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RESEARCH AND DESIGN**Implementation of Nonlinear Model Predictive Control Based on FPGA.....(1)***Han Huiting, Li Dewei, Xi Yugeng (Department of Automation, Shanghai Jiao Tong University, Shanghai 200240, China)*

Abstract: Nonlinear model predictive control (NMPC) is an effective control strategy where application of nonlinear optimization methods is essential. In order to achieve effective control of such objects, this paper studies the implementation of nonlinear model predictive controller on FPGA, which, with high flexibility and adaptability, can be used in industrial control. In order to meet the feasibility requirements of industrial control, this paper proposes an improved SQP algorithm, which could be applied on FPGA with limited computing resources, to get the feasible solution of NMPC optimization problem in each sampling interval. The simulation results show that the controller with algorithm can achieve good performance on both speed and accuracy.

Key words: Nonlinear Predictive Controller, FPGA, Feasibility

A Tele-operation System of Multi-view Robot Based on Augmented Reality.....(5)*Zhou Mingzhu, Chen Yimin, Wang Di, Xu Shen, Huang Chen, Wang Xichen (School of Computer Engineering and Science, Shanghai University, Shanghai 200072, China)*

Abstract: In traditional robot control system of single-view based on Augmented Reality, the following problems can seriously affect the overall performance of the system: insufficient depth information, failure in overlap of robot model video to real robot video due to hidden mark, and bad quality of video results from a congested network. To solve the mentioned problems, this paper proposes a robot control system of multi-view based on augmented reality. A refined network congestion control policy is also presented. Experimental results show that compared with traditional system, system is more stable in video overlap and improves accuracy of user operation.

Key words: Multi-view, Augmented Reality, Tele-operation, Robot

Performance Analysis and Research of Cooperative Spectrum Sensing under the Imperfect Report Channel.....(9)*Wang Chao, Jiang Zhong (Key Lab of Specialty Fiber Optics and Optical Access Network, Shanghai University, Shanghai 200072, China)*

Abstract: This paper analyzes the performance of cooperative spectrum sensing under the non-ideal report channel. A new cooperative spectrum sensing scheme is proposed based on the improved energy detector. The improved energy detector selects the sum of any positive p power of the signal samples as the test statistics. Each cognitive user sends the local decision to data fusion center, which takes the final decision of the presence of the authorized user using the OR rule. According to the non-ideal report channel, the closed-loop expression of the number of collaborating cognitive users is derived by minimizing the error probability. And the value of p is obtained by numerical simulation when the error probability is least. Numerical simulation results also show that the probability of detection increases with the raise of the value of p .

Key words: Energy Detector, Spectrum Sensing, Error Probability, Cognitive Radio

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Abstract: On the basis of contour extraction of fragments, a novel contour matching algorithm was presented, which is a curve matching framework for planar open curves under similarity transform based on a new scale invariant signature. The signature is derived from the concept of integral of unsigned curvatures. The main idea behind this method was firstly to utilize integral of unsigned curvatures to calculate point wise curvatures, and the feature points were selected. The segments consist of the feature points. The Hausdorff distance between feature segments indicated their match degree. If the Hausdorff distance is less than the given tolerance, the contour is matched. The contributions of the paper are the new signature as well as faster algorithms for matching open 2D curves. The method proves to be effective by realistic experiments.

Key words: Contour Matching, Integral of Curvatures, Hausdorff Distance

Based on the Constraint Conditions of Wireless Sensor Network QoS Routing Algorithm.....(17)*Yin Guofu (Mathematics and the Information Science Institute, Weinan Normal University, Weinan 714000, China)*

Abstract: Many constraints QoS routing is wireless sensor network multimedia key problems to be solved. This problem has been proved to be NP problem. All analysis the cable sensor network use polynomial time and pseudo polynomial time heuristic path selection algorithm exist the characteristics of high complexity, not suitable for wireless sensor network multimedia. Put forward based on the improvement of the simulated annealing constraint QoS routing algorithm, the selection of control parameters T attenuation function and control parameters of final value T_f the two important parameters optimization, structure of a more subtle cooling time schedule. The analysis shows that the algorithm is a kind of high efficient path selection algorithm, without sacrificing the algorithm complexity, can improve the quality of the final solution.

Key words: Path Selection, Energy Limited, Polynomial Time Algorithm, Cooling Schedule

Status Analyzing and Strategy Studying on the Internet of Things for Port in Ningbo.....(20)*Cheng Xuelin, Lin Xiaofeng, Gan Honghua, Hu Zhongzhou, Lu Jiang, Zhao Chen (College of Software Technology, Zhejiang University, Ningbo 315103, China)*

Abstract: As the center of modern integrated logistics, port has become more important for the economical development. Applying the new technology internet of things (IOT) is an important means to promote the development of port. To build the modern port of Ningbo more quickly, the Ningbo Port has

start to study and analyze techniques and projects using IOT This paper firstly describes the status IOT techniques applied at Ningbo Port, and then illustrate both the advantages and disadvantages of Ningbo port for IOT building Based on the analysis, a concrete proposal is presented to develop the IOT at Ningbo Port

Key words: Port, Internet of Things, Intelligence, Strategy

Research on Architecture Modeling of the Cloud Computing Federation.....(23)

Yang Xinfeng, Liu Kecheng (Department of Computer Science and Technology, Nanyang Institute of Technology, Nanyang 473000, China)

Abstract: The architecture of the Cloud Computing Federation has significant effect on the design, realization, and the efficiency of resource management in Cloud Computing Federation As the components and the running of the Cloud Computing Federation has the typical characteristic of the Complex System, therefore, based on the Emergence theory and Complex Network theory, this paper uses the Complex Network theory to model the architecture of Cloud Computing Federation, and presented in this dissertation a Cloud Computing Federation architecture model called Region and Complex Network theory, and carries out a detailed research of the resource announcement and resource discovery mechanisms of the model

Key words: Cloud Computing Federation, Architecture, Modeling, Complex Network Theory

Design of an Experimental Platform for Wind-solar Hybrid MPPT Power Generation System.....(26)

Cao Yan, Tian Zuohua (School of Automation, Shanghai Jiao Tong University, Shanghai 200240, China)

Abstract: In this paper, an experimental platform for wind-solar hybrid MPPT power generation system is presented The output power characteristics of wind and solar system are discussed in details This paper uses DC motor to simulate wind turbine and tungsten to simulate solar power generation A combination of Boost /Buck as DC /DC circuit is promoted and three algorithms are realized Finally, a product of this platform is successfully developed and makes a good performance

Key words: Wind-solar Hybrid Power Generation, Wind Turbine Simulation, Solar Power Simulation, MPPT Control

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Nan Zhimin, Qian Songrong (School of Information Science and Technology, Fu Dan University, Shanghai 200433, China)

Abstract: Users' interest model is set up to reflect users' interest with quantitative methods when users are browsing webpage The interest model is used to recommend articles to users later On the basis of the preview studies, user interest model in this paper introduces time slicing and time decay mechanism to improve update efficiency and reflect interest drifting Experimental results show that the optimization of user interest model obviously improves the system efficiency and better reflects users' interest drifting, which further improves the accuracy of the interest model recommended articles

Key words: Interest Drift, User Interest Model, Time Slicing, Time Decay

Design and Research of Wireless Access Control System Based on ARM.....(33)

Yan Xiyun, Zhang Tengyu, Yan Yan (School of Computer and Information, Ho Hai University, Nanjing 210098, China)

Abstract: As traditional access control systems have shortcomings such as single function, inefficient, wiring complexity and so on, this paper proposes a wireless access control system based on ARM In this system, the communication between the host computer and access controller is by wireless, instead of the wired to avoid a series of problems caused by wiring The key control chip of the Access controller is ARM, instead of traditional single-chip microcomputer, which does not only increase processing speed and storage capacity, but also increases hardware resources It can support more peripheral circuit and realize more function, so it can better meet the needs

Key words: Access Control System, Wireless Communications, ARM, RFID

Adaptive Filtering for White Noise Suppression Based on Immune Algorithm.....(36)

Tong Xiaorong (College of Mathematics and Information Science, Weinan Teachers University, Weinan 714000, China)

Abstract: Signal transmission is often subject to the disturbance of white noise and high-order harmonic, Owing to the spectrum of white noise can be found in the real number field, It is often difficult to filter out with the traditional filter This article describes the principle of adaptive filter and the methods of white noise, high-order harmonic suppression using adaptive filter Using the immune algorithm to optimize the weight vector of the adaptive filter, and then using the method of the mean filter to further filter, finally, this paper simulate the algorithm by MATLAB Compare the simulation results of LMS filtering algorithm and adaptive filtering based on immune algorithm Simulation results show that the filter can effectively suppress white noise

Key words: Immune Algorithm, Adaptive Filtering, White Noise, MATLAB

Development of A Blood Oxygen Saturation and Heart Rate Signal Collector of Sleeping Environment Regulating System..... (39)

Huang Junjie¹, Sun Xiao¹, Liu Yan¹, Huang Yaoliang² (1 Zhongshan School of Medicine, Guangzhou 510080, China, 2 Sun Yat-sen University, Guangzhou 510080, China)

Abstract: Sleep is the rest stage for energy recovery and storage after daily activities The sleep quality in this stage is closely related to health Temperature, humidity, oxygen content, noise, illumination, anion, etc of the sleeping environment are connected with the sleep quality tightly In order to gain better sleep effect, it is necessary to provide sleeping environment which can be automatically adjusted according to physiological parameters This paper designs the blood oxygen saturation and heart rate signal collector using MSP430F2274 and CC2500 as core module based on the development tool eZ430-RF2500 from Texas Instruments, achieves to collect process and wirelessly transmit pulse signals, and provides measurement methods of physiological parameters for the sleeping environment regulating system

Key words: Blood Oxygen Saturation, Heart Rate, Wireless, Sleeping Environment, Regulating System

A Surveillance System Based on Omnidirectional Camera.....(43)

Liu Dongdong (Department of Automation, Shanghai Jiao Tong University, Shanghai 200240, China)

Abstract: A surveillance system based on omnidirectional camera is proposed in this article Omnidirectional camera has a wide field of view, can be used to detect, track targets in a large scale PTZ camera has flexible field of view, can be used to capture detailed image of targets In this paper, omnidirectional camera is used in conjunction with PTZ cameras, detection and tracking of multiple moving objects in large scale area as well as capturing detail images of target is realized by using the hierarchical tracking algorithm, multiple sensors data fusion and multiple cameras cooperation

algorithm Experiment verified the performance of the surveillance network

Key words: Omnidirectional Camera, Multiple Camera System, Multiple Objects Tracking, Surveillance

Neural Network Prediction Model of CPI Using Firefly Algorithm Training.....(46)

Peng Wei, Wang Lei(College of Electronics and Information Engineering, Tong Ji University, Shanghai 201804,China)

Abstract: This paper uses firefly algorithm to train neural network model using for predicting consumer price index It specifies the model constructing process, train method and simulation By collecting data from Statistics Bureau, the papers sets up an algorithm model in matlab and calculate the simulating result It proves to be good in accuracy and satisfies the predicting standard The work will be positive in the macroeconomic policy decision

Key words: Neural Network, Radius Function, Firefly Algorithm, CPI, Statistics

DEVELOPMENT AND APPLICATION

Low-power Design of Automatic Meter Reading System.....(49)

Hu Minjie (Sino-German College, Tong Ji University, Shanghai 200092, China)

Abstract: Automatic meter reading system is an important component of intelligent buildings which is vigorously developing The design has chosen MSP430C336 chip as a processor to meet the design requirements, because its functions and prices are considered the most suitable In the hardware circuit design, take chips, sensors, meters and other characteristics of the properties into account In software design, the programming is completed with C430 Using C language rather than assembly language as a programming tool, can greatly improve the efficiency of software development, code reliability, readability and portability The guiding ideology of the whole design is low power consumption, simplicity and Practicability On the basis of functional improvement, select the most energy-saving design

Key words: Automatic Meter Reading System, MSP430, Sensors, C430

Design and Implementation of Snake-like Rescue Robot Front Sensor.....(52)

Jiang Maokui (Department of Automation, Shanghai Jiao Tong University, Shanghai 200240, China)

Abstract: A new snake-like rescue robot front sensor is proposed in this paper Basing on the flexible robot body, snake-like rescue robot is used for search and rescue in debris environment Rescue robot with a multi-sensor module can get more rescue information, improve efficiency and expand the search scope This module is capable of collecting video, temperature, CO2 and other sensor information It can also complete two-way audio conversation and provide LED lights for camera Experiments verified the performance of the rescue robot front sensor in man-made search and rescue environment

Key words: Rescue Robot, Multi-sensor, Post-disaster Environment, Embedded Technology

Analysis and Design of ScreenShare Whiteboard.....(56)

Chen Tiancong , Zhang Zhongneng (Shanghai JiaoTong University, Shanghai200240, China)

Abstract: Screen sharing is an important module in web conference system A Screen share whiteboard is designed based on Red 5 stream media server Backend service is implemented decoupled according to factory design pattern Real time content update is achieved by Flex SharedObject, and free pencil tool is optimized by vector approximation

Key words: Screenshare, Whiteboard, Red5, SharedObject

TECHNICAL COMMUNICATION

Application Study of AJAX Technology in the Consulting Service System for Scientific Research.....(59)

Zhang Zhengzuo, Gong Qing (Zhejiang Institute for Food and Drug Control, Hangzhou310004, China)

Abstract: A Consulting Service System for Scientific Research was designed aimed at improving user experience using AJAX technology, the core in technology of the Web2.0, with the scientific research consulting service in our institute as the background This paper introduces the working principles of AJAX and the framework of ASP.NET AJAX, studies the application of AJAX in developing the Consulting Service System for Scientific Research, and describes in detail the implementation of Auto-Completion The application indicates that the solution improves the efficiency of information input as well as convenience and enhances the users' experience using AJAX technology

Key words: Ajax, Asynchronous, ASP.NET AJAX, Auto-Completion, AutoCompleteExtender Controls

A New Image Matching Method Based on MSER and SURF.....(61)

Tang Le, Lu Linji (Department of Automation, Shanghai Jiao Tong University, Shanghai200240, China)

Abstract: Aimed at the defect of traditional image registration method, which detect the stable features inadequately, this paper proposes a new image registration method based on MSER and SURF MSER and SURF are two different feature extraction methods, and they have complementary advantages The presented method uses MSER and SURF to detect the features, SURF descriptor to represent all extracted features by MSER and SURF, resulting better features than both MSER and SURF Based on better feature representation to match the extracted features, finally the image registration obtained is much robust than traditional method

Key words: Image Matching, Feature Extraction, SURF, MSER, Scale Space, Hessian Matrix

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