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Smart Home Management

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ABSTRACT

Smart home refers to a house in which number of interconnected devices and home appliances are performing certain actions in order to monitor energy, optimize its usage and thus save money. a smart home represents also a home that satisfies its need on an intelligent and flexible ways, responding to the needs and comfort of its dwellers. The proposed project smart home management (SHM) consist of two designs. First an energy management system (EMS). Energy management system is used to know the power and current consumption in an appliance. Second a smart home management system (SHMS). This system enables the dwellers to control and manage the appliances their own. This project smart home management system is proposed that can be access and control the home equipment from every corner of the world. The aim of this project is to present an cost effective energy management system design and implementation suitable for frugal smart Home.

INTRODUCTION

A smart home represents a home that satisfies its needs in an intelligent and flexibles ways, responding to the needs and comfort of its dwellers, enabling them to control and manage consumption of their own green energy sources. Indeed,the term smart home is very broad. Being relatively new technology each can have a smart home-specific definition. Smart home management software uses all computer and communication technologies to reduce energy consumption of a home and makes possible to centralize and control several essential controls of a building, such as, heating, lighting, cooling, energy management and centralized accesses. In this project, we focus on proposing a solution of continuous monitoring system constituted by connected energy metering and control devices based on esp32 and remotely controlled, via wifi, current and voltage smart meters/switches. This cost effective monitoring system is wireless connected to an application installed in a computer mobile device, to collect energy production/consumption data and operates control actions. The collection of data is done via sensors (current, voltage, power factor, ...)

LITERATURE SURVEY

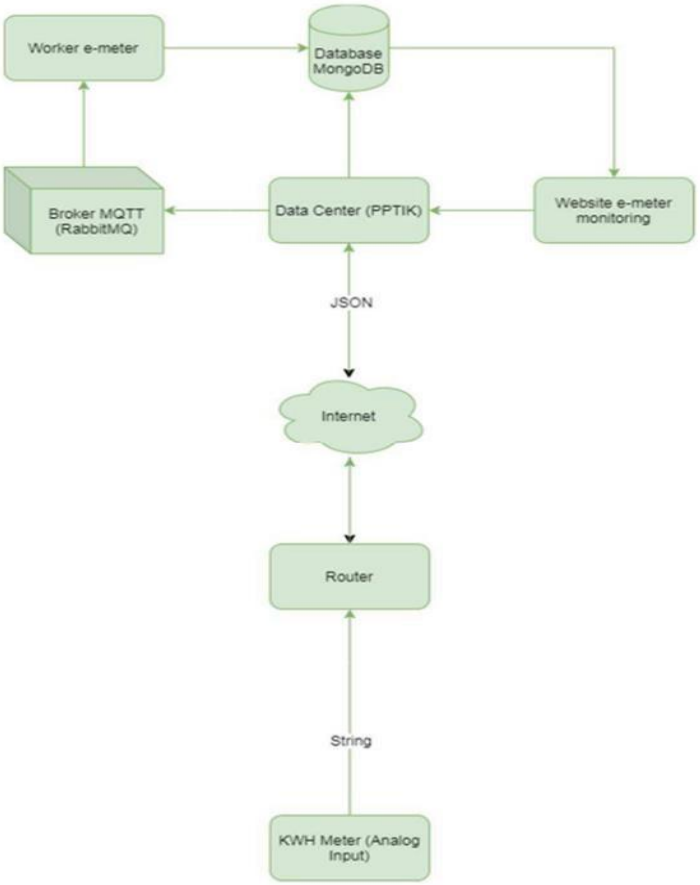
[1] Farzana Shabram,Tawfat-UI Islam, Subroto Saha,Hasin Ishraque ,2020 IOT based smart home automationand demand based optimum energy harvesting and management technique

Automation technique effectively reduce the energy consumption and lessen the load on national grid by including a smart energy management system. Here, The proposed algorithm which controls the usage of the household electric loads based on the peak or off-peak hours of national grid and the battery voltage level of the solar system. Finally, this intelligent automatic system gives timely update to the user about the peak and off-peak hours. It helps the consumers to decide when to use the high power electric loads and save energy and money accordingly.

[2] Muhammad Fahmi Nurfadilah, Nurman Hariyanto, Ary Sejitadi Prihatmanto, Reza Darmakusuma, Rifki Wijaya, Vitradisa Pratama, 2020 Energy saving management with suggestion method in home sutomation based on user habits

Smart meter design helps the users to track their energy consumption from LCD display and Android application. The IoT concept can also be implemented in various working environment such as home automation, automatic water level detector and traffic control system etc. Smart meter system with consumer control in energy saving events corresponding to smart grid concept. The active and non-active power bi- directional measurement can be made in non-sinusoidal conditions without reducing accuracy. The energy power management structure is built using

multiple low-cost microprocessors to increase its feasibility that contains smart meter, smart plug, and smart home energy saving system. The power information visualization platform based on smart meter which makes full use of the existing architecture of intelligent power information acquistion system. The data is used to monitor the energy consumption by means of two-way communication between provider and consumer. The use of smart meter to embed the control logic is used to reduce the cost of controller and to increase the robustness of the system. Sending data which is not small through network may increase the cost of power management an operations. The linear regression method for trams to predict the energy consumption of urban trams and does not reduce the energy consumption of trainsto every station



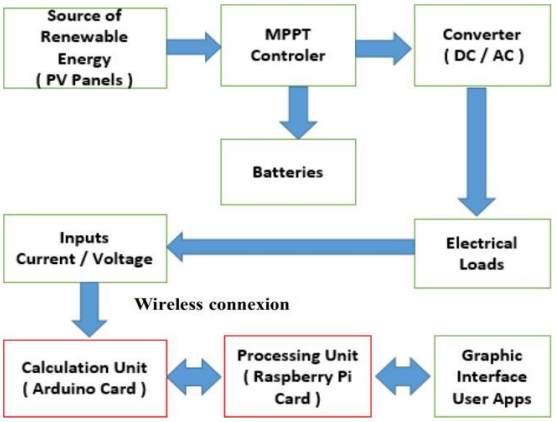
Home automation architec

[3] Q. Wang and Y. G. Wang, "Research on Power Internet of Things Architecture for smart grid demand" 2018 2nd IEEE Conference on Energy Internet and Energy System Integration (EI2), Beijing, 2018, pp.1-9.

The existing power communication networks, data networks and switching networks are designed only for the original specific services, and the carrying capacity of a large number of new services emerging in the construction of smart grids and power Internet of Things is uncertain. In the power Internet of Things, all power facilities have intelligent and interactive functions, and finally the communication between the operation and management personnel, the operation management personnel, the power facilities, and the power facilities can be communicated through the network. This poses a severe challenge to the existing power communication network system. At present, it is necessary to explore the network architecture and implementation scheme of the information exchange between the current network and the present. Build a ubiquitous network that can support the communication needs of various new services in the future, support flexible access at any time, any place, any device, any service, and provide "plug and play" power communication security and security for the power Internet of Things. Reliable and economical communication services will be the research content and development goals of current power communication networks. As an infrastructure and supporting environment for building a ubiquitous information society, ubiquitous networks will become an important target for the development of information and communication network infrastructure.

[4] LARAKI Mehdi , Yassine Ouallou, Oussa Mohamed, Aawatif HAYAR Smart City Team / RITM Laboratory / CED ENSEM / GREENTIC Université Hassan II Casablanca, Morocco

Due to the latest electronic techniques and the advances in energy systems, Telecommunications and information technologies, the different units of a building or house can be controlled by the same remotely programmable smart home management centre, depending on your lifestyle, several control scenarios can be set up remotely, via a smartphone or via smart hub as an indoor/outdoor service. This paper proposed an intelligent platform with a minimum of electrical and electronic equipment. Thus, this proposed platform represents a new Smart Home's energy management for frugal smart cities with a low cost.



[5] Guo, Y., Pan, M., Fang, Y., Khargonekar, P. P., 2012. Coordinated Energy Scheduling for Residential Households in the Smart Grid, IEEE Smart grid communication.

Demand side management (DSM) is a key component in the smart grid, which can help reduce peak load, increase grid reliability, and lower generation cost. There are mainly two types of demand side management techniques: direct load control (DLC) and demand response based on time-varying pricing. In DLC, the load serving entity, usually a utility company, enters into a contract with the consumers beforehand, so that certain amount of energy load can be curtailed during the peak hours in order to release the congestion on the power grid or to avoid the operation of high cost peak generators. Currently, it is mainly adopted by large industrial and commercial customers. On the other hand, the demand response based on time-varying pricing encourages the customers to adjust their normal energy consumption, either reducing or shifting consumption, in return for some benefits, such as reduced electricity bill. Several popular schemes already exist in this regard, such as critical-peak pricing, time of-use pricing, and real-time pricing. In the smart grid, it is expected that there will be a widespread deployment of such demand response programs for residential customers due to the existence of advanced metering infrastructure (AMI), which can provide two-way communication between utility companies and smart meters.

CONCLUSION

The IoT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer based systems, and resulting in improved efficiency, accuracy and economic benefit. Smart home energy system is a cost effective and sustainable energy IoT based system in which renewable energy production and consumption infrastructures are integrated, interconnected and coordinated through energy mobile apps, active users, and enabling technologies. The aim of this project is to present cost effective smart home architecture based on algorithms for smart energy control. The proposed smart home system is a contribution to promote low cost IoT solutions for smart home energy management in the context of frugal smart cities and smart villages.