AUTOMATIC CONTROL and COMPUTER SCIENCE Section

CONTENTS

Performance Evaluation of a SCADA System for Monitoring and
Controlling the Industrial Process
Simona-Anda Gherasim and Vasile-Gheorghiţă Găitan

Full text

In recent decades, SCADA systems had an exponential trend of development, being used all over the world, particularly to monitor and control industrial processes or infrastructure. This article presents a system for monitoring and control of industrial processes that is part of a complex SCADA system. Based on this system, we proposed a solution that validates the possibility of extending the functionality of MCPI client, by porting it on a real-time operating system, Windows Embedded Compact (CE). Application testing and analysis of results have validated the proposed solution.

Key words: middleware, SCADA systems, embedded systems, data stream, performance.

2010 Mathematics Subject Classification: 68M99, 68W35.

top

Research on Transient Regime of A Paraffin Actuator
Ilie Nitan

This paper presents a study on an electromechanical actuator with paraffin and Bourdon tube used in positioning applications from the electrical industry. Are shown experimental results obtained for two models of heating sources used to activate the actuator. These experiments led to the drawing of adequate and specificity characteristics which was intended for establishing actuator behavior analysis

Key words: electromechanical actuator, paraffin, Bourdon tube, Peltier element.

2010 Mathematics Subject Classification: 74A40, 82D40

Magnetostrictive Vibromotors Using Terfenol-D Alloy
Ilie Romaniuc

This paper presents the use of Terfenol-D alloy in the development of unconventional motors, i.e. vibromotors. Choosing Terfenol-D alloy in the construction of these types of unconventional motors was determined by excellent magnetostrictive properties that this alloy holds. The basic principle in achieving these magnetostrictive vibromotors consists in achieving a vibrating system consisting of a coil wrapped around a Terfenol-D rod which acts on a disk-shaped rotor in the center of which is fitted a shaft. This paper presents three types of magnetostrictive vibromotors, one that uses two rotors, a vibromotor solution with the possibility of reversing the direction of rotation and a vibromotor solution with the possibility of adjusting the rotational speed.

Key words: vibromotors, Terfenol-D alloy, magnetostrictive alloy, smart materials.

2000 Mathematics Subject Classification: 82D40.

Designing a Robot's Guidance Algorithm through Petri Nets for Following a Mobile Target Using the Data of Several Sensors
Ali KhosrAvi, Mohammad Danesh, Mohammad Khosravi

In this paper, the issue of designing the robot guidance algorithm through Petri nets is examined. The robot is due to identify a mobile target using the data of active ultrasonic, magnetic and Hall Effect sensors. The design of the guidance algorithm by use of Petri nets helps the robot choose the best sensor for identifying the target in the existing situations, thus guiding the robot toward the target. The results of evaluation and simulation indicate the effectiveness of using Petri nets. The simulations confirm the performance and efficacy of this method.

Key words: mobile robot, guidance algorithm design, Petri nets, energy saving.

2010 Mathematics Subject Classification: 93C85, 37M05.

Attitude Determination and Control of Microsatellite Using Type-1 and Type-2 Fuzzy Logic
Ali Asaee, Saeed Balochian and Saeed Heshmati

Attitude controlling has been investigated from various points of view and different controllers have been designed. In addition to respecting microsatellite limitations, control algorithm needs to have high reliability in noise. This is because of the nonlinearity, complexity and uncertainty satellite model. It is essential to use smart controllers in microsatellite control systems which don't have high accuracy attitude sensors and whose control operator does not have high capability facing turbulent torque. Since control input is a torque, attitude control system operators are torque generators. For optimal maneuver, the controlling torque applied to the nonlinear satellite system must have proper size and quality. Reaction wheels, thrusters, magnetic coils and control moment gyroscopes (CMG) are some of the most important satellite operators. In this study we have used fuzzy controllers of type 1 and 2 in three axis control with high accuracy. Finally, simulation results are given to show the effectiveness of the proposed method.

top

A New Method for Paroxysmal Atrial Fibrillation Automatic Prediction
Hariton Costin, Cristian Rotariu and Alexandru Păsărică

The main reason of this study is the long-term effects of atrial fibrillation of the human heart, which lead to increased risk of cardiac mortality. This paper presents the use of two different methods for the prediction of the onset of paroxysmal atrial fibrillation (PAF) by means of surface electrocardiographic (ECG) signal automatic analysis. The first method is commonly used and consists in the analysis of the heart rate variability (HRV) of the ECG signal. Two significant parameters are taken into consideration: the time-domain standard deviation of average five minute window of the time series and the frequency-domain low-frequency/high-frequency ratio of the ECG RR interval. The second analysis method, which is based on the morphological timing characteristics of the QRS complex, is called morphologic variability (MV) of the ECG signal, and was not used before us for PAF prediction. Both methods are applied on 198 Holter records taken from the PAF Database found on physionet.org portal. The results show a better accuracy of the MV analysis than that obtained by means of HRV technique alone. Moreover, by using an appropriate decision rule, both methods were combined and the overall accuracy of PAF onset prediction was raised up to 90%. Experimental results indicate that our method is applicable for usual Holter recordings, is robust against noise and common artifacts, and is fast enough, as it uses only 5-minute signal windows. Its high prediction accuracy is comparable with that obtained by manual annotation made by experts and is suitable to be used in clinical practice.

top