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Smart Electricity Energy Meter Embedded in an IOT Platform

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ABSTRACT: A smart meter system for office and industrial environment is being designed in this system. Previously electromechanical meter device which helps in determining billing charges are monthly basis and are computed in kilowatt-hours. To solve this problem, we propose a detailed architecture and an implementation of a smart energy meter using the portion of the smart grid on customer premises which is embedded in an internet-of-things platform. Our approach has four aspects of novelty and advantages with respect to the state of the art as seamless integration of smart grid with smart home applications in the same infrastructure, data gathering from heterogeneous sensor communication protocols, secure and customized data access, univocal sensor and actuator mapping to a common abstraction layer on which additional concurrent applications can be built which is flexible to user interface. The emerging field of wireless sensor networks combines sensing, computation, and communication into a single tiny device.

KEYWORDS*:* Demand side management, internet of things, power meter, smart grid, raspberry pu3.

I. INTRODUCTION

Now days in each and every sector there are many people consuming electricity. The people are not satisfied with the services provided by power distribution companies, also electricity authority. The administration likewise understands the issue happening in the current framework. Today worker of the organization visits every single house take the photograph of the meter or note down the readings of the meter due to which time required to take preview increments. This preview is put together by the worker to the organization databases. Presently from the submitted preview bill is produced. Because of parcel of human mediations precision in the bill generation is not accomplished. Blunder rate is high. In the event that the entryway is shut for over two months then the bill is figured all things considered of last a few months. Due to this purchaser confronts issue for adjusting the bill. Commonly wrong depiction is gone up against wrong individuals name; this is additionally the real issue. This requires extensive number of labor and furthermore long working time to register the bill. At some point meter is additionally situated at the remote area where it is impractical to reach in first visit. In the primary visit work is not done because of which representative needs to return to the site. Now and again the printed charge gets lost or it is not conveyed to the fitting address. The nation like India which has tremendous populace requires extended periods to produce the bill. So we are proposing an answer for this issue. Where we are utilizing IOT based electric bill generation where we are checking the electric meter persistently and produce the bill in light of utilization of power. For reference we are alluding portable PC battery and in light of utilization of portable PC battery bill will be created. The utilization of the battery is as far as rate we will change over it as far as units and ascertain the bill. Because of this there will be no intercession of human so there will be no mistake in the bill generation.

II. OBJECTIVES

The objective of the proposed system is given below

- To solve the problem of customer domain of the smart grid naturally blends with smart home and smart building systems, but typical proposed approaches are “distributor-centric” rather than “customer-centric,” undermining user acceptance, and are often poorly scalable.

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- The gateway can have reduced hardware requirements and computational complexity. Our gateway has only to ensure an IP connection, to implement the encapsulation of the nodes' native protocol into TCP/IP packets, and to ensure the security level required by the specific application.
- Different applications and new functionalities can be developed and added without modifying the gateway.
- The user side of the platform can communicate at the application level directly with network nodes.
- Fine transmission and clear display units.
- Wireless data transmission.
- Data acquisition system.
- Time integrity.

III. LITERATURE SURVEY

In literature, the problem and the previous techniques of healthcare monitoring system is described

Ruofei Ma et al. [1] the difficulties and utilizations of communication technologies in SG are discussed. In particular, recognize three noteworthy difficulties to execute SG correspondence frameworks, including standards interoperability, cognitive access to unlicensed radio spectra, and cyber security. The issues to execute SG communications on an evolutional way and its future patterns are moreover addressed. The aim of this paper is to offer a comprehensive review of state-of-the-art researches on SG communications. The key communication technologies for SG have been identified and their state-of-the-art research activities were reviewed. In addition, the issues on security and wireless sensor networks for their applications in SG have also been discussed. Future SG should comprise intelligent monitoring systems to keep a track of all electricity flows and must be flexible and resilient to accommodate new communication systems.

Peter Palensky et al. [2] Demand Side Management (DSM) is a portfolio of measures to improve the energy framework at the side of consumption. It ranges from enhancing tariffs with incentives for certain consumption patterns, up to sophisticated real-time control of distributed energy assets. This paper gives an overview and a taxonomy for DSM, analyses the various types of DSM, and gives an outlook on the latest demonstration projects in this domain.

K. Samarakoon et al. [3] The U.K. transmission framework operator, NGET, has demonstrated that it is beneficial if domestic appliances can notify their accessibility for demand response periodically. Therefore, the number of power measurements needs to be sent to NGET at one minute interval, to notify the amount of controllable loads available, was calculated.

J. Byun et al. [4] recently, smart grid innovation and green IT is developing. Many reviews and improvement identified with this theme have been done by different analysts everywhere throughout the world. This paper proposes a smart energy distribution and management framework. Consider coordination of another sustainable power source framework, dynamic example based shrewd administrations, and versatile request administration to make the dissemination and buyer part (in keen frameworks) more vitality productive and smart. Expect that our work will add to the advancement of novel home and building energy distribution and management framework. . With a specific end goal to confirm the proficiency of our framework, they actualized our framework in genuine proving ground and complete a few tests. The outcomes demonstrate that a decrease of the service response time and the power consumption are approximately 45.6% and 9-17% respectively.

Francesco Benzi et al. [5] The communication between electricity smart meters and households offers a number of opportunities to the privates and the community in a world urging for solutions intended at energy saving. This paper has shown that a number of available and technically sound solutions are at hand and make it possible the implementation of a local interface offering to the end user added services related to energy saving and home automation. The arrangements proposed and examined here depend on open interfaces and different physical media (twisted pair, wireless communication, power line, and Web); the features, points of interest also, issues of each of them have been focused. In conclusion, whatever is the choice, new improved architectures are implied for the entire grid system, where the meter should be endowed with a greater autonomy from the concentrator and could interact more effectively with the house, making plenty of data and information accessible.

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Qinran Hu et al. [6] this paper presents a hardware design of a smart home energy management system (SHEMS) with the application of communication, sensing technology, and machine learning algorithm. With the proposed design, consumers can achieve a RTP-responsive control strategy over residential loads including EWHs, HVAC units, EVs, dishwashers, washing machines, and dryers. Also, they may interact with suppliers or load serving entities (LSEs) to facilitate the management at the provider side. Facilitate, SHEMS is planned with sensors to identify human exercises and afterward apply machine learning algorithm to intelligently help consumers reduce total electricity payment without much involvement of consumers.

IV. PROPOSED SYSTEM

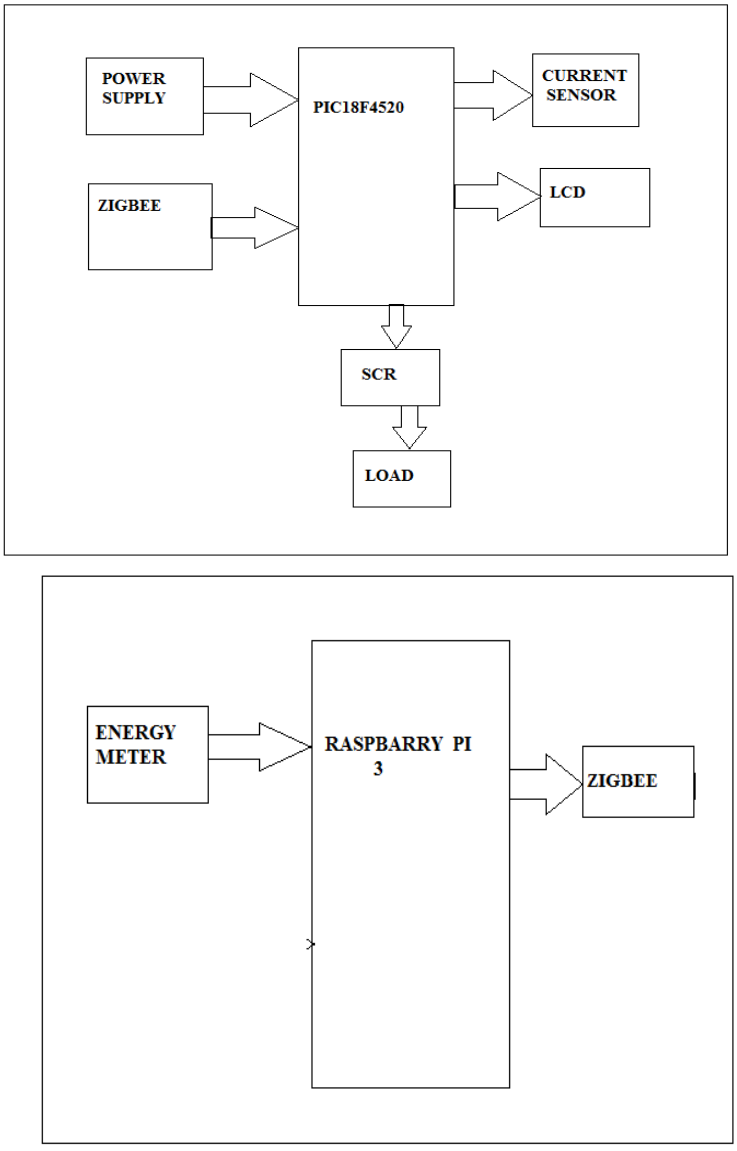

Fig. System Architecture:-

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Description and Working:-

A traditional power grid consists of a large number of loosely interconnected synchronous Alternate Current (AC) grids. It performs three fundamental capacities: era, transmission and distribution of electrical energy, in which electric power flows only in one direction, i.e., from a service provider to the consumers. Firstly in power generation, a number of large power plants generate electrical energy, mostly from burning carbon and uranium based fuels. Secondly in power transmission, the electricity is transmitted from power plants to remote load centers through high voltage transmission lines. Thirdly in power conveyance, the electrical circulation frameworks convey electrical vitality to the end customers at diminished voltage. Each grid is centrally controlled and monitored to ensure that the power plants generate electrical energy in accordance with the needs of the consumers within the requirements of energy frameworks. Almost, all the era, transmission and appropriation of electrical vitality is claimed by the service organizations that give electrical energy to consumers and bill them accordingly to recover their costs and earn benefit.

Raspberry pi board:

Raspberry Pi is a credit-card-sized single board computer developed in the UK by Raspberry Pi foundation with the intention of stimulating the teaching of basic computer science in schools. It has two models; Model A has 25 6Mb RAM, one USB port and no network connection. Model B has 5 12Mb RAM, 2 USB ports and an Ethernet port. The foundation provides Debian and Arch Linux ARM distributions and also Python as the main programming language, with the support for BBC BASIC, C and Perl.

LCD

A liquid crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals (LCs). Their programming is also same and they all have same 14 pins (0-13) or 16 pins (0 to 15). ALL LCDs have

- Eight (8) Data pins
- VCC (Apply 5v here)
- GND (Ground this pin)
- RS (Register select)
- RW (read - write)
- EN (Enable)
- V0 (Set Lcd contrast)

Zig bee

ZigBee is an IEEE 802.15.4-based detail for a suite of abnormal state correspondence conventions used to make personal area networks with little, low-control digital radios , for example, for home robotization, restorative gadget information gathering, and other low-control low-data transfer capacity needs, intended for little scale ventures which require remote association. Hence, ZigBee is a low-power, low data rate, and close proximity (i.e., personal area) wireless ad hoc networkThe working of the system is as follows The SCR is the A silicon controlled rectifier or semiconductor-controlled rectifier is a four-layer solid-state current-controlling device which is used to check the light brightness then according from the brightness the various parameters of the light i.e. power voltage and the current given to the raspberry pi module 3 through the zig bee model and the raspberry display the result on the LCD as well as the energy meter reading is displayed on the web page.

V. CONCLUSION

The proposed system is used for the detection of the energy meter using the raspberry board and the zigbee the SCR is used to calculate the light parameters and the overall result is displayed on the web page. The system possesses the good results than the previous methods.

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