Ultrasonic Distance Meter

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Name Of Guide: Mrs. Amruta Deshpande

Abstract

The Ultrasonic Range Meter is an efficient way to measure the distance of unreachable obstacles. It is based on sending sound waves through a specific medium and observing the returning echoes to measure the distance from the device to the obstacle.

The device is divided into three parts, transmitter, receiver and the microcontroller. The transmitter consists of an electronics circuitry which generates electrical signal .In addition, an electromechanical transducer to convert electrical signal to physical form to drive through the medium, which is air. The receiver also consists of an electronics circuitry which detects the echoes bounced back from the obstacles. The microcontroller is programmed for selectivity sequence and to calculate the time of flight of the signal to find the distance and display it.

The system architecture of the Ultrasonic Range Meter was built to be cheaper, requires less power and delivers better performance. It can be reconfigured to adapt to a variety of pulsed Ultrasonic systems.

Automatic Blood Pressure Measurement

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Name of the Guide : Prof. U.M.Chaskar

Abstract

This project presents a different method of measuring Blood Pressure by automatic Non Invasive Blood Pressure (NIBP) measurement technique by oscillometric method using software tools like MATLAB and LabVIEW. A key component of such a type of measurement is to develop an algorithm and an analytical method for accurate inflation and deflation of the cuff to acquire the blood pressure values. The data acquisition part of the project is done using LabVIEW and processing of the data to point out the value of MAP and thereby calculating the systolic and diastolic is done using MATLAB. These values can then be transmitted via a Bluetooth module to any Bluetooth-compatible device thereby aiding to the virtual clinic concept. This proposed method is relatively faster and easier in computing the values and has a wide future scope in telemedicine and product manufacturing and also any institute having these tools can use this method effectively.

Boiler Drum Level Control using PLC

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Name of the Guide : Sapana Korde

Abstract

In the industrial sector power plants, the demand for high quality, efficiency and automated machines is increasing. Power plant units need to be closely monitored and supervised on a regular basis. In this Project the focus is on automating the boiler which is a crucial component of the power plant

.If we are going for automation it is also necessary to design a system that monitors the system and minimizes human errors. The system used her is SCADA-Supervisory Control and Data Acquisition which monitors and PLC (Programmable logic controller) that is used for internal instruction storage and implementation of functions such as sequencing, timing etc. to control via digital I/O modules of various types of machine processes.

PLC applications are extensively used in industry to control and facilitate repetitive processes such as manufacturing cell management, fly-by-wire control, or nuclear plant shutdown systems. One of these applications is industrial automation which includes numerous automated processes. This again includes automation of boiler which demands determination of certain physical parameters (viz. pressure, temperature, etc.) & utilizing these parameters to make the boiler start-stop or function in any manner we want, but automatically.

Electronic Water Softner

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Abstract

Scale is a coating or precipitate deposited on surfaces that are in contact with hard water. When this hard water is heated or when evaporation takes place, calcium carbonate will form scale. Practically all equipment coming in contact with hard water will be affected by scale. This scale build-up will clog up pipes, tubes, block jets and form a layer of mineral scale deposits in heat transfer surfaces. The result are billion-dollar problems for industry. Higher energy costs, serious maintenance problems and prolong damage to expensive capital equipment are all symptoms of scale build-up. Up until now, the only reliable solution is expensive chemical scale inhibitors, acid washes or water softening equipment. This all methods are expensive and environment polluting so cheapest and environment friendly solution is Electronic Water Softner.

This project deals with the hardware implementation of Electronic Water Softner , which consists of generation of variable square wave frequency with current boosting circuit. Square wave should change from 1 kHz and 12 kHz. Major Electronic Water Softner need is to break the calcium carbonate bond which is mainly responsible for formation of scale. Current boosting is required to generate the strong electromagnetic field. Also project deals with chemical testing methods for measurement of calcium carbonate (ppm).

Blood Glucose Control for Type 1 Diabetic Patient

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Abstract

Diabetes mellitus results from impaired insulin secretion from beta cells of islets of Langerhans of the pancreas. This leads to a wide variation of glucose in the body , leading to further complications. The primary aim is to control blood glucose concentration by modelling time-dependent uncertainties as stochastic processes of Ito type so as to achieve optimal control. A mathematical model of the problem attempts to explain the basic physiology of insulin utilization and glucose absorption in the body. Experimental data from a diabetic patient is obtained and glucose and insulin profiles are computed by using stochastic and deterministic control theories. The principal objective is to maintain blood glucose in the body of a diabetic patient at 4.5mmol/L.This novel technology shall have a pragmatic significance in improving the quality of life of type 1 diabetic patients.

CENTRALIZED MANAGEMENT OF DUMMY CALIBRATION LABORATORY AND DATA ACQUISITION/ANALYSIS

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Abstract

With the increasing awareness about safety among the users, and the stringent regulations that need to be followed car manufacturers these days are making all possible efforts to improve the design of the car as regards safety. Before any new model of the car is on the road it must undergo many checks and tests. Crash test is one such test. The dummies used in the crash test are dummies are full-scale anthropomorphic test devices (ATD) that simulate the dimensions, weight proportions and articulation of the human body, and are usually instrumented to record data about the dynamic behavior of the ATD in simulated vehicle impacts. This data can include variables such as velocity of impact, crushing force, bending, folding, or torque of the body, and deceleration rates during a collision for use in crash tests. Transducers in the dummy provide the physical levels experienced by the dummy. These readings are controlled and repeatable due to careful dummy design and manufacture so that the vehicle designer may use them to perfect the safety of his product. With the advent in the field of Dummy instrumentation sensors and transducers with better static and dynamic characteristics are being used. The responses of the dummies to various parameters are being captured in a better way thereby enabling car manufacturers to improve the design as regards safety.

Motion Tracking with Mobile Robot

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Name of the Guide : Dr. P.D.Shendge

Abstract

Motions of external objects should be perceived by a mobile robot to perform tasks successfully in a dynamic environment. In this work, set of algorithms are proposed for motion tracking from a mobile robot equipped with a camera and an Infra-Red sensor. The key challenges are to compensate the ego-motion of the robot for external motion detection and to cope with transient and structural noise for robust motion tracking. In our algorithms, the robot's ego-motion is directly estimated using corresponding feature sets in two consecutive images and also a velocity based feedback has been implemented to improve the performance at various speeds.

Implementation of PID Architecture in FPGA for DC Motor

Control

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Abstract

This project deals with the hardware implementation of customized Proportional-Integral-Derivative (PID) architecture using FPGA for the speed and position control of permanent magnet DC motor. This architecture is embedded in FPGA using Verilog to implement speed control loop. Controller design, synthesis and analysis are completed by Xilinx ISE software and chipscope tool. Real time interface of this architecture with DC motor is demonstrated successfully, under dynamic load conditions. Re-configurability, high degree of parallelism, robustness of solution and DSP capability, these features of FPGA are explored by the customized PID architecture. Further closed loop system is simulated using MATLAB Simulink. Comparison of simulation results with the experimental results shows the effectiveness of the proposed PID architecture.

SMART Temperature Transmitter

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Mrs. Amruta Deshpande
(Project Guide)

Abstract

Temperature is a physical quantity that is a measure of hotness and coldness on a numerical scale. In this project we are designing the SMART temperature transmitter using microcontroller and temperature sensor. We are entering the lower range and upper range value of temperature using keypad interfacing with microcontroller. Input temperature range will be converted into standard 4-20 mA output signal. The value of temperature will be displayed on LCD. We are using RTD as temperature sensing element. 2 wire bridge configuration is used to convert resistance into the voltage which will be amplified and given to the A/D converter. We are using ATmega16 microcontroller for processing the signal Also the signal from the transmitter can be used to control the temperature of a process using the controller. In this project we are trying to decrease the cost of conventional SMART temperature transmitter.

Polyhouse Automation and Wireless Data Transmission

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Name of Guide :-Dr. C. Y. Patil

Abstract

Control and monitoring of environmental parameters inside a Polyhouse farm, so as to ensure continuous maintenance of favorable crop atmosphere is the objective of the work presented in this paper. The concept encompasses control of process parameters of a Polyhouse, such as temperature, humidity, solar radiations, micro irrigation by incorporating different mechanisms (for example, toggle on/off control of pumps and accessories, louvers and ventilators, air flow rate, sunlight management, etc.).

In this project report, we present an automatic monitoring system to prevent environmental conditions a Polyhouse deviating from predetermined range suitable for particular crop. The system is composed of sensor nodes for collecting data, base nodes for processing collected data, relay nodes for driving devices for adjusting the environment inside greenhouse and a display device to indicate conditions inside the Polyhouse. We also constructed a physical model resembling the typical greenhouse in order to verify the performance of our system with regard to environment control.

Robust Control System Development for Unmanned Ground Vehicle

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Abstract

An Unmanned Ground Vehicle (UGV) system has different mobility, manipulation capabilities and perception abilities. The resultant high-performance and robustness of the control system are achieved by using a sliding mode controller (SMC). Unmanned Ground Vehicles (UGVs) have the potential for performing a large number of tactical behaviours, including road, area, and zone reconnaissance. Fundamental to these behaviours is basic navigation that is, moving from one point to another on the terrain. To move from A to B, the UGV selects a route that minimizes some objective function, such as distance travelled, energy consumed, risk incurred, and intelligence gained. A dynamic model for an unmanned ground vehicle (UGV) is developed and a sliding mode controller is designed to account for modelling uncertainties. The system is simulated and validated experimentally by implementing the controller in real time. The simulation results are compared with the results obtained experimentally.

Boiler Drum Level Control using DeltaV

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Name of the Guide: (Mrs. Meera Khandekar)

Abstract

A boiler is a closed vessel in which water or other fluid is heated. The heated or vaporized fluid exits the boiler for use in various processes or heating applications. Instrumentation and controls in a boiler plant encompass an enormous range of equipment from simple industrial plant to the complex in the large utility station. The boiler control system is the means by which the balance of energy & mass into and out of the boiler are achieved. Drum Level Control Systems are used extensively throughout the process industries and the Utilities to control the level of boiling water contained in boiler drums on process plant and help provide a constant supply of steam.

If the level is too high, flooding of steam purification equipment can occur. If the level is too low, reduction in efficiency of the treatment and recirculation function. Pressure can also build to dangerous levels. A surge in water level as a result of the drum pressure decreasing is called 'swell'. A water level decrease due to drum pressure increase is called 'shrink'. Normally drum level is expected to be held within 2 to 5cm of the set-point with some tolerance for temporary load changes. A drum level control system tightly controls the level whatever the disturbances, level change, increase/decrease of steam demand, feed water flow variation.

To achieve this objective we are using the control system provided by Emerson Delta V. This system integration is the important part while setting up the DCS as per the standard. The Delta V system offers powerful, easy to use software for designing & operating a process control application. One of the important features of DCS is a good operator interface which also provides the operator display of the plant showing the real time process of the plant.