The complex Wishart distribution is the statistical distribution model most used to work with images generated from polarimetric multilook data. This distribution is indexed by two parameters: the covariance matrix and L the equivalent number of looks used to form the image. It is necessary to work with a very precise L value, this has led to research works aimed at reducing the bias in their estimation. The importance of processing times in estimating the edge points position has led to analyze and compare the processing times consumed using different estimation methods. In this work, different edge points identification techniques using the complex Wishart distribution, maximum likelihood, stochastic distances and active contours are analyzed, with the aim of reducing the computational cost in the estimation of the position of the edge points for the segmentation of PolSAR images. By applying the signal model in discrete time, optimized analytical expressions are obtained to estimate the edge points position with a lower computational cost. For the graphic visualization of the results, the region edges with B-spline curves are delineated. As a significant fact, in the particular case of complex Wishart distribution, the new analytical expression developed does not include the equivalent number of looks L. With Montecarlo experiments in simulated and real PolSAR images, the reduction of processing times is evaluated.

Monitoreo satelital de la calidad del agua en una cuenca y su relación con incendios, precipitaciones y crecimiento urbano

Autores:

German, Alba; Argañaraz, Juan; Lighezzolo, Andrés; Ferral, Anabella

Abstract:

Water has historically been considered a renewable resource, however in the last century a sustained degradation of its quality has been observed, both in continental and oceanic systems due to the anthropic impact. Added to this problem, a new global threat appears, climate change, causing severe droughts or extraordinary floods in different regions of the planet. In this framework, the management of water resources and satellite monitoring represent a central point in public policies, since they allow us to anticipate and adapt to these disturbances. In this work, satellite information is used to perform an analysis of the annual evolution of the water quality of the San Roque reservoir, Córdoba, and its relationship with the occurrence of fires, rainfall and urban growth for the period 2001-2016. Water quality is evaluated from a time series of chlorophyll-a generated with MODIS-TERRA data and previously validated for the water body of study. The constructed and burned area is calculated from the classification of LANDSAT-TM / ETM + / OLI images for the basin. Accumulated precipitation is obtained from the products of NASA's TRMM mission. The temperature in the water reservoir is also analyzed, obtained from MODIS-TERRA data. Finally, correlation analysis between the mentioned variables is studied.

Monte Carlo Simulation of NanoCommunications with the Diffusion Equation

Autores:

Nieto-Chaupis, Huber

Abstract:

We apply computational simulation such as the Monte Carlo technique to calculate observables which are of importance to characterize biological systems in the nano level such as bacteria. Essentially we focus on the calculation of the mobility of physical observables by using the Diffusion's equation. For this end we make use of the cylindrical coordinate system by which ones obtains the solutions depending on the Bessel functions. It has a certain similarity with the wellknown Jackson's potential by which the potential of a single charged object in point inside of a geometrical system based in a cylinder is proportional to Bessel functions. We assume that the electrical configuration of the fluid dynamics is dictated by the diffusion's equation. With the closed-form solutions we calculate the temporal evolutions of the fluid from the respective electric force by assuming that the nano biological system is composed by positive and negative ions. Under this view we establish the relations of nano communications from events derived purely from a Coulomb-like force. In this manner we perform Monte Carlo simulations by assuming that the nano networks are achieving nano-communications from electric repulsion or attraction forces. Thus, we estimate the net displacement of a bacteria population. This formulation might be entirely of interest for ends of advanced networking such as Internet of Nano-Things[1].

Optimization designs in patch antennas using nature-inspired metaheuristic algorithms: A review

Autores:

Poveda-Pulla, Danilo Fernando; Dominguez-Paute, Jefferson Vicente; Guerrero-Vásquez, Luis Fernando; Andres, Paul; Ordoñez-Ordoñez, Jorge Osmani; Vintimilla-Tapia, Paul Esteban

Abstract:

In this article we present a general review of nature-inspired metaheuristic algorithms with implementations in patch antenna designs. The primary focus is on Genetic Algorithm (GA), Differential Evolution (DE), Particle Swarm Optimization (PSO), Bacterial Foraging Optimization (BFO). New algorithms recently been introduced also are analyzed, such as: Firefly algorithm (FA), Cuckoo Search (CS), Bat algorithm (BA), Social Spider Optimization (SSO) and Spider Monkey Optimization (SMO). Of each algorithm, a summary of significant examples and a flowchart for a quick and easy interpretation are presented. Finally, the common characteristics of algorithms are compared, concluding in a hierarchical classification according to the efficiency of each one to solve the patch antenna problems.

Overview of the status of smart metering systems in Argentina and future perspectives

Autores:

Donato, Patricio G; Carugati, Ignacio; Strack, Jorge; Maestri, Sebastián; Orallo, Carlos; Hadad, Matías; Funes, Marcos

Abstract:

Smart grids have become a tangible reality in most of the developed countries. The implementation of a large number of pilot programs and a multi-million dollar investment by major European countries, North America and China has successfully transformed the electricity grid. However, the road that still remains to be travelled is very long and there are many years of investment and development ahead. In the case of developing countries, such as those in Latin America, the gap is even greater, although in recent years there has been a significant increase in investment in the area. This paper presents an overview of the situation in Argentina, focused mainly from the point of view of smart metering systems, which have become the basic pieces for the development of a real smart grid. Although there is currently no general implementation programme in the country, there is a slow but persistent progress through uncoordinated regional or local initiatives. This report presents a state of the art of the area, supported by data from the commercial sector, and discusses some of the possible scenarios in the short and medium term. In the analysis are considered issues like communication technologies adopted, urban and/or rural environment, etc., and the impact of smart metering devices in the daily operation of the grid.

Percepción Social de la problemática de los Residuos Electrónicos en la Ciudad de Córdoba

Autores:

Musso, Laura A Reyna; Chesini, Ezequiel; Atea, Juan J

Abstract:

Electronic waste is an emerging fraction of Municipal solid waste (MSW) and as such they are a problem that is addressed to a greater or lesser extent in different parts of the world. This waste classification includes from batteries to washing machines and refrigerators including consumer electronics. The objective of this paper is to analyze the population perception regarding electronic waste. This is done through information collected by the Computers Recycling Program of Exact, Physical and Natural Sciences Faculty of National University of Córdoba. It is generally found that an association has been made between hazard and the fraction consisting of batteries. This is seen in the accumulation of used batteries in domiciles or collection centers, avoiding being discarded along with the MSW. The technological replacement leads to the replacement of equipment, mainly cell phones and computers, without predicting what to do with this waste devices. 60% of electronic equipment users perceive that obsolete electronic equipment has some remaining value when they reach the end of their useful life and transiently store them in homes or sometimes leaves them in the streets with the intention that an informal garbage collector gives them some use, ignoring the presence of potentially dangerous elements that can contaminate the environment.

Pervasive Serious Game para el desarrollo de Competencias en Redes de Computadoras

Autores:

Felipe, Evans; Massa, Stella; Rico, Carlos A

Abstract:

Play is one of the activities inherent to the human being and of universal character. We focus on a type of video game called Pervasive Games. This type of games allows to extend the experience of the game to the real world, going beyond virtuality. The Pervasive Serious Game breaks with the game board concept, entering the context surrounding the user. Therefore it allows a customized interaction with the player depending on the educational level and / or gameplay, to other interventions for random reasons.

PLATAFORMA WEB PARA EL PROCESAMIENTO DIGITAL DE IMÁGENES SATELITALES ENFOCADA A LA GESTIÓN HIDROCLIMÁTICA

Autores:

Cara Leandro J.; Masiokas Mariano H.; Scavuzzo Carlos M.

Abstract:

The Andes mountains play a fundamental role in the configuration of the weather and hydrology of all the west of South America. Currently there is a large number of satellites collecting several kinds of environmental information in this region, and often the volume of information available is huge. This massive availability of satellite information, combined with the processing capabilities of modern computers, makes it possible to analyze large volumes of data, but strongly restricted by an advanced knowledge in spatial information management and development tools. In many opportunities this determine the type and level of detail of the analyzes that could be carried out both at a scientific-academic level and for natural resources management institutions, in different sectors of the Andes. Due to technical and operational restrictions related to processing big volumes of satellite information. A web platform for automatic processing this information was developed, and an implementation of MODIS satellite images of daily resolution was carried out. The platform will allow obtaining, in a simple and accessible way, maps and time series of different variables (snow and cloud cover, soil temperature, etc.). Thats for the entire of argentinian and chilean cordillera. The generated information has a large number of potential users and many applications, as Hidrology and Climate studies, but also for decision makers in the dump water distribution management.

Platform for the creation of dental case studies as a learning tool

Autores:

Bravo-Torres, Jack F; Tapia, Paul E Vintimilla; Gallegos-Segovia, Pablo L; Palacios-Astudillo, Ivan A; Bravo-Torres, Wilson D; Cevallos-Ludena, Cinthya M

Abstract:

Today, information and communication technologies (ICTs) have marked a significant change in the education and preparation of society. In this sense, several academic fields implement virtual tools that help to simulate real situations, preparing students in a better way. From a dental point of view, future professionals can be trained without compromising the health and safety of others. For this reason, this work proposes the development of a virtual platform for the creation and management of dental cases focused on postgraduate academia. With the help of learning resources such as x-rays, medical records, basic exams and a real patient's background, a specialist can create a case that will be presented to a student, in conjunction with a tutor, for resolution. Among the results obtained, it is possible to show the efficiency of this method of learning, based on the opinions of the students.

PMU Applications Requirements Test Framework: An Open Source Code

Autores:

Marchi, Pablo; Goldstein, Allen R

Abstract:

Phasor measurement units (PMUs) performance changes among instrument models and the data delivered to the applications may vary widely in quality. To date, there is not a clear understanding of how problems that develop in the data process path may affect the performance of synchrophasor applications. To assess the severity of these problems, we need a simulation platform capable of modeling the entire data process. The basic idea is to model and to simulate PMU measurements in presence of dynamic events in the electrical network, for then to study application's performance when different kinds of impairments are applied to the input signal. These impairments could include uncompensated effects from transformers, A/D converters, errors in the PMU estimation algorithms, problems with the communication channels, etc. The construction of such an experimental platform is under way at the National Institute of Standards and Technology (NIST). In particular, in this work, we have designed and used this open source simulator to evaluate applications to perform modal analysis, state estimation, and generator model validation. For each application, different estimation techniques were tested: Prony's method, least squares and the extended Kalman filter, respectively. Finally, we analyze these results and we elaborate on the appropriateness of the requirements imposed by the present PMU standards.

Polarimetric Demodulator Based on a Seven-Port Network

Autores:

Venere, Alejandro J; Hurtado, Martín; Muravchik, Carlos H

Abstract:

This paper presents the theoretical basis and the experimental validation of a seven-port microwave demodulator capable of measuring the polarization and the complex envelope of the incoming signal. The proposed architecture is a variant of the six-port demodulator in which four power detectors are used to generate the baseband in-phase and quadrature-phase data. This six-port technique provides simpler circuits with lower cost and lower consumption with respect to the conventional quadrature demodulator. The additional port (seventh port) in our novel design provides additional information to recover the polarization of the received signal. In the paper, the analytical expressions of the polarization and the complex envelope of the incoming signal are derived as a function of the four power measurements. A prototype of the demodulator is designed and implemented for a central frequency of 1575 MHz. Measurements validate the theory by showing good agreement between the theoretical and experimental results.

PON Monitoring Technologies based on OTDR Techniques: State of the Art and Trends

Autores:

Fernández, Manuel Pablo; Rossini, Laureano A Bulus; Morbidel, Leonardo; Caso, Pablo A Costanzo

Abstract:

Passive optical networks (PON) are cost-efficient solutions to deploy a fiber connection in the last mile and they have been massively installed. Therefore, physical layer supervision of these type of networks has become particularly important. So far, the use of an optical time-domain reflectometer (OTDR) is recognized as being the most efficient technique to characterize an optical link. However, the direct application of OTDR in point-to-multipoint networks such as PONs presents severe limitations. Hence, several OTDR-based techniques have been proposed to overcome these limitations. In this paper we present a state of the art of the employed techniques by comparing their performance and feasibility. Finally, we present a novel time-domain reflectometry technique that aims to perform a spectral analysis in PONs by exploiting the frequency-to-time mapping in dispersive media.

Práctica Orientada a la Resolución de Problemas Herramienta para una Mejora en el Aprendizaje en el Área de Electromagnetismo

Autores:

Muñoz, Claudio Marcelo; Goitia, Carlos Belaustegui; Sigwald, Martín; Bozzini, Augusto Viotti

Abstract:

These times are manifested with questions about traditional learning processes. Especially, within the field of electromagnetism, serious difficulties are observed in the learning process. In response, a work proposal is presented that, based on the articulation between courses, seeks to overcome the difficulties raised.

Pronóstico de Demanda Eléctrica con Pocos Datos

Autores:

Torres, Luis R; Larregay, Guillermo O; Catuogno, Guillermo R; Garcia, Guillermo O

Abstract:

This paper presents an application of artificial neural networks for short-term forecasting of electricity demand. A feed-forward architecture with 97 entries, two hidden layers of 100 and 70 neurons respectively, and 48 output data are used. The input data to the network are the temperature and energy demand of the day before the one you want to forecast, and the day of the week you want to predict. At the output, the predicted demand for the next day is obtained. The demand and temperature data are sampled every 30 minutes. The proposed method was designed using the tools of the MATLAB Neural Network Toolbox, and the results were analyzed by working with 21 data of the electrical demand of the center area of the Argentine electrical system.

Prototipo de Arquitectura de IoT

Autores:

Saade, Sergio Daniel; Volentini, Esteban Daniel; Paraván, Carlos Albaca; Lutz, Federico Herman; Bilbao, Javier Ignacio

Abstract:

This work presents a universal prototype for the study of possible solutions regarding the Internet of Things. First of all, the layer model proposed by ITU-T is introduced. Based on this model, we show and investigate some variants of technologies for different layers of it.

Recents Designs of Ultra Wide Band Antennas using Fractal Geometry: A Review

Autores:

Aucapiña, Josué Bernardo Benavides; Guartán, Rafael Andrés Lituma; Vásquez, Luis Fernando Guerrero; Pesantez, Paul Andrés Chasi; Ordoñez, Jorge Osmani Ordoñez; Vintimilla, Paul Esteban

Abstract:

In this article we present a study of different models with fractal geometry implemented in Ultra Wide-Band (UWB) antennas design. With different methods and geometric variants applied to this type of antennas, frequency ranges between 1-20GHz are obtained, generating an efficiency greater than 90% in its operating band, considering the variation of different parameters such as iterations, shape, slots, among other things; Bandwidths greater than 15GHz have been achieved, this has generated a wide range of applications for fractal antennas. An analysis was carried out based on the similarity of the models, the operating ranges, and the constructive characteristics, with the aim of improving bandwidth, efficiency, and radiation properties, generating options that will serve as a starting point for the development and design of antennas in the future.

Recommendation system of authorities and content based on Twitter for language therapy through data mining techniques.

Autores:

Quisi-Peralta, Diego; Robles-Bykbaev, Vladimir; López-Nores, Martín; Chaglla-Rodríguez, Liliana; Chiluisa-Castillo, Diego

Abstract:

According to latest estimations of the World Health Organization (WHO), approximately 15% of persons have some disability. From this group, a significant percentage of persons present different kinds of communication and language disorders. Additionally, it is important mentioning that language supports other essential processes in children development, such as learning, skills to interact with his/her peers, and establishing relationships. On the other hand, nowadays exist several digital platforms like blogs, twitter, and in general, social networks, where experts and practitioners contribute with contents related to speech and language therapy. For these reasons, in this paper, we present a recommender system to support the content filtering, identify experts or interest groups related to communication disorders. Our recommender uses data mining techniques to perform the contents filtering, and a clustering approach to classifying the which twitter contents are related to speech-language therapy area. In order to validate our proposal, we have conducted several tests with the support of a team of experts. The achieved results show that the recommendations of the system are useful, coherent, and understandable.

Rediseño de Trabajos de Laboratorio

Autores:

Volentini, Esteban D; Cohen, Eduardo D; Rosemberg, Guillermo

Abstract:

This article presents the latest results of the redesign project for didactic laboratories under the paradigms of mobility and personalization. The development of expansion modules for the CIAA project is described in order to use the set as low cost evaluation boards, which are given to the students so that they can carry out lab work at the time and place they consider most appropriate. Two teaching experiences are presented and analyzed, carried out with different groups of students. Finally, the convergence towards a common hardware platform is introduced, transversal to different courses, and the possibility of using the same domain in all of them is proposed, with the aim of promoting vertical and horizontal integration using Problem-Based Learning Methodologies (PBLM).

Reliability Assessment of Buenos Aires Power Grid Using Monte Carlo Method

Autores:

Carletti, Leandro; Barochiner, Darío; Pintar, Fernando

Abstract:

The Electrical Power Grid is a complex system allocating a large amount of components which have to operate simultaneously in order to deliver energy from generation facilities to consumption. Such components can suffer faults causing partial or total system collapse. The occurrence of these faults is typically random. Therefore it is necessary to consider this random nature of the system to avoid or reduce blackouts.

Self-Evaluation and Accreditation Schemes of Engineering Schools Based on the Capstone Projects Outcomes Assessment in Electrical, Networking and Systems Engineering Programs

Autores:

Nieto-Chaupis, Huber

Abstract:

Commonly a previous step towards to the accreditation of an engineering program turns out to be the self-evaluation where the program carry out schemes of observation to all edges and corners of the program [1][2]. An interesting angle of a program is in the territory of research and development where students in the last year of the program acquire capabilities to apply pure knowledge of engineering to face and solve a tangible problem. In this paper we study the different aspects of selfevaluation towards to the acquisition of the accreditation having as example the programs of electrical, networking and system engineering in young private Peruvian universities. Essentially in this paper we present a scheme of self-evaluation focused on the research activities of the so-called capstone-project which would reflect to some extent the capabilities and level or degree of efficiency of students near to complete their bachelor program. We focus in concrete in the effects of implementing research activities as part of the capstone project that would enclose individual achievements and that seen from the self-evaluation perspective would constitute a valid methodology towards to the accreditation of the program.

Sensado remoto de procesos de remoción en masa: Pautas para el monitoreo operativo

Autores:

Almendra, Brasca Merlin; Mario, Lanfri; Claudio, Carignano; Ignacio, Pascual; Romy, Schlägel

Abstract:

This work describes the basic guidelines in order to study landslides using remote sensing. There are presented three test cases in different scenarios: The first one in South Tyrol (Northern Italy), the second one in El Hierro Island (Canary Islands, Spain), and the last one in Sierras Chicas (Córdoba, Argentina).

Serious games en el aprendizaje de Redes de Computadoras. Un análisis desde la experiencia óptima

Autores:

Hinojal, Hernan; Massa, Stella Maris

Abstract:

In this article we present an experience of application of a serious game as a simulation tool for a subject of computer networks. Like games, learning is an interactive process, challenging students and having more or less explicit rules about how to acquire new knowledge or skills. The simulators are valuable didactic resources since they allow the students to face real situations in a safe context and are guided by the teachers.

Sistema de Adquisición, Procesamiento y Visualización de Tráfico Aéreo Utilizando ADS-B y Conectividad IoT

Autores:

Primo, D; Escobar, F; Badino, D; Vittar, J Rumie

Abstract:

ADS-B (Automatic Dependent Surveillance Broadcast) is a cooperative surveillance technology in which an aircraft determines its position through satellite navigation and issues it periodically, which allows tracking. The information can be received by the ground stations of air traffic control as a complement to the secondary radar system that does not need to receive a signal from the ground to emit. It can also be received by other aircraft to allow knowledge of the situation and allow self-separation. The ADS-B is automatic in that it does not require any pilot action or external input and is in turn dependent, which depends on the data of the navigation system of the aircraft. ADS-B equipment are currently mandatory parts in parts of Australia's airspace, while in the United States and Europe they are part of the aircraft that own these devices by the year 2020. Argentina is governed by ICAO regulations (International Civil Aviation Organization) and the FAA (Federal Aviation Administration) of the United States, which implies the same application times in Argentina. This paper explains the development of a receiving earth station system and decoder of the ADS-B system using an embedded platform, combining COTS (Commercial Off-The-Shelf) and associated software components. An OrangePI+ board, an SDR-RTL-2832U receiver and a LoRa transceiver were used to distribute the information to remote stations for further processing and visualization in a distributed manner.

Sistema de evasión de obstáculos para robots móviles basado en el método de fuerzas virtuales

Autores:

Gianibelli, Agustín; Carlacho, Ignacio; Paula, Mariano De; Acosta, Gerardo G

Abstract:

A basic task an autonomous mobile vehicle must perform in any environment is moving from its current position to a desired position. In order to do so, a capacity to avoid obstacles should be present. However, sensors introduce measurement errors that increase the uncertainty regarding the robot current state. In this work, an obstacle avoidance algorithm based on the methodology of the field of virtual forces for path planning will be implemented. This algorithm is based on a heuristic optimization of the balance between two design objectives: the fast convergence to the objective position and navigation free of collisions. The obstacle avoidance system will be tested on a mobile robot, the Pioneer 3at®, using its front facing sonars for sensing its environment.

Sizing Techniques applied to Network Capacity Planning

Autores:

Romano, Carlos German Carreno; Clivio, Natalia; Righetti, Claudio

Abstract:

Network capacity planning is a big issue in Communications Service Providers (CSP) because it involves big annual investments mainly in the access networks, and the methods of forecasting the growth of the average or peak usage are strongly based on measurements. In this work we present a comparison between two methods of forecasting, in order to make better predictions about the network usage: one from the classical time series analysis (ARIMA) and one with long short-term memory recurrent neural networks approach (LSTM RNN). Based on real data from a network within 2.2 M of broadband users, we present some results about costs, benefits, trade-offs and difficulties encountered in addressing these approaches.

Software Defined Optical Interferometry

Autores:

Riobo, L M; Veiras, F E; Gonzalez, M G; Garea, M T; Sorichetti, P A

Abstract:

The flexibility offered by software-defined hardware (SDH) platforms makes it possible to implement optoelectronic systems which can be readily configured to adapt to multiple high-speed optoelectronic engineering applications. Two software-defined, optical heterodyne interferometers (SDOI) were built using low-cost commercial software-defined radio (SDR) platforms. The first SDOI uses a digital television receiver USB dongle, to measure sub-nanometer periodic displacements in the MHz range. The other SDOI uses a SDR transceiver, to synthesize the optical excitation and to demodulate the heterodyne output signals. It is applied to study sub- microsecond pulsed optoacoustic signals in liquids.

Soil Erosion in Sierras Chicas Córdoba: A RUSLE Model Analysis with Remote Sensing Data

Autores:

Abbondanza, Sara; Ferral, Anabella; Laneve, Giovanni; Marzialetti, Pablo; Platzeck, Gabriel

Abstract:

In Argentina, the deforestation has reached a significant magnitude, particularly in the Chaco Serrano area. One of the main consequences of deforestation is the presence of bare soils which are vulnerable to precipitation, where runoff causes flash floods, particularly in the cities crossed by the river in Saldán stream basin, region Sierras Chicas –Córdoba. In this context geospatial techniques allow to quantify the spatial distribution and temporal evolution of prone zones to erosion based on models which incorporate climatic, edaphological, biological and anthropic variables. The RUSLE (Revised Universal Soil Loss Equation) model, calibrated by means of local factors, is used as base methodology to carry out the analysis. The calculation is made by merging satellite, archive and field information. The optical image classifications show a decrease in middle and low stratum of the vegetation cover for the period 2005-2013, a situation that directly impacts the erosion rate of soils close to urban piedmont populations.

The Usage of Jackson Electric Potential to Characterize the Electrodynamics of a Bacteria Population And Their Role Inside of an Internet of Bio-Nano Things Nanonetwork

Autores:

Nieto-Chaupis, Huber

Abstract:

We use the well-known Jackson's electric potential to characterize the dynamics of bacterial nanonetworks by assuming that all of them are achieving actions of communication from the behavior of their electric fields as well as electric forces, as consequence of the internal dynamics of their ions in processes of (Nitrogen and sugar) phosphotransferase systems (PTS) aimed to phosphate exchange that is crucial to maintain Potassium K⁺ homeostasis systems to assure virulence to colonize a host body. Under this view in this paper we propose that bacteria communication are using the free ions of Potassium to exert electric fields to others bacteria targeting a determined task. For this end we use the Jackson's potential to derive the electric forces that would allow to establish communication and achieve concrete task such as motility and chemotaxis. We worked out the idea that the static charge concentration of Potassium ions are responsible to drive communications and thus establishing a nanonetworks previous to achieve tasks of colonization among others necessities to keep the stability of a certain population of bacteria. Finally, we estimate the error bit rate (BER) for a single bacterium of length of a few micrometers. From the results we have found that the robustness of the nanonetworks would depend to some extent in the electrodynamics parameters which have been obtained as consequence of the solution of the Laplace's equation in a cylindrical coordinate system.

Three-Phase AC-DC Converters with Passive, Active and Hybrid Current Injection Circuits - Part I

Autores:

Rivera, M; Faundez, D; Kolar, J; Wheeler, P; Riveros, J A

Abstract:

AC-DC three-phase converters are very well known for having enhanced power quality with unity displacement power factor, low total harmonic pollution on the AC side, and controllable DC output with unidirectional or bidirectional power flow. The first part of this paper presents a review of several three-phase AC-DC converters with passive current injection circuits, detailing their respective topologies and characteristics.

Three-Phase AC-DC Converters with Passive, Active and Hybrid Current Injection Circuits - Part II

Autores:

Rivera, M; Faundez, D; Kolar, J; Wheeler, P; Riveros, J A

Abstract:

AC-DC Three-phase converters are highly well known for having enhanced power quality with unity displacement power factor, low total harmonic pollution on the AC side, and controllable DC output with unidirectional or bidirectional power flow. The second part of this paper presents a review of several three-phase AC-DC converters with active current injection circuits, including some hybrid configurations, detailing their respective topologies and characteristics.

Un Modelo de la Máquina de Inducción con Falla en los Bobinados de Estátor considerando los Armónicos de la Red

Autores:

Mazzoletti, Manuel A; Barruffaldi, Luis A; Potschka, Julio A; Oliveira, Mario O; Bossio, Guillermo R

Abstract:

A model of the Induction Machine (IM) considering the harmonics of the power supply network is presented in this paper. Unlike previous models that consider the effect only on the fundamental frequency component, the proposed model allows to evaluate the effect of an interturn short-circuit faults on the harmonic components. This is very useful for the development of the fault diagnostic strategies capable of isolating the stator faults of other usual disturbances in the industrial applications, such as the unbalance or distortion of the power supply voltage or the high-resistance connection, among others. The steady-state IM equivalent circuits with stator fault derived from the dynamic model in qd reference frame are presented. Finally, the behavior of the proposed model for different fault conditions and IM operations are analyzed by simulation results.

Una Estrategia de Estimación de Velocidad en Motores de Inducción de Rotor Bobinado

Autores:

Meira, M; Ruschetti, C; Verucchi, C; Bossio, J M; Bossio, G

Abstract:

In this paper, a speed estimation strategy for wound-rotor induction motors (WRIM) is presented based on the measurement of the stator current. The estimation is made by frequency tracking of the rotor harmonics present in the stator current. The speed estimation avoids the use of electromechanical sensors such resolvers or encoders that are usually fragile and expensive to install. To validate the proposal, experimental results obtained in a laboratory prototype of WRIM are shown.

Unplanned Event Impact Assessment in Multi-project (Re)scheduling through Agent-based Simulation

Autores:

Tosselli, Laura; Bogado, Verónica; Martínez, Ernesto

Abstract:

The concurrent execution of multiple projects might be affected by the occurrence of unplanned events, leaving obsolete the initial schedule resulting from the individual actions of the different agents involved. Therefore, computational tools that allow impact assessment of unplanned events or significant disturbances are necessary in order to anticipate the outcome of the interactions between selfish agents, generating a compromise solution to face the uncertainty and the dynamics of the environment. In this work, an interaction mechanism based on an agent-based simulation model to evaluate how individual selfish learning may affect the overall solution to the scheduling problem is presented. This mechanism includes an assessment process in terms of violations to project constraints, such as time and cost, where each agent learns to select their next action which represents the best response for achieving its planned objectives. Thus, each project is able to adapt its initial schedule to the changes caused by unforeseen events. The proposed mechanism is implemented and incorporated into a Multi-agent System (MAS) for the Multi-Project (Re)scheduling Problem, where decentralized interaction protocols and decoupled learning rules are used based on learning by trial and error approach. The Agent-based Simulation Model allows obtaining a new equilibrium schedule in a decentralized way, where selfish agents decide the response to other agents' actions using schedule indicators that allow evaluating the impact of each unplanned event.

UWB target classification using SVM

Autores:

Bouza, Magdalena; Altieri, Andres O; Galarza, Cecilia G

Abstract:

Ultra-Wideband (UWB) radar signals are characterized for having both high frequency carrier and high bandwidth. This makes the scattered field from the targets when irradiated with UWB pulses highly dependent of the composition and shape of the target. Our goal is to classify objects by their composition from their scattered responses. In this paper, we propose to use a Support Vector Machine (SVM) to solve the problem for distinct dielectric materials and sphere elements. For a problem considering M different materials and R radii, we compare performance of three different SVM configurations. The first one considers the general problem where each class corresponds to a different material. In this approach, each class is trained with data corresponding to all R radii. On a second approach, we classify by both radii and material. This gives a larger problem to solve, where the number of classes of the SVM is $M \times R + 1$. Finally, a third approach considers a cascade of SVMs where the first layer consists of a SVM for $R + 1$ classes, each class associated with one radius, while the second layer is composed of R different SVMs, each corresponding to a different radius, that classify between the M materials. Monte Carlo experiments are run to compare performance among the different proposed schemes. We analyze the results considering both classification and algorithmic complexity.

Valuing Risk and Flexibility of the Yguazú Hydropower Project in Paraguay

Autores:

Ferreira, F; Ríos, D; Fernández, F; Escudero, F; Blanco, G

Abstract:

Traditionally, power system planners aim to promote investments in generation and transmission capacity in order to keep pace of an increasing demand. However, if the evolution of this variable is conditioned by major uncertainties, tailored investment valuation models could help in quantifying the contribution of strategic flexibility to the value of investment portfolios of such power system activities. This is the particular case for most of the developing countries, included Paraguay, which started to develop high demand growth rates, with high volatilities, in the last years. However, the investment valuation method used by the Paraguayan system administrator (ANDE) still follows the classic NPV based approach. In that sense, this paper seeks to assess the performance of scheduled investments within the Paraguayan power system under uncertainty. Firstly, it is proposed a mathematical model of Paraguay's National Interconnected System, which considers an uncertain demand growth, by means of the Brownian Motion with Drift stochastic process. This model is applied for calculating the system's Optimal Power Flow in Direct Current (OPF-DC) during the period 2014 to 2023, with the objective of maximizing the system-wide social welfare. This allows computing the risk inherent to the execution of investments scheduled by ANDE. Furthermore, the Real Options method is applied for valuing the strategic flexibility embedded into the Yguazú hydropower project. Finally, results show that the risk levels corresponding to the execution of ANDE's investment plan are significantly low. However, it is found convenient to defer the Yguazú generation project until past 2023.

Variables Ambientales de Escala Regional Como Soporte a Modelo de Riesgo de Transmisión Vectorial de la Enfermedad de Chagas

Autores:

Porcasi, Ximena; Andreo, Verónica; Ferral, Anabella; Guimarey, Pilar; Santini, M Soledad; Spillmann, Cynthia; Hernandez, Ricardo; Serra, Andres Geuna; Aguirre, Exequiel; Gulich-CONAE, Instituto

Abstract:

In this study we present advances in the analysis of environmental variables obtained from moderate resolution satellite images and their association with infestation indexes by *Triatoma infestans* (vector of Chagas disease). The environmental variables considered are the result of climatology and anomaly summaries derived from MODIS sensor time series (products MOD11A2 and MOD13A2) for the period 2000 to 2015), land use from Serena and precipitation from TRMM.

Voltage Stability Assessment Using Synchronized Phasor Measurements Applied to the Argentine Power System

Autores:

Estevez, P D Gill; Elizondo, M; Galarza, C

Abstract:

This paper presents tests of different methods for long term voltage stability analysis based on PMU measurements. In particular, Thevenin Impedance Matching and sensitivity calculation are studied. Simulation are performed in a Argentine power system model, modified to include the main components for studying long term voltage stability. In particular, Disconnection of a large Thermal Generating Station causing long-term voltage instability at Gran Buenos Aires Area is studied. It is shown that computing the apparent impedance of Thevenin equivalent at a load bus from measurements taken at a single time but at various locations of the transmission corridor produce a significant reduction of the estimation error respect from the case when only local measurements are used. Voltage Stability analysis is performed using a reduced power system model with changing parameters that are computed only with PMU data at each time. Voltage stability index and sensibility calculations are performed using this reduced power system model.

Volterra Convolution as Tool to Assess and Forestall Flooding and Aftermaths Along the Far Coast Peruvian

Autores:

Nieto-Chaupis, Huber

Abstract:

We use the formalism of Volterra series as a tool of probabilities in order to assess the risk's level in those far coast Peruvian cities under a potential risk to the affected due to imminent arrival of climate phenomena such as "El Niño" that have seriously affected populations located along the Peruvian coast from past decades having been the most recent impact on the 2017 summer. Essentially we follow the methodology given by: (i) we propose the Volterra formalism, (ii) we test the most suitable probability distribution, and (iii) we adjudicate a physical meaning to the resulting output. For this end we establish that the input function is related to distances to be in risk by flooding in urban areas. Our proposal of perceiving a Volterratabased probability theory is founded on the basis that the input probability distribution functions are convoluted together to their Volterra kernel that in this analysis are denoted by orthogonal polynomials. We apply this formalism to assess risk in Urban areas located along the far north cities in Perú . Our approach has turned out to be validated as to identify those zones of risk inside the main urban zone of the Tumbes city. The identified zones corresponding to those areas that might be characterized by being very sensitive to the flooding.

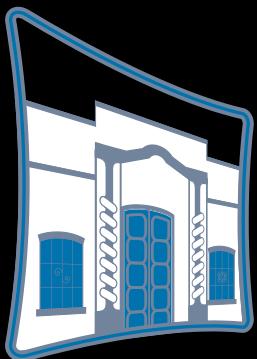
Weather Radar Spectral Estimation Using Sparse Models

Autores:

Garcia, Manuel Redondo; Hurtado, Martin; Pazos, Sebastian; Muravchik, Carlos H

Abstract:

In weather radar systems, the echoes from the weather phenomena can be contaminated by ground reflections (clutter). If this interference is not properly removed, it produces biased estimates of the meteorological variables, or it can even hide the signal of interest. In this paper, we analyze different formulations of sparse models for estimating the Doppler spectrum and spectral moments of the radar signal. The performance of the sparse models is compared with classical ground clutter filters using synthetic data; and then validated using real data provided by INVAP through their weather radar located in Bariloche.



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