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IOT BASED E-BILLING AND E-AUDITING USING CLOUD INTEGRATION

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ABSTRACT

IOT design and implementation is presented in this paper electronic billing and electronic-auditing (e-auditing) system to provide an easier and more reliable method for billing from any area of the world using internet, and perhaps to ensure the auditing procedures of the daily consumed electricity, It provides a systematic routine for the customers to remind them to pay the bill on time with an SMS alert on correct schedule, or else the electric power connectivity can be turned off autonomously from the distant host i.e. the created web page using, Dot NET and # C .Daily consumption reports as well as a comparison of the previous month and present month average is displayed on web portal page as well as SMS alert. In order to save energy all over the designed system is concentrating on the automation of electronic devices based on the visitor counter, using sensors.

KEYWORDS: Internet of thing (IoT), power consumption, smart devices-auditing-billing.

INTRODUCTION

Network of things may be defined as IOT or various applications. So IoT has become the host and most important subject in current digitalized world since it promises to be most reliable method in the internet connectivity for all kinds' devices and physical objects (analog and digital devices).The studies held over the digitalized devices have proven the functionality of IoT. The studies held over the digitalized devices have proven the functionality of IoT, to modify the shape of living by ensuring cost effective living including safety, security and entertainment.

In this paper we are introducing an IoT based energy meter. Old GSM technology in the existing system domestic energy meter reading has been replaced with Internet of things in the basic energy meter by,[23] universally exist a variety of technical problems and no two way communication and tragic billing system.[28] In the IoT based energy meter the power variations occurring in the microcontroller can be measured using voltage and current sensor. From the IoT based energy meter the billing details are communicated with the consumer via GPS or a 3G/4G attached sum and finally displayed in the created web page which has been allotted with an individual user ID and password patterns, which enables the respective user to pay the bill from anywhere of the world .The created web page gives the complete details of bill payment, the consumed amount of data and a comparison with allow the user data. Hence this will allow the user to maintain an average and controlled usage of electricity.

The system mainly provides a automation function with an ON/OFF option for the electricity supply using the web page created ,In addition to the above system we are implementing an partial automation system which enables the lighting ,fan ,AC etc on the basis of number of visitors or visitor counter .The most credible part of the IoT is based on the e-auditing.

LITERATURE SURVEY

This chapter includes some references from previous projects, journals, articles etc gathered in this survey, are a massive collection from different sources and articles. The information gathered in this paper is related to background study of this designed project.

In the paper IoT Based Smart home design using security and power Management system introduces the implementation of the entire system with an Ethernet-based Smart Home design for monitoring the energy consumption based upon the real time measurement of the devices at home with the help of a 2nd generation Intel Galileo development board, widely used in homes as well as other buildings and societies.[1] The designed system mainly works on monitoring and control process over voice, so that the electrical devices can be automated using the common control system than the android app. The Sensor is used for monitoring the vehicle tracking and security maintenance in the house. By using android app It is monitored and controlled remotely. The paper aims on the large benefits of recording electricity bills of the houses, offices etc as well as keep the users updated about their home security with an the automation process using their fingerprint or touch on their Smartphone, and last but most importantly as the outcome, monitor the usage and conservation of resources natural by reducing consumption of energy.

The paper directs the functionality of Creating a Digitalized Environment for better and enlarged area of Energy Management at Homes. Here it has been clearly designed a reliable system of domestic energy management system (DEHEMS), which shows a beneficial electricity and gas monitoring in European-wide homes with less risk factors and a elaborate way.[25] The paper defines the details of DEHEMS processed in triangular cyclic order for household's in order make a beneficiary report in the final Results based on both the measured tactical analysis data show that less energy has been consumed using this adaptive system.[2]

Last Meter Smart Grid Embedded in IoT Platform which is a most robust advanced method in embedded system, it mainly shorten the data accessed, over Customer centric than distributor centric in transmission of power within the hosts. Here well designed approaches with a four basic principles are being followed which also deals with reliability 1) seamless integration for applications of smart home 2) Collection of enourmless amount of data from heterogeneous sensor communication protocols attributed system 3) secure and customized data access from all over the assigned nodes.

The introduction of AMR Real Time & Control of House Hold Meter Energy combined with Communications Zigbee, which is considered one of the recent evolving advanced technologies with the introduction of new Automatic and efficient Energy meter reading and overall control along with Zigbee communication.[4] Design mainly presents a configured arbitral method of Zigbee combined and GPS for communication Mobile (GSM) technology in order consumed consumption power on daily or periodical basis and automatic control over meters remotely which enables the accurate management of electricity. This system is highly benifitable since it avoids the human intervention in the overall power usage.[44]

Smart Home Management of energy has constructed a system that Includes Renewable Energy resources based on ZIGBEE prototype & PLD assembles architecture HEMS that considers simultaneously both energy and power consumption and supply for a smart home design. The data is generated on weekly basis based on the energy consumption, analyzes them for energy estimation meter or other assigned devices, and home energy is well controlled using the scheduled strategy to minimize the electricity cost. The EMCUs are robust method of power management system to monitor the home appliances using the block control node. The device table has the efficiency to manage home applications. On taking account of the Solar based intelligent energy distribution management system is a well-

defined and reliable system with Intelligent power Energy Distribution Management (IEDM) to measure energy over the fast changing variable environment and solar power measurement process.[6] On Comparison with mutual interactive systems, they have introduced the IEDM for energy efficiency with a photovoltaic cell.

All environments has the capacity to measure the variable changes, hence renewable energy sources coincide with optimal energy management to obtain the highest efficiency and available growth. Various researches over this topic have been analyzed for the appropriate designed Management products involving photovoltaic cell power and wind energy, and these IEDM is installed into a test bed system, its eventual results are verified which have significant roles in propagating friendly atmosphere in its performance and loss of energy. IEDM is preferably used to determine how solar panel can produce the efficiency that has to be used can be used. Hence IEDM creates a detailed data of the usage of solar batteries charge and power consumption.

The value is being predicted which is to increase the resources cloud utilization. The utilization of this process in case of energy-efficiency in resources of Iot. The experimentally results show energy saving methodology over nodes sensor and utilization improved of improved sensor technology of cloud resources.

In the paper,[10] remotely controlled home automation system, common line is used to merge the IOT line. Human functionalities is identified by image processing system. Development of Smart Security devices and Monitoring process using IoT for Agriculture sector is considered to be the central force of security in Indian economy deserves.[11] Security not in terms of resources only but also agricultural products needs security and protection at the very initial stage, like protection from attacks of creatures, in agriculture fields for better yielding capacity. Such efforts should be well noticed. After sensing the problem security issues are not smart enough to give the exact detailed information.

In case of remote location it can be installed in fields, grain storekeeping for the purpose of security. This paper is concentrating on the methods to solve such problems like identification of creatures spoiling the plantation. Future Directions and Challenges was written The potential growth for the embedded field of industries are increasing day by day.[12] IoT systems are used widely, so as to provide value to our customers.

IoT is being flourished to connect more than an 27 billion things to the world by 2020 ranging from digitalized devices such as smart watches to automobiles, appliances, and industrial equipment's in short all the digitalized devices. In this paper IOT solutions differently developed so far, their functionalities and technological solutions are used and thus challenges are overcome to be focused on to give way to innovative solutions that will help the society.

Iot is emerging into its peak so that it is well observed from the areas that are completely under its effects. Resulting from smart cities to rural area it is highly essential. Perhaps the issues over the security system in Mobile e-Commerce can be well handled. This criterion enables the entire mobile users to buy and pay their bill or beneficiary's using mobile phone. However, it must be made strict in case of the user's privacy to avoid illegal issues creating a harmful trouble.[13]

The paper gives the detailed description of the R&D activities in mobile ecommerce at Ericsson, which aims at making mobile e-commerce applications securing upward and downward strategies along with the achievements of WAP. Web ecommerce is well designed with its architectural design. Energy managing system and embedded data system for acquisition has been used to display on web page using E-mail, GPS alert, MS etc.[14] The applications of IoT ranging from small home applications to industrial application. Where This data's are used to send information from one place to another in case of sensor data collection and maintain over all control of the sensor data network using IoT.

It is designed as a re-constructible interface sensible device system for industrial purpose using IoT with a wireless communication system atmosphere, ARM as the central controller parallel scan the data and in real with Avery high speed and accuracy. For this style intelligent device interface specification is adopted.[23] Specifications to meet the rising needs. Hazards present in the industrial environment can be handled by any situation from all over in the world through IOT technology So preventive measure to avoid that dangerous situation can be done using this technology.

Supervisory system which is low cost for IoT based smart home applications which is highly discussed and demanded. For all kinds of devices IoT enables internet connectivity. Enable performing activities without direct physical interaction.[15] In consideration with the real world to handle with the difficulties a further more advanced technology of IoT must be

introduced. This paper proposes an efficient low cost affordable system for smart home automation that can be managed using IoT technology. The Experimental proposed system is based on Apriority algorithmic function provisory system in a most affordable and robust manner.

In paper.[16] Routing Protocol is being used for Intelligent Internet of Things for Energy Conservation system that has become a significant technology in the recent research area. The IoT application expands to the connectivity criteria all over the world regardless the locations. It is expected that there might be more than 52 billion devices combined with internet of things by 2020.Couple of devices are connected together to establish internet of things. However, many problems accomplished this technology's proliferation such as technique, the exploitation of resources combined to energy. Saving power is the vital factor in performance enhancing new approaches are established in this paper to save energy using IoT devices. Proposal kept forward can prove its beneficiary role in enhancing performance of nodes in IoT.

In paper.[17] IoT is leading to high demand for IoT Sensors for Smart Home Electric Energy Usage Management. A smart home includes combinations of IoT sensors, IoT actuators and visualization devices (in-house and remote), which creates a favorable situation in multiple ways. IoT provides a different communication strategy. IoT and its mechanism is explained well. The most prevalent technologies which centralizes the RFID and wide ranged IoT systems, Sensor networks an intelligence technologies. The potential applications of the current technologies are reviewed and the major research issues are presented.

Implementation of "IoT" for monitoring the overall environmental conditions in Homes was The recent splinted growth in communication especially wireless & internet has enabled the development of internet of things. IOT coverage covered over a large area and includes different devices like smart phones and other gadgets etc. The objective of proposed system structure is to implement efficient system to monitor our environmental conditions in homes. The proposed system contains different sensors connected to the different devices to check the working condition of the respective devices. All the devices are talking with server through the smart sensor network. The structure of monitoring system consists of combination of efficient unit sensors, for data collection reasoning and context awareness. Automatic Lighting and Control System for Classroom was introduced for the beneficial effects of Most of the Colleges and Universities use the traditional lighting system where we

have a switch to control the lighting. Most of us i.e. staffs and students even at offices all are well careless of switching the AC, fan, light etc which creates unnecessary energy consumption and huge bill amount.

Few systems have come with light and fan similar to the applications of air conditioner, Remote system wards controlling devices at homes. Hence researchers have developed Adriano based Automatic lighting control and lighting for the efficient use of energy in Class room condition where we have divided the class room intro grids.[29] Irrespective of the position without human intervention the devices are preferably controlled base on the visitors. Android mobile App via Bluetooth to control lighting based on voice command.

In paper.[21] E-commerce for the Enterprise management as well as for the eternity of commercial environment a platform for the Net Auditing Architecture has been constructed which has been widely resulted in the innovation of auditing environment and the developments of traditional auditing architecture and pattern lag behind the developments of modern auditing technologies like modern information technology. In paper.[22] Internet of things: monitoring system, eventual home control and using smart phones which are android based, the authors have developed a system using REST based Web services that properly does not require a controlling environment or a dedicated monitoring server PC for the overall control meaning sores.

Customized IoT sensors play an role for energy efficiency of smart home devices. With IoT sensors, the home-owners can actively optimize energy supplies as needed to avoid energy waste and generate savings. IoT sensors also contribute to home environment monitoring by actively detecting pollutants or other harmful gases in the home environment and alerting the homeowner to take correction in a timely manner.[24] Additionally, IoT sensors enhance the social well-being of smart homeowners by bringing more comfort and convenience in their lives.

Interoperability is critical for the network to seamlessly and autonomously integrate all IoT sensors in the smart home power system. To achieve, need to develop abasic standards. One such standard, which is targeted towards massive IoT sensor penetration in smart home power systems, is 5G. It is on the path of development and should be available for use by 2020. With 5G, low-cost and efficient communication with increased network bandwidths and coverage will be possible.

In paper,[26] an advanced implementation for IoT is monitoring Environmental Conditional at Homes is been introduced in an effective domestic condition within a reasonable cost effective system. The detailed description about the integrated network architecture and the interconnecting mechanisms for most virtual measurement methods of parameters by transmitting data via internet using sensors is being presented here in a designed manner. The longitudinal learning system was able to provide self-control mechanism so that it will help for better operations of the devices in monitoring stage.

Cloud Computing for IoT & Sensing Based Applications published here is a concept that gives the idea for complete part of internet.[27] loT includes the application level of a vast area of electronic gadgets. Once it is connected it plays a very sequential role in all areas of communication, hospitality etc. Similarly devices are connected to internet which provides many kinds of services in real time application and transferring data eventually .The architectural design of computing using cloud is highly authorized that can be easily grouped as Infrastructure, software and applications (SaS). Cloud based platforms help to connect to the things (LaaS) around us so that we can access anything at any time and any place in a user friendly manner.[28]

III. Problem Statements, Explanation and Solutions

From this survey, many common observations are observed related to the problems pertaining to Iot during designing stages. Some common problems are notified in this surveys are as follows and the possible solutions to overcome are also suggested.

Problem 1: Domestic energy meter reading exist a variety of technical problem.

Explanation: The GSM technology with domestic energy meter reading had too low rate, no two way communication and tragic billing system.

Solution: Internet of things has been introduced in the energy meter by replacing the old GSM technology.

Problem 2: The survey and calculation of power used was hard.

Problem 3: Excess usage of energy.

Explanation: The customer does not maintain an average and controlled usage of electricity.

Solution: The **s**ystem provides a function to ON/OFF the electricity supply using the web page created with partial automation system.

CONCLUSION

Connectivity & networking factor of the IoT is discussed in this paper and consumption energy calculation based on the pulses calibrated is measured and is designed and implemented using PIC16F877A MCU in a domain of embedded system. In the proposed work using PLC as well as the IoT meter reading is done so that a system is designed in which the power source can be disconnected whenever the customer is reluctant to pay bill on time also it avoids human intervention, delivers effective meter reading, prevent the billing mistake, with monthly information updating of the power used and comparison values between the present and previous month. Enables energy saving by automatic on and off of the electronic appliances in a room depending on the number of visitors inside the room, indicated with display setting .Overall the main advantage is the placement of IoT over GSM.

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