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Energy efficient deployment of mobile node in wireless Sensor networks

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Abstract

The wired environment encomprises with that of physical devices and interfaces of electrical equipments. Though the wireless trait has been emerged with its flexibility in information and communication technology,the wired atmosphere has the plugged in resource of fidelity and reliability providing armor to physical and logical data. The industrial field with the basement of control and instrumentation technology which makes the entire world automated. The hardware is ubiquitous with tangible outputs in robotics field also which further progress tremendously. This project deals with the robotic technique to control the various input parameters and puts the technical disorder in safe mode from electrical damage. Proposed information about manage the power consumption in Wireless sensor network based on effective node deployment by making the sensor communication in standby mode using a hardware model integrating multiple sensors in a single devices.ie, implementing various sensors in a single hardware unit. Also the recursive mechanism provides stability and infers the system in total power consumption which in turn gives the good performance.

Keyterms: Mobile deployment, sensors, PIC, Zigbee

I.INTRODUCTION

A wireless sensor networks(WSN) consists of spatically distributed autonomous sensing devices which cooperatively moniter physical or environmental conditions,such as temperature, sound, pressure, motion at different locations. A wireless sensor network is a collection of nodes organized into a cooperative network. Each node consists of processing capability (one or more microcontrollers, CPUs or DSP chips), may contain multiple types of memory (program, data and flash memories), have a RF transceiver (usually with a single Omni- directional antenna), have a power source (e.g. batteries and solar cells), and accommodate various sensors and actuators. The nodes communicate wirelessly and often self-organize after being deployed in an adhoc fashion. Recently there has been renewed interest in using mobile robots as sensor carring platforms in order to perform hazardous tasks [6].One of the major activities of mobile robots is to move from one place to another. In order to reach the goal position, mobile robots are required to follow a predetermined route.

Deploying large numbers of sensors has been receiving a lot of attention for detection of hazardous biological or chemical substances in public buildings, airports, shallow water harbors, etc. The sensor-carrying robots are in fact agents that facilitate the repositioning of network nodes in order to increase their coverage and accuracy. The collaborative nature of Industrial Wireless Sensor Networks (IWSN s) brings several advantages over traditional wired industrial monitoring and control systems, including self-organization, rapid deployment,flexibility,and inherent intelligent-processing capability.

In this regard, IWSN plays a vital role in creating a highly reliable and self- healing industrial system that rapidly responds to real-time events with appropriate actions. Technical challenges [3] and design principles are introduced in terms of hardware development, system architectures and protocols, and software

development.

Wireless network communication is an essential technology in transmitting the sensed and telemetry information between robots, but it has traditionally been addressed from mobile robot navigation. In robotic deployment [5] of sensor networks to use a potential field framework to control the behavior of the mobile sensor nodes by combining classical robotic team concepts (obstacle avoidance, goal attainment, flight formation,environment mapping and coverage) with traditional sensor network concepts.

II.ARCHITECTURE

In this section, the design principles and technical approaches in hardware development are briefly explained. Hardware design model, allows to understand how their components fit into a system architecture and provides software

Component designs important information needed for software development and integration.

A) Hardware Design

Hardware architecture allows That engineering disciplines (e.g., electrical and mechanical engineering) to work more effectively together to develop and manufacture new machines, devices and components. The main design considerations for the mobiles sensor node include compactness,effectiveness, and lowcost. The design principle can be found in [3]. In addition, IR sensors are devoted to obstacle avoidance[2]. The hardware architecture of a typical industrial sensor node is composed of three basic components.

a)Sensor:

A sensor is a device which receives and responds to a signal when touched. A sensor's sensitivity indicates how much the sensor's output changes when the measured quantity changes. Sensors are hardware devices that produce measurable response to a change in a physical condition, e.g.temperature, pressure, voltage, current, etc. The analog signals produced by the sensors based on the observed phenomenon are converted to digital signals by the analog-to-digital converters and sent to processor for further processing. Several sources of power consumption in sensors are as follows:

i) signal sampling and conversion of physical signals to electrical ones

ii)signal conditioning and

iii) analog-to-digital conversion.

b) Microcontroller:

A microcontroller is a small computer on a single integrated circuit containing a processor core, memory, and programmable input/output peripherals reducing the size and cost compared to a design that uses a separate microprocessor, memory, and input output devices, microcontrollers make it economical to digitally control even more devices and processes. Mixed signal microcontrollers are common, integrating analog components needed to control non- digital electronic systems.

c)Zigbee:

ZigBee is a specification for a suite of high level communication protocols using small, low-power digital radios based on an IEEE 802 standard for personal area networks. ZigBee devices are often used in mesh network form to transmit data over longer distances, passing data through intermediate devices to reach more distant ones.

B) Software Design

The software runs on the Microcontroller and is an integral part of the industrial server. MPLAB IDE is a Windows Operating System (OS) software program that runs on a PC to developapplications for .

C) PIC simulator IDE

This software mainly used for simulation purpose. Using this software we can easily simulate and see the result for the pic microcontroller. It is a real time environment in which all the component required for the project will be inbuilt and they can be called and placed and depending upon the code, each and every block will be enabled and executed depending upon the program.

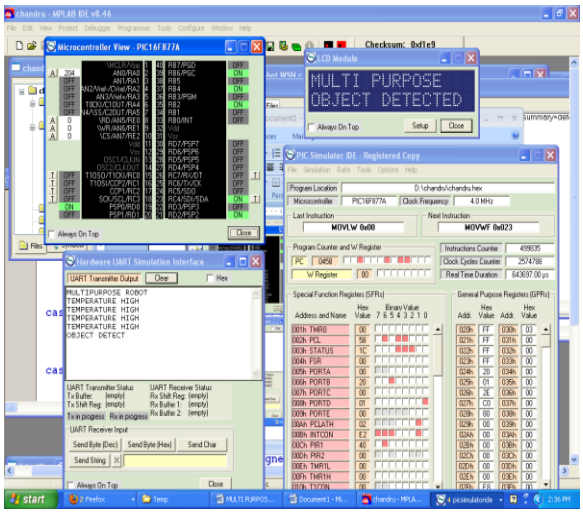


Fig.1. Simlation result for Multi purpose sensing object detected

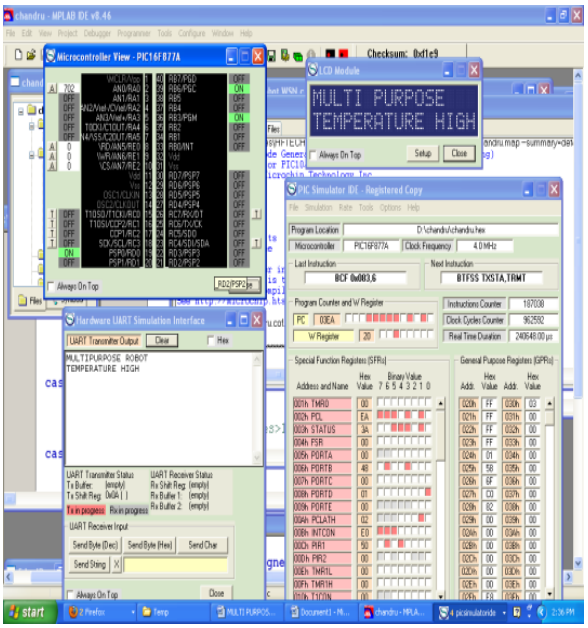
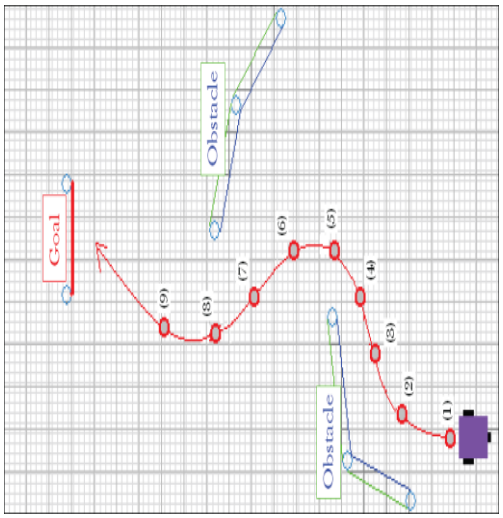


Fig.2. Simlation result for Multi purpose Temperature high

III.PERFORMANCE VALIDATION

The performance is validated through software tool. This gives the improved performance over existing method and avoids the obstacle in high accuracy. Further the simulation results provide the effectivediagnos is of obstacle avoidance.



IV. CONCULSION

The mass application of control systems in automation trait needs energy efficient mechanisms and less time management.In conclusion, the calculation of power consumption by the device gives the high percentage of reduction in power level which is not achieved in the mobile device. The communication in stand-by mode provide reduction in power and shows improved time management. This also aids in lower percentage of obstacle detection.

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