

## **EMERGENCE OF SMART ASSEMBLY CONCEPT IN MANUFACTURERS AND ITS ADVANTAGES: A OVERVIEW**

**BiswajitSen Gupta<sup>1</sup>,Dr. Amit K Srivastav<sup>2</sup>**

**Department of Management**

**<sup>1,2</sup>Shri Venkateshwara University, Gajraula (Amroha), U.P. India**

**Abstract-**Some of the most important advantages provided by the smart grid derive from its capability of improving performance reliability and customers' responsiveness. The rapid advancements in ICT solutions and smart metering are well suited to tackling the limitations above of existing power grids. The conversion of traditional electricity grids into smart grids ensures productive interactions among energy providers, users, and other stakeholders. The advent of smart grids has fostered the deployment of smart meters, low-cost sensors and smart load devices, and the integration of ICTs in residential energy management programs. The combination of advanced ICTs increases the efficiency of the traditional grid by providing more automation, a reliable forecast of electrical loads, and a safer operation of electrical appliances, resulting in a rise in the quality of the energy delivery service and higher overall user satisfaction. New ICT infrastructures supporting a more efficient smart grid will also include frequent price updates to follow the evolution of the balance between supply and demand in near real-time. This article primarily focuses on developing of a main control board prototype and two Graphical User Interfaces (GUIs) on computer and smart phone and to explore the IoT smart home adoption and its importance of proper level automation.

**Keywords:**

### **1. Introduction**

Automation performs an increasingly vital role in daily experience and the global economy. Engineers strive to combine automated devices with mathematical and organizational tools to create complex systems for a rapidly expanding range of applications and human activities. The concept of home automation has been around since the late 1970s. But with the enhancement of technology and smart services, people's expectations have changed a lot during the course of time to turn the traditional house into smart home perfectly, and also think that what a home should do or how the services should be provided and accessed at home to become a smart home and so has the idea of home automation systems.

Many existing, well-established home automation systems are based on wired communication such as Arduino based and raspberry pi based home automation systems. It does not pose a problem until the system is planned well in advance and installed during the physical construction of the building. But for already existing buildings, the implementation cost goes very high. In contrast, Wireless systems can be of great help for automation systems like Bluetooth, WI-Fi, and IoT based home automation systems. With the advancement of wireless technologies such as Wi-Fi, cloud networks in the recent past, wireless systems are used every day and everywhere.

Home automation systems suffer four main challenges; these are poor manageability, inflexibility, difficulty in achieving security and high cost of ownership, the main objectives of this research is to design and implement a home automation system using IoT that is capable of controlling and automating most of the house appliances through an easily manageable web interface. The proposed method has high flexibility by using Wi-Fi technology to interconnect its distributed sensors to a home automation server. It will decrease the deployment cost and will increase the ability of upgrading, and system reconfiguration [1,2].

## **2. APPLICATIONS OF SMART METERING AND HOME APPLIANCES' POWER SIGNATURES**

The increasing of the electrical network after some time and the way that it is broadly interconnected was the main explanation behind the occurrence of what is called now the smart grid. The distinction between a force network and a smart grid is that the last uses digital technology to accumulate information used to improve the services. Consequently, it can say that one of the needs of the new sort of network is to create a connection between the users and the providers of electric force.

This new infrastructure allows both utility providers and outsider companies to develop different applications that offer explicit types of assistance to their clients. These applications offer various potential outcomes for the examination of the working method of the force network and permit better control of energy consumption costs.

Future purchaser devices might be sufficiently smart to communicate with the grid infrastructure and metering devices, depict their energy needs, and select the ideal use design based on the best accessible tariff and technical help and analysis. In the course of the most recent decade, critical changes have happened in the territory of both force systems and figuring systems. It is except to propose and develop applications over smart grid power infrastructures that monitor, break down, arrange, and describe different electronic equipment connected to this infrastructure.

The present research targets talking about the future applications of Advanced Metering Infrastructure (AMI) and how they can utilize purchaser electronic equipment power marks. At last, we mean to stretch out the smart grid to the client location and construct a network of smart meters that monitor all appliances. AMI is a technology work from smart meters, communication interfaces, and communication infrastructure. Today smart meters can dissect power consumption varieties of customer devices and may send this information to the service organization. The companies use data got from their clients to generate their energy charge and predict and upgrade the energy distribution load designs. Instead, we propose gathering, putting away, and handling data from smart meters locally and utilize their capacity marks to develop smart user application [3,4].

### **3. Home automation using Android ADK**

The devices of home are associate to the ADK and the Connection is established between the Android device and ADK. The devices of house are link to the input/output ports of the board (EMBEDDED SYSTEM) and their current situation will have passed to the ADK. The microcontroller board (Arduino ADK) is based on the ATmega2560. It has a USB host connection to associate with Android based phones, and that is based on the MAX3421e IC. The two important features of Android Open Accessory Protocol 2.0(AOAP) are as follows: It has audio output that is from the Android device to the component and it also support for the component serves as one or more Human Interface Devices (HID) to the Android device. This research depends upon Android and Arduino platform in which both are FOSS (Free Open Source Software). Including motion sensors for safety systems will detect an unauthorized action and it will automatically notice the user through cell phone or the security system.

#### **❖ Cloud Based home automation system**

Home Automation using cloud-based system focuses on design and implementation of home gateway to collect data about data from home appliances and then send to the cloud-based data server to get store on Hadoop Distributed File System, it is processed using MapReduce and use to implement a monitoring tasks to Remote user Presently home Automation System is persistently developing its resilience by assimilating the current characteristics which gratify the rising interest of the people. This research presents the design and development of a home automation system that use cloud computing as a service.

The current system consists of three important units: the first part is a cloud server, handle and controls the data and information of client and users and the status of devices the hardware interface module is the second part which implements the relevant connection to the actuators

and sensing devices which give the physical service. The last part is the Home Server, which constructs the hardware device and provides the user interface.

This research focus to build the web services using cloud which is need for security and storage and availability of the data. The current system is cost-efficient, reliable, and comfortable, which also gives a secured home automation system for the entire family. The system is made up of various client modules for multiple platforms.

Cloud Server is a central server aims on implementing services to the other sub modules. Central server serves as the data respiratory system and brain it implements three connections to the three sub modules viz home system, web configuration tool and mobile. The server evaluates the data it takes from the house send current status to the mobile device and vice versa. A database is managing by the server and it is status gets updated as per the changes done at home end [5].

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The variety in time of the force devoured by an electrical device when executing an undertaking is characterized as the force mark of that device. It very well may be seen that, right now, power mark is explicit to a specific device when executing a particular undertaking. In our past work, we described various classes of devices (for example, clothing machine, refrigerator, bread machine) based on their capacity marks.

The method proposed right now the programmed detection of breaking down for low-insight buyer electrical devices. Inconsistency detection is made by contrasting the present force signature and an ideal mark (standard mark) meant to be provided by the maker. Areas of the sign that are not indistinguishable are considered breaking down for the device [6,7].

## **5. SMART HOME AND HOME AUTOMATION TECHNOLOGIES**

A "smart house" that reacts to the dweller's needs and desires by adjusting lighting, temperature, even ambient music has shown up in sci-fi for a significant part of the twentieth century. From LeCorbusier's vision of the house as a machine for living to Negroponte's Architecture Machine, home automation technologies are the most recent augmentation of a century-long interest with lodging and component. Be that as it may, with the development of new electronic technologies and their mix with more seasoned, traditional building technologies, the intelligent home is finally turning into a genuine chance.

The fundamental idea of home automation is to employ sensors and control systems to monitor an abode, and in like manner, alter the different instruments that provide heat, ventilation, lighting, and different administrations. By more intently tuning the abode's mechanical systems to the dweller's needs, the automated "intelligent" home can provide a more secure, increasingly comfortable, and progressively efficient dwelling.

For instance, the electronic controller of an automated home can decide when the dwellers have hit the sack and mood killer the lights and lower the indoor regulator; it can monitor criminals

and alarms; it can foresee hot water use and streamline the activity of the water heater. The Smart House Project was started in the mid-1980s as a task of the National Research Center of the National Association of Home Builders (NAHB) with the cooperation of an assortment of major mechanical partners. The "smart house" technology is one acknowledgment of home automation ideals utilizing a particular arrangement of technologies. In Smart House technology, the abode is set up with a single multiconductor link that incorporates electric force wires, communications links for telephone and video, and different conduits that interface appliances and lights with electronic devices that control the inventory and exchanging of intensity.

A chief advantage asserted for the Smart House technology is safety. With current technology, the electric force is provided to all appliances that are plugged into a divider outlet. Cutting a wire, embeddings a screwdriver into a divider outlet or a shortcoming inside the appliance can bring about a serious electric shock. The Smart House, interestingly, provides power just to outlets that have appliances plugged in and turned on. The smart house controllers monitor the circuit, disengaging power at the main sign of a short out or other disappointment.

The Smart House cabling provides a single outlet for force and communications; gas is provided through flexible tubing and its own, speedy interface outlets. Likewise, Smart House technology can automatically control the temperature, humidity, and lighting in the home on a room by room premise. A third advantage is the economy. The Smart House technology would modify the force provided to every appliance as per need. In the traditional plan, every appliance is provided with adequate capacity to provide for its peak use.

Also, the Smart House controllers could plan the activity of substantial force consuming appliances (for example, dishwashers, electric water heaters, and climate control systems) to exploit off-peak electric rates. These alterations could bring about lower utility costs. A great deal of foundation has been done to facilitate the building business framework in preparation for putting up Smart House technology for sale to the public. Regardless of whether Smart House and other home automation technologies prevail at changing standard residential development, obviously, probably a portion of the advancements are now entering the marketplace, yet in fragmentary structures. For instance, ground issues interrupted circuits, which recognize an electric shock occurrence (a "ground deficiency") and shut down promptly, are currently commonly utilized in bathrooms, kitchens, and in outside outlets [8].

## **6. Conclusion**

Home Automation industry is growing rapidly nowadays and enters quickly in this emerging market quickly. A home automation system integrates electrical appliances in a house with each

other and includes centralized control. Home Automation can undoubtedly make life at home much easier. For the millions of people affected by disabilities and also the elderly population, it can make a life-changing difference. This thesis presents the overall design of the Home Automation System (HAS) with low cost and wireless remote control.

This research of different home automation system shows that there are various kinds of technologies used to implement this type of system. All the proposed methods have been presented and compared in this research, which reveals some merits and demerits of the systems. This review explained different home automation system e.g., Web-based, Bluetooth-based, mobile-based, SMS based, ZigBee-based, Arduino microcontroller-based, Android app-based, IoT based and cloud-based. Due to its performance, simplicity, low cost, and reliability home automation system are making its position in the global market, that day is not so far when every home will be the smart home.

Internet of Things is creating a new wave in the field of healthcare, defense, business, aerospace, etc. Here a short description of the internet of things; its components and working scenarios are adequately described. An illustration of the working is explained in the context of the automation of home appliances. It can be extended to any application to any scenario. The Internet of Things is on a developing stage, and a small attempt is made to implement the concept using this application.

The smart home networks are currently influencing the people for a quality lifestyle. Soon IoT will connect even the simplest devices in the home to the internet. This research summarizes the available standards in the market, which are the building blocks of the home network and innovation. Also, the challenges in the smart home network are addressed based on its connectivity. For low power needs, ZigBee modules are used, and for higher bandwidth applications, WiFi is dominant. Hence the degree of standardization between the protocols is small in a smart home network.

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