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ONLINE INTERACTIVE HOME

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ABSTRACT

This paper presents design and implementation concepts for a wireless real-time home automation system based on Arduino Mega microcontroller as central controller and Uno as sub controller.Based on Internet of Things (IoT) we have made a novel approach on making an interactive house with interconnectivity through Wi-Fi. Here at each section of house anIoT module along with a controller/processor is placed which is connected in an Adhoc network to provide a seamless data transfer between the central system and sub controller. The controllers monitor the User actions and Power consumption and provide automation and monitoring for a proper and comfortable living. Here the user interaction is captured by the Sixth Sense technology, one of the developing research topics where the physical world and digital world are augmented by sensors and camera for real time image processing for enhanced user interface. Thus it provides ease of access to any object in the home at the pinch of the fingers.

I. INTRODUCTION

Nowadays, homes are increasingly expected to meet higher and more complex performance requirements. Among these requirements, energy efficiency is recognized as an international goal to promote energy sustainability of the planet. Different approaches have been adopted to address this goal, the most recent relating consumption patterns with human occupancy. In this work, we analyze what are the main parameters that should be considered to be included in any home energy management. The goal of this analysis is to help system to select the most relevant parameters to control the energy consumption of the home according to their context, selecting them as input data of the automation system.

The home is entwined with a sensor network and gesture capturing system (GCS) to provide interaction between the computer server and the user. The GCS captures each movement of the user and gestures made elegantly and trigger the main server for corresponding response. Then the main server matches the gesture with its corresponding response and implements the action. The main objectives of this work are Power Management, Improve Comfort Level, Enhanced Security System, Interacting with Objects, Sixth

Sense Technology, Interface to Internet, Frontend Software for users and remote access.

II. Existing System

Smart Home Using Different Wireless Connectivity's by YugandharaBelgi, AnuragShinde, PravadaDeshmukh - International Journal of Scientific & Engineering Research, Volume 5, Issue 2, February-2014.

The home Automation System in fig.1 allows different wireless connectivity's for controlling and monitoring the home appliances using smart phone or tablet. There are different connectivity's introduced such as GSM, WiFi, Zigbee and Bluetooth. Each connectivity has different specifications, merits & demerits. According to their merits & demerits they are used for the home automation system. In this paper they have explained the different wireless connectivity's for Home Automation Project and among all we prefer the Bluetooth technology because Bluetooth connectivity has low cost, easily synchronized to the mobile phone.

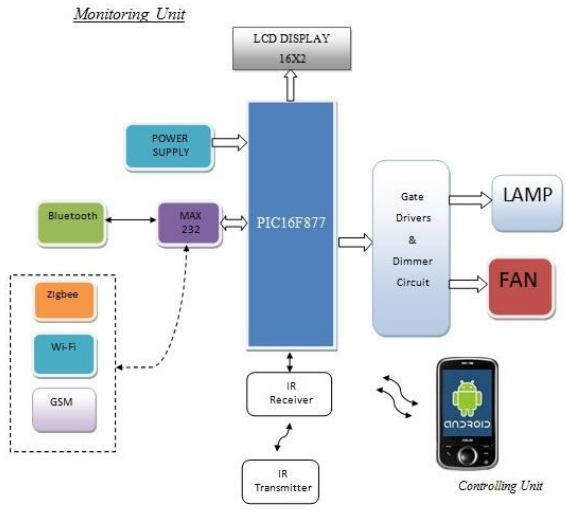

Fig.1. Existing System - Home Automation with Bluetooth

III. Proposed System

In our work depicted by fig.2, the cons of the existing system are rectified such as lack of internet connectivity and addition of Power Consumption monitor and Energy saving mechanisms. In a word, it is a superior updated Smart home. The various buildings blocks of our system are:

1. Internet of Things (IoT)

The use of the Internet as a global platform for letting devices, machines and smart objects to communicate, dialogue, compute and coordinate is unleashing a new world order.It is predictable that, in the coming decade, the Internet will exist as a seamless fabric of classic networks and networked objects.

- Class Networks - network of PCs
- Networked objects - IoT

Content and services will be all around us, always available, paving the way to new applications, enabling new ways of working, new ways of interacting (foot rug), new ways of entertainments and new ways of living shown by fig.3.

The term IoT is broadly refers to both the global network interconnecting smart objects by means of extended Internet technologies and the set of supporting technologies necessary to realize that vision and the ensemble of applications and servicing leveraging such technologies to open new business and market opportunities. It also facilitates high-end data security with AES 128bit encryption so it is a reliable secured accessing scheme.

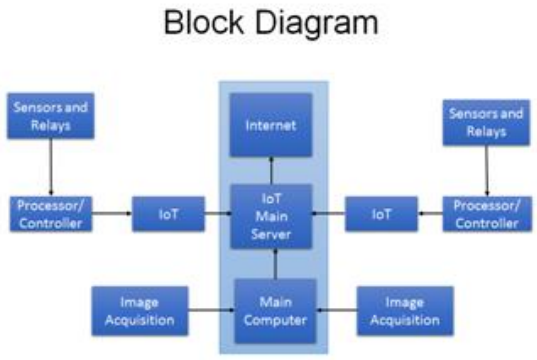

Fig.2.Proposed System –Online Interactive Home

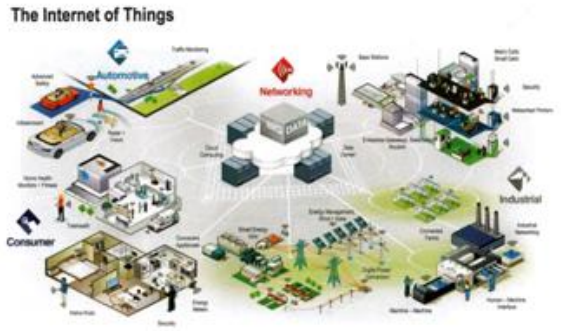

Fig.3. Internet of Things

The important characteristics of Internet of Things are described as follows:

I. Interconnectivity: According to the concept of Internet of Things anything can be connected with the global communication and information infrastructure.

II. Things-related Services: Various things related services such as privacy protection, semantic consistency between physical things and their associated virtual things can be provided by IoT.

III. Heterogeneity: The devices which are interconnected with the IoT infrastructure are heterogeneous in nature as they require different hardware platforms and network environment.

IV. Dynamic Challenges: The state of various devices which are present in the IoT can change dynamically for example sleeping/waking up, connected/disconnected etc. Moreover it uses the dynamic topology of the network.

V. Enormous Scale: As the internet of things is not a single technology here various new technologies are connected and enabled. The enormous scale of Internet of Things talks about the higher order of magnitude associated with the various devices of IoT.

2. Sensor Network

In our work, the system is a multilevel combination of multiple sensors and cameras which accurately captures the actions of each individual at home and serves as a virtual hand working their works. It is close to Artificial Intelligence in augmenting user interactions with its corresponding response. Sensor networks consist of the sensors and hardware, firmware and a thin layer of software framework where the IoT consists of many thing including sensor networks. Since many years sensor networks are designed and developed for some specific application purpose from now on some of the recent study says that it will be applicable in the field of IoT for general purpose such as some sensors will be deployed nearby a newly builtbuilding to sense its structural condition thus that will definitely reduce the labour work. It also have been found that the existence of IoT infrastructure is nothing without sensor network as the SN provides the majority of the hardware and infrastructure support (e.g.Sensing and Communication).

3. Sixth Sense Technology

Every one of us is aware of the five basic senses - seeing, feeling, smelling, tasting and hearing. These senses have evolved through millions of years. Whenever we encounter a new object/experience our natural senses tries to analyze that experience and the information that is obtained is used to modify our interaction with the environment. But in this new age of technologies the most important information that helps one to make right decision is something that cannot be perceived and analyzed by our natural senses. That information is the data in the digital form, and it is available to everyone through sources like internet. The sixth sense technology concept is an effort to connect this data in the digital world in to the real world. The sixth sense technology was developed by PranavMistry, a PhD student in the Fluid Interfaces Group at the MIT Media Lab. According to him the sixth sense technology has a Web 4.0 view of human and machine interactions. The SixthSense technology contains a pocketprojector, a mirror and a camera contained in a pendant-like, wearable device. Both the projector the camera and sensors are connected to a coding device (in our case-a laptop) in the user's pocket. The projector projects visual information enabling surfaces, walls and physical objects around us to be used as interfaces; while the camera recognizes and tracks users' hand gestures and physical objects using computer-vision

based techniques. The software program processes the video stream data captured by the camera and tracks the locations of the colored markers (visual tracking fiducially) at the tips of the user's fingers. The movements and arrangements of these fiducial are interpreted into gestures that act as interaction instructions for the projected application interfaces. The Sixth Sense prototype is used to implement several applications that have shown the usefulness, viability and flexibility of the system.

4. Results and discussion

In the existing system Bluetooth is used for its less complex design capability and connectivity. But it is prone to many cons due to the lack of Internet Connectivity. It is rectified in our work by using IoT. The interface is made simpler by the sixth sense technology. Additionally in our work, the Home can be monitored from anywhere in the world which is the ultimate usage of IoT. Further, we can compare and monitor the power consumption levels with ease using android application in the smart phones which proves to be an invariable asset in today cyber-theft prone world.

5. Conclusion

In this paper, we've explained our project in depth which includes sensor networking with IoT and sixth sense technology. It will definitely prove to be an invaluable boon and world promoting project."Due to advancement in technology smart home system comes into picture using different wireless connectivity's" *et al* Yugandhara Belgi, Anurag Shinde, Pravada Deshmukh. So with wireless remote access from anywhere in the world, Home monitoring and control provides more than just Home automation. It provides the "Eye of the God" to watch over our home from anywhere.

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