

Embedded PROJECT ABSTRACTS

(IOT (Internet Of Things, Automotive, Biomedical, Robotics, Biometric, Eco- Friendly, Biomedical, GSM, GPRS, BLUETOOTH, ZIGBEE), Raspberry Pi.



IEEE 2015 Embedded Projects on Internet Of Things (IOT).

1. Monitoring and controlling of smart equipments using Android compatible devices towards IoT applications and services in manufacturing industry

The ever increasing requirements for information being accessible at any time, from any place, regardless the type of remote device or planned operation, together with the need of complete control of a specific scenario or device has paved the way towards the next technological revolution: Internet of Things (IoT) and led to several major research projects. Within this paperwork the au... View more

2. EURIDICE — IoT applied to logistics using the Intelligent Cargo concept

In an interconnected world, the need to exchange information across domain's boundaries is increasingly common, the concern is rapidly moving towards defining the content that needs to be consumed by numerous and different actors using different platforms and/or software solutions, since the internal processes have been consolidated and optimized. The transport logistics sector is no excepti... View more

3. Design and development of sensor-based mini projects for embedded system laboratory using ARM Cortex-M3(LPC1768)

In majority of Indian Universities, advanced courses on embedded system design and its related laboratory are not available until the post-graduate level. Early exposure to embedded system design with advanced microcontroller is necessary for computer science and engineering students to face the design challenges in the today's world. This paper presents a mini project-based laboratory for l... View more

4. Enabling reliable and secure IoT-based smart city applications

Smart Cities are considered recently as a promising solution for providing efficient services to citizens with the use of Information and Communication Technologies. With the latest advances on the Internet of Things, a new era has emerged in the Smart City domain, opening new opportunities for the development of efficient and low-cost applications that aim to improve the Quality of Life in ... View more

5. A CAN protocol based embedded system to avoid rear-end collision of vehicles

Driver and passenger safety is one of the prime concerns in modern day vehicle. Alarming statistics of accidents and increased number of vehicles on road demands for an intelligent safety mechanism that helps the driver in handling immediate precarious situations like sudden probability of a rear- end collision. The work proposes a mechanism that not only computes the deceleration of vehicle due t... View more

6. Design of a home multi-robot system for the elderly and disabled

Home-based assistive robotic care for the elderly and disabled has long been a goal of robotics researchers. Unfortunately, no single group has solved the problem of making robots that will perform a set of tasks sufficient enough to warrant the cost to the end consumer. Numerous advances and improvements in computing, communication and related robotic technologies have been paving the way towards.

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7. Software interface design for home-based assistive multi-robot system

In many assistive robotic systems, the interface to the user is simply a tablet computer or a monitor attached to a single robot. Missing from approaches are the system extensibility made possible with a tablet computer and a division of work between multiple agents. In this paper we present the design for a software interface to connect users to an assistive robot system for the disabled and elde... View more

8. An intervention study on automated lighting control to save energy in open space offices

We present intervention study on energy saving investigating the benefit of controlling ceiling lighting based on occupant presence information obtained at each desk. We show that fine-grained sensing and control is particularly beneficial for lighting control in open plan office spaces. Our intervention was conducted in a 63.8m² modern open office space over a time of 1.5 months. Ultra... View more

9. Computer vision based vehicle detection for toll collection system using embedded Linux

Many highway toll collection systems have already been developed and are widely used in India. Some of these include Manual toll collection, RF tags, Barcodes, Number plate recognition. All these systems have disadvantages that lead to some errors in the corresponding system. This paper presents a brief review of toll collection systems present in India, their advantages and disadvantages and also.

10. Design and implementation of automated blood bank using embedded systems

Automated Blood Bank is an associate work that brings voluntary blood donors and those in need of blood on to a common platform. The mission is to fulfill every blood request in the country with a promising android application and motivated individuals who are willing to donate blood. The proposed work aims to overcome this communication barrier by providing a direct link between the donor and the...View more

11. Web based automatic irrigation system using wireless sensor network and embedded Linux board

This paper presents an automation of farm irrigation system using a wireless sensor network (WSN) and embedded Linux board. The system provides a web interface to the user so that the user can control and monitor the system remotely. In this paper, Raspberry Pi is used as an embedded Linux board which is designed based on the arm 11 microcontroller architecture. Embedded Linux board ma... View more

12. Pibot: The raspberry pi controlled multi-environment robot for surveillance & live streaming

In today's world, everyone is worried about their safety due to increase in crime rate. This has led to an increase in the importance of surveillance systems In this project raspberry pi is used to make a robot which in turn is used to make a real-time

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surveillance system possible within a local network. The live streaming is accomplished by using the mjpeg streamer and the server-client.

13. Smart drip irrigation system using raspberry pi and arduino

This paper proposes a design for home automation system using ready-to-use, cost effective and energy efficient devices including raspberry pi, arduino microcontrollers, xbee modules and relay boards. Use of these components results in overall cost effective, scalable and robust implementation of system. The commands from the user are processed at raspberry pi using python

14. A smart system connecting e-health sensors and the cloud

This paper presents the design and implementation of an e-health smart networked system. The system is aimed to prevent delays in the arrival of patients' medical information to the healthcare providers, particularly in accident and emergency situations, to stop manual data entering, and to increase beds capacity in hospitals, especially during public events where a large number of people are meet.

15. The real time monitoring of water quality in IoT environment

In order to ensure the safe supply of the drinking water the quality needs to be monitor in real time. In this paper we present a design and development of a low cost system for real time monitoring of the water quality in IOT(internet of things).the system consist of several sensors is used to measuring physical and chemical parameters of the water. The parameters such as temperature, PH, turbid

16. Design and operation of Wi-Fi agribot integrated system

Robotics in agriculture is not a new concept; in controlled environments (green houses), it has a history of over 20 years. Research has been performed to develop harvesters for cherry tomatoes, cucumbers, mushrooms, and other fruits. In horticulture, robots have been introduced to harvest citrus and apples. In this paper autonomous robot for agriculture (AgriBot) is a prototype and implemented fo

Raspberry pi projects 2015.

17. Design and management of an intelligent parking lot system by multiple camera platforms

Parking in the city has been a major problem in modern days. An efficient way to manage the parking lot and to improve the safety of the driver is very important. Traditional parking lots commonly use security camera, ultrasonic sensors or infrared ray sensors to manage the parking lots. However, these systems are not only expensive but time consuming.

18. RoboSantral: An autonomous mobile guide robot

RoboSantral, An autonomous mobile robot which has been designed and realized in order to guide the visitors through a university campus, is presented in this paper. This robot

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accompanies guests through the campus and gives presentations on predefined locations. Location data is obtained from GPS sensors. Targets such as faculty buildings, museums etc... are recognized by the image processing of p

19. An Internet of things approach for motion detection using Raspberry Pi

Internet of things is the communication of anything with any other thing, the communication mainly transferring of use able data, for example a sensor in a room to monitor and control the temperature. It is estimated that by 2020 there will be about 50 billion internet-enabled devices. This paper aims to describe a security alarm system using low processing power chips using Internet of things whi... View more

20. Design & development of daughter board for Raspberry Pi to support Bluetooth communication using UART

Reliable and secured communication between two or more devices require wired connection. A wireless communication such as - Bluetooth, WI-Fi, ZigBee etc. provides flexible and inexpensive solution for remote applications. A large number of low cost hardware platforms such as Raspberry Pi, Arduino, mbed boards etc. are available that do not provide any inbuilt wireless module.

21. Computer vision based vehicle detection for toll collection system using embedded Linux

Many highway toll collection systems have already been developed and are widely used in India. Some of these include Manual toll collection, RF tags, Barcodes, Number plate recognition. All these systems have disadvantages that lead to some errors in the corresponding system. This paper presents a brief review of toll collection systems present in India, their advantages and disadvantages and also.

22. Development of cloud based light intensity monitoring system usingraspberry Pi

Accurate and quantifiable measurement of light is essential in creating desired outcomes in practical day to day applications as well as unique applications such as Traffic lighting system, Poultry Industry, Gardening, Museum lighting system, at emergency exits etc. Hence, Light measurement and analysis is an important step in ensuring efficiency and safety. Many of the industries are burdened wit...

23. Web based automatic irrigation system using wireless sensor network and embedded Linux board

This paper presents an automation of farm irrigation system using a wireless sensor network (WSN) and embedded Linux board. The system provides a web interface to the user so that the user can control and monitor the system remotely. In this paper, Raspberry Pi is used as an embedded Linux board which is designed based on the arm 11 microcontroller architecture. Embedded Linux board ma..

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project raspberry pi is used to make a robot which in turn is used to make a real-time surveillance system possible within a local network. The live streaming is accomplished by using the mjpeg streamer and the server-clie.

25. User Interactive and Assistive Fleet Management and Eco-Driving System

Today, in the era of Internet of Things, an enormous amount of research is going on in the direction of probing into vehicle's engine control units for collecting kinematic and diagnostic information, analyzing and integrating them with software platforms and providing valuable services to drivers and passengers. This is largely facilitated by the car's several sensors forming an in-vehicle network.

26. Real time vehicle monitoring and tracking system based on embedded Linux board and android application

An advanced vehicle monitoring and tracking system based on Embedded Linux Board and android application is designed and implemented for monitoring the school vehicle from any location A to location B at real time. The proposed system would make good use of new technology that based on Embedded Linux board namely Raspberry Pi and Smartphone android application. The proposed system work.

27. Raspberry PI based global industrial process monitoring through wireless communication

This paper proposes an advanced system for process management via a credit card sized single board computer called raspberry pi based multi parameter monitoring hardware system designed using RS232 and microcontroller that measures and controls various global parameters. The system comprises of a single master and multiple slaves with wireless mode of communication and raspberry pi::.

28. A low cost smart irrigation control system

This paper focus on a smart irrigation system which is cost effective and a middle class farmer use it in farm field. Today we are living in 21st century where automation is playing important role in human life. Automation allows us to control appliances automatic control. It not only provide comfort but also reduce energy, efficiency and time saving. Today industries are use automation.

29. The real time monitoring of water quality in IoT environment

In order to ensure the safe supply of the drinking water the quality needs to be monitor in real time. In this paper we present a design and development of a low cost system for real time monitoring of the water quality in IOT(internet of things).the system consist of several sensors is used to measuring physical and chemical parameters of the water. The parameters such as temperature, PH, turbidi

30. Raspberry Pi for Automation of Water Treatment Plant

Clean drinking water is a basic human need. Automation serves a vital role in the safe and reliable operation of a water treatment plant in providing safe drinking water. This paper focuses on an innovative and intelligent control and monitoring system for Water

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Treatment Plant by using "Raspberry Pi" as an effective alternative to PLCs for the automation of small water t..

31. Design and operation of Wi-Fi agribot integrated system

Robotics in agriculture is not a new concept; in controlled environments (green houses), it has a history of over 20 years. Research has been performed to develop harvesters for cherry tomatoes, cucumbers, mushrooms, and other fruits. In horticulture, robots have been introduced to harvest citrus and apples. In this paper autonomous robot for agriculture (AgriBot) is a prototype.

Data acquisition.

32. Acquisition and management of biomedical data using Internet of Things concepts

Internet of Things (IoT) is a concept that considers the pervasive presence of things or objects/equipment that communicate through wireless, cable connections and can interact with each other and can collaborate with other things or objects, to create new services and medical applications in order to achieve common objectives (diagnosis, treatment, patient rehabilitation).

33. Agricultural Drought Data Acquisition and Transmission System Based on Internet of Things

The real-time acquisition and transmission system of agricultural drought data is researched. With the real time acquisition and analysis of agricultural droughtdata, it can effectively and accurately predict and analyze the agricultural droughtdata and provide scientific decision-making of water supply and drainage engineering.

34. Water management system using dynamic IP based Embedded Webserver in real time.

Water-quality monitoring technology has been taken a great attention in aquaculture because of increasing aquatic products and impact of food safety vicious incidents. In order to meet the technology requirements of water-quality monitoring in multi-parameter, dynamic, and networked monitoring, a water-quality dynamic monitoring system was developed to monitor multi-parameter water-quality variables such as water temperature, pH, dissolved oxygen, electrical conductivity, oxidation reduction potential dynamically, and communicate with remote information servers in a high security. As result of a two-years testing experiment in a seawater aquiculture company, relative errors of each water-quality parameter measured by the instrument were less than 5%, data lost percentage of remote communication was less than 3%, and power energy consumption was less than 13W. Therefore, the water-quality dynamic monitoring system as a node infrastructure of wireless sensor networks can be used to achieve a distributed water-quality network monitoring system in a large-scale aquaculture farm, or to construct a distributed water-quality monitoring network system in multipoint of different cities for aquaculture farm and administration section.

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35. Application of GPRS technology in water quality monitoring system.

36. Multi-hop WBAN Construction for Healthcare IoT Systems.

It is expected that the Internet of Things (IoT) applications for medical services can be one of the most remarkable solution for taking care of aging population which is in the rapid growth. IoT consists of communications and sensors to accomplish purpose. In the diverse kinds of networks, wireless body area network (WBAN) is a highly suitable communication tool for the medical IoT devices. There are many researches about WBAN and sensor network, which are mainly focused on energy efficiency. However, in this paper, we discuss more practical issues for implementation of WBAN to healthcare service. Therefore, we propose a multi-hop WBAN construction scheme that is consists of 4 operations, the clustered topology setup, mobility support, and transmission efficiency enhancement. As an auxiliary benefit, the proposed scheme achieves an energy efficient feature by reducing the number of total control messages. Extensive simulation shows that the proposed scheme remarkably improves the performance of WBAN.

37. Development of Android based on-line monitoring and control system for Renewable Energy Sources.

This paper describes the development of an online monitoring and control system for distributed Renewable Energy Sources (RES) based on Android platform. This method utilizes the Bluetooth interface of Android Tablet/ Mobile phone as a communication link for data exchange with digital hardware of Power Conditioning Unit (PCU). The Low Cost Android tablet can replace the graphical LCD displays and Internet modem of RES Power Conditioning Unit (PCU) with enhanced graphical visualization and touch screen interface.

38. Web based Automatic Irrigation System using wireless sensor network and Embedded Linux board.

This paper presents an automation of farm irrigation system using a wireless sensor network (WSN) and embedded Linux board. The system provides a web interface to the user so that the user can control and monitor the system remotely. In this paper, Raspberry Pi is used as an embedded Linux board which is designed based on the arm 11 microcontroller architecture. Embedded Linux board makes the communication with all distributed sensor nodes placed in the farm through ZigBee protocol and itself act as a coordinated node in the wireless sensor network. The goal of coordinator node is to collect the parameters like soil moisture and soil temperature wirelessly. Each sensor node consists of soil moisture and soil temperature sensor and one ZigBee RF antenna device for communication with the coordinator node. Raspberry Pi stores collected data in the database and analyzes the stored data. The system will work according to the algorithm developed for watering the crop. The board has an Ethernet interface and runs the simple data web server. Hence coordinator collects the data over ZigBee wireless communication protocol and allow user to monitor the data from a web browser. User can make the irrigation system ON or OFF remotely. The system will reduce the water consumption and giving uniform water to the crop results in increasing yield.

39. A Framework for Environmental Monitoring with Arduino-based Sensors using Restful Web Service -- 2015

The Nevada Solar Energy-Water-Environment Nexus project generates a large amount of environmental monitoring data from variety of sensors. This data is valuable for all related research areas, such as soil, atmosphere, biology, and ecology. An important aspect of this project is promoting data sharing and analysis using a common platform. To support this effort, we developed a comprehensive architecture that can efficiently collect the data from various sensors, store them in a database, and offer an intuitive user interface for data retrieval. We employed Arduino-based sensors due to their flexibility and cost-effectiveness. Restful Web Service is used for communication with the Arduino-based sensors, and Google Charts service has been used for data visualization. This framework for sensor data monitoring with Web Service is expected to allow the Nevada Nexus project to seamlessly integrate all types of sensor data and to provide a common platform for researchers to easily share the data

40. A Smart System Connecting e-Health Sensors and the Cloud – 2015

This paper presents the design and implementation of an e-health smart networked system. The system is aimed to prevent delays in the arrival of patients' medical information to the healthcare providers, particularly in accident and emergency situations, to stop manual data entering, and to increase beds capacity in hospitals, especially during public events where a large number of people are meeting in one place. The architecture for this system is based on medical sensors which measure patients physical parameters by using wireless sensor networks (WSNs). These sensors transfer data from patients' bodies over the wireless network to the cloud environment. Therefore, patients will have a high quality services because the e-health smart system supports medical staff by providing real-time data gathering, eliminating manual data collection, enabling the monitoring of huge numbers of patients.

41. Enabling Reliable and Secure IoT-based Smart City Applications - 2015

42. A survey of Internet-of-Things: Future Vision Architecture, Challenges and Services.

Recently, the concept of the Internet as a set of connected computer devices is changed to a set of connected surrounding things of human's living space, such as home appliances, machines, transportation, business storage, and goods etc. The number of things in the living space is larger than the number of world population. Research is going on how to make these things to communicate with each other like computer devices communicate through Internet. The communication among these things is referred as Internet of Things (IoT). Till now, there is no specific definition or standard architecture of IoT. Some researchers define the IoT as a new model that contains all of wireless communication

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technologies such as wireless sensor networks, mobile networks, and actuators. Each element of IoT is called a thing and should have a unique address. Things communicate using the Radio-Frequency Identification (RFID) technology and work in harmony to reach a common goal. In addition, the IoT should contain a strategy to determine its users and their privileges and restrictions. The US National Intelligence Council has stated that by 2025 the IoT will connect everything in our life [1]. For this target new architectures are proposed and more research challenges are opened. Authors in [1] highlight some research challenges. Despite new architectures are proposed in the recent years, however, the future vision of IoT is still unclear. Considering the research challenges and future vision of IoT, in this paper we present a detail survey. At the end of the paper, we also present our recommendations.

43. Application of RFID Technology and the Maximum Spanning Tree Algorithm for Solving Vehicle Emissions in Cities on Internet of Things.

The proportion of air pollution which is caused by the cars is increasing. In order to solve this serious problem, many countries and regions have already presented a series of emissions standards, meanwhile some methods have been developed, include update motor engine or improve the quality of the gasoline. However, these actions have not brought about a striking effect as we expect. There are also some situations to fail implement these emissions standards. In this paper, a wireless inspection and notification system (WINS) through the concept of Internet of Things (IoT) is proposed. By applying the system, it is possible to smoothly realize a green traffic network. In this system, Radio frequency identification (RFID) technology as a low-cost and mature wireless communication method is adopted to collect and transmit emissions information of vehicles. Moreover, The RFID devices need to be installed on the traffic lights so that reliable reading of emissions signals from a vehicle can be interrogated when the vehicles stop in front of the red light. Taken into consideration the real environment, an efficient and innovative maximum spanning tree algorithm (MXAST) is also presented to select suitable traffic lights aim to reduce the number of RFID devices (more economy) and guaranteed the whole urban cars can be monitored (simple & safety).

44. Surveillance System with Light Sensor -2014 (IOT)

Security and safety is one of the most talked of topics in almost every facet like surveillance, industrial applications, offices, and in general, in smart environments. Traditional surveillance systems suffer from an unnecessary waste of power and the shortcomings of memory conditions in the absence of invasion. In this paper we design a home embedded surveillance system which evaluates the development of a Low-cost security system using small PIR (Pyroelectric Infrared) sensor built around a microcontroller with ultra-low alert power. The system senses the signal generated by PIR sensor detecting the presence of individuals not at thermal equilibrium with the surrounding environment. Detecting the presence of any unauthorized person in any specific time interval, it triggers an alarm & sets up a call to a predefined number through a GSM modem. After the MCU sends the sensor signals to the embedded system, the

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program starts the Web camera. Our sensing experiment will show that we reduce not only memory consumption but also the system's power consumption.

45. Implementation of a Web of Things based Smart Grid to remotely monitor and control Renewable Energy Sources.

In recent years, electricity generation by photovoltaic (PV) or wind power (WP) has received considerable attention worldwide. The State Grid Corporation of China (SGCC) is building the National Wind/PV/battery energy storage station (BESS) and Transmission Joint demonstration project and it is located in the region of Zhangbei, Hebei, China. The Zhangbei belongs to one of the country's 10 million kilowatts of wind power base. The demonstration project is scheduled in three stages. Now, it is in the first stage and at the end of December, 2011, a 100-MW wind farm, a 40-MW PV farm, and 14-MW/63-MWh lithium-ion BESS have been built at Zhangbei. Development of batteries, battery energy storage systems recently have begun to be utilized for multiple applications such as frequency regulation, grid stabilization, transmission loss reduction, diminished congestion, increased reliability, wind and solar energy smoothing, spinning reserve, peak-shaving, load leveling, uninterruptible power sources, grid services, electric vehicle (EV) charging stations, and others. The sensor's outputs are given to Microcontroller (MC) which is connected to WSN (wireless communication network) to communicate the data between PC and MC. When the intensity of energy from the solar panel is less, then the panel can be shifted automatically upwards. If the energy from the solar panel is less, then the energy generated by the windmill is used to drive the device. The whole system is placed in the ocean.

46. Application of Data Acquisition System for Superconducting Quantum Interface Devices (SQUID) at Remote Location.

Together with technological developments related to the specific area, the scope of remote data acquisition systems has become widened. The usages of these kinds of systems prevent waste of time and labor. Therefore, in this work, the introduction and design of a data acquisition system that can sense and send the output of Superconducting Quantum Interface Devices (SQUID) to main lab via wireless with GPRS is aimed to be provided. The system of this design uses FPGA and MCU together within the processes of collecting, packing and sending data. In this design, XILINX Spartan 3AN is used as a FPGA, ST Microelectronics ARM Cortex-M4 used as a MCU. The main purpose of FPGA is collecting analog data with using ADC and packing them in order. On the other hand, the main purpose of MCU is to send packed data through the GPRS. The processing load of MCU is decreased by using FSMC (Flexible static memory controller) of it while getting data from FPGA; also with parallel connection data transfer rate is increased. Also by using FSMC, first time 200Hz data collecting will actualized through the remote data acquisition systems based on GPRS.

47. Automated Irrigation System Using a Wireless Sensor Network and GPRS Module.

The project is designed to develop an automatic irrigation system that switches a pump motor ON/OFF by sensing the moisture content of the soil using wireless technology
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effectively for agriculture applications through GSM Modem used in sending an SMS on the status. In the field of agriculture, use of proper method of irrigation is important. The advantage of using this method is to reduce human intervention and to ensure proper irrigation. The project uses an 8051 series microcontroller which is programmed to receive the input signal of varying moisture condition of the soil through sensing arrangement. This is achieved by using an op-amp as comparator which acts as interface between the sensing device and the microcontroller. Once the controller receives this signal, it generates an output that drives a relay for operating the water pump. It also sends an SMS to the concerned number using GSM modem. An LCD display is also interfaced to the microcontroller to display the status of the soil and water pump ON / Off condition. The sensing arrangement is made by using two stiff metallic rods inserted to the agricultural field required to be in control. Connections from the metallic rods are interfaced to the control unit.

48. Plantation Monitoring System Based on Internet of Things.

In this work, we present a plantation monitoring system based on Internet of Things. The system combines wireless sensor network, embedded development, GPRS communication technology, web service, and Android mobile platform. The hardware design of sensor nodes, data acquisition, data transmission, together with data visualization and abnormal alarm are discussed in detail. Long-term experiment of the system shows that the scheme is feasible and reliable.

49. Design of on-line Interactive Data Acquisition and Control System for embedded real time applications.

Design of on-line embedded web server is a challenging part of many embedded and real time data acquisition and control system applications. The World Wide Web is a global system of interconnected computer networks that use the standard Internet Protocol Suite (TCP/IP) to serve billion of users worldwide and allows the user to interface many real time embedded applications like data acquisition, Industrial automations and safety measures etc.,. This paper approached towards the design and development of on-line Interactive Data Acquisition and Control System (IDACS) using ARM based embedded web server. It can be a network, intelligent and digital distributed control system. Single chip IDACS method improves the processing capability of a system and overcomes the problem of poor real time and reliability. This system uses ARM9 Processor portability with Real Time Linux operating system (RTLinux RTOS) it makes the system more real time and handling various processes based on multi tasking and reliable scheduling mechanisms. Web server application is ported into an ARM processor using embedded 'C' language. Web pages are written by Hyper text markup language (HTML); it is beneficial for real time IDACS, Mission critical applications, ATM networks and more.

50. IOT Gateway: Bridging Wireless Sensor Networks into Internet of Things -2014

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Embedded PROJECT ABSTRACTS

(IOT (Internet Of Things, Automotive, Biomedical, Robotics, Biometric, Eco- Friendly, Biomedical, GSM, GPRS, BLUETOOTH, ZIGBEE), Raspberry Pi.



A Cloud Network-based Power Management Technology for Smart Home Systems - With the fast development of network infrastructure, connecting to the Internet at any time and any place has been made easy and possible. On the other hand, as our world is suffering energy crisis on oil and natural resources shortages, how to make efficient use of limited power energy has remained a major problem to be conquered so far. Aimed to facilitate the life of human being as well as to use the limited power energy more efficiently, we propose in this paper a technology that can perform remote control and monitoring of electrical appliances on the Internet. To do this, an intelligent power socket (IPS) module that is able to control and monitoring the power of electricity is realized in this research. The IPS modules are placed in conjunction with the electrical appliances that are to be controlled from a far-end place. In addition, an embedded system-based home gateway that can be connected with the Internet is set up in which the electrical appliances are located. Moreover, the acquired power consumption information or the status of the appliances is stored in a database server in the Cloud. With the proposed structure, authorized users or system managers can log into the web server which is connected with the database, monitoring the power status and take actions on the appliances remotely. The control command from the far-end place, i.e., from the web server on the Internet, is first sent to the home gateway and then transmitted to the IPS modules through the Zigbee wireless communication protocol so that the remote control of appliances can be achieved. The proposed architecture can be easily applied to any kind of room space. Moreover, only a browser is needed for the client to communicate with the web server, no other application program is required. As the browser is now available almost on every information technology products, e.g., a notebook or a smart phone, the proposed architecture has been shown to be very convenient and useful for remote control and monitoring of electrical appliances, and hence can facilitate the life of human beings.

51. Raspberry Pi based Interactive Home Automation System through E-mail.

52. The Glasgow Raspberry Pi Cloud: A Scale Model for Cloud Computing Infrastructures.