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Using Internet of Things for Home Applications

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Abstract: *By implementing IoT along with a home automated system, which monitors the sensor data, like temperature, gas, light, motion sensors, and also actuates a process according to the requirement. For example turning the light on when it gets dark or when no movement has been recorded in a room for more than a specified time period.*

Index Terms— Home Automation; Internet of Things; Smart Homes; Wi-Fi Technology; Remote Accessibility

I. INTRODUCTION

The objective of this paper, is to find a cost effective solution that will provide controlling of home appliances remotely and will also enable maintenance of house-hold appliances.

The aim is to facilitate the users to automate their homes having complete access. The system is a cheaper alternative that gives the end user access to home appliances control system with an affordable cost was thought to be built that should be mobile providing remote access to the appliances and their complete wear and tear.

Appropriate maintenance of appliances has always been an issues when comes to most electrical appliances. In addition there was a need to automate home so that user can take advantage of the technological advancement in such a way that a person getting off the office does not get melted with the hot climate.

Therefore this paper proposes a system that allows user to be control home appliances and also alert when those appliances need maintenance on detection of malfunction or replacement via SMS to the home owner and the maintenance worker.

The Internet of Things (IoTs) can be summarized as connecting everyday objects like smart-phones, TVs and sensors to the Internet where the devices are interconnected to each other allowing new forms of communication between things and people, and between things themselves.

There are a number of issues involved when designing a home automation system. It should provide a user- friendly interface on the host side, so that the devices can be easily setup, monitored, and controlled.

Furthermore the overall system should be swift enough to realize the true power of wireless technology. Lastly the system should be cost effective in order to justify its application in home automation. To minimize the shortcomings of each system and to overcome the design issues previously mentioned, this project integrates locally and remotely controlled systems with the use of Cloud data network.

This allows the system to operate without the dependence of a mobile provider, allows the system to be used with various mobile phone platforms, and allows the system to operate locally when phone or computer access is not available.

II. RELATED WORK

Deepali Javale, Mohd. Mohsin, Shreerang Nandanwar proposed a paper to help handicapped/old aged people to interact using a home automated application on their Android phone/tab called Arduino Mega ADK and send command signals which is interpreted by the corresponding sensors or devices.

Sirsath N. S, Dhole P. S, Mohire N. P, Naik S. C & Ratnaparkhi N.S proposed a paper where a Home Automated system which used smartphones, cloud computing, sensors to give the user the remote access to lights and appliances in their home.

Basma M. Mohammad El-Basioni, Sherine M. Abd El-kader and Mahmoud Abdelmonim Fakhreldin proposes a new design for the smart home using the wireless sensor network and the biometric technologies. It employs the biometric in the authentication for home entrance which enhances home security as well as easiness of home entering process.

Basil Hamed proposed a paper to design and implement a control and monitor system for smart house. Smart house system consists of many systems that controlled by LabVIEW. The system also is connected to the internet to monitor and control the house equipment's from anywhere in the world using LabVIEW..

Kevin Ashton, "That 'Internet of Things' Thing", RFID Journal, July 22, 2009

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III. NEED

We need a cost efficient, flexible system which detects the faulty the appliances automatically and also alerts the technician and the home owner. As in many cases some people are not able move much from one place it is essential for them to develop a system which requires less human interaction. "Today computers—and, therefore, the Internet—are almost wholly dependent on human beings for information. Nearly all of the roughly 50 petabytes(a petabyte is 1,024 terabytes) of data available on the Internet were first captured and created by human beings—by typing, pressing a record button, taking a digital picture, or scanning a bar code. Conventional diagrams of the Internet ... leave out the most numerous and important routers of all - people. The problem is, people have limited time, attention and accuracy—all of which means they are not very good at capturing data about things in the real world. And that's a big deal. We're physical, and so is our environment ... You can't eat bits, burn them to stay warm or put them in your gas tank. Ideas and information are important, but things matter much more. Yet today's information technology is so dependent on data originated by people that our computers know more about ideas than things. If we had computers that knew everything there was to know about things—using data they gathered without any help from us—we would be able to track and count everything, and greatly reduce waste, loss and cost. We would know when things needed replacing, repairing or recalling, and whether they were fresh or past their best. The Internet of Things has the potential to change the world, just as the Internet did. Maybe even more so.

"Things are active participants in business, information and social processes where they are enabled to interact and communicate among themselves and with the environment by exchanging data and information sensed about the environment, while reacting autonomously to the real/physical world events and influencing it by running processes that trigger actions and create services with or without direct human intervention."

"The Internet of Things represents an evolution in which objects are capable of interacting with other objects. Hospitals can monitor and regulate pacemakers long distance, factories can automatically address production line issues and hotels can adjust temperature and lighting according to a guest's preferences."

IV. EXISTING SOLUTIONS

- A. Planning in advanced all the required parameters and devices while building the Smart-home.
- B. Designing the Smart-home as per the user requirements and their uses, so to give them maximum operability.
- C. Eg: If users are handicapped/old aged people they can operate the home using either their voices or the devices will respond to their presence.

V. PROPOSED DESIGN

- A. By using Wi-Fi technology as a medium to interconnect we can considerably reduce the cost of installation. Thus reducing the cost while using wired communication.
- B. Flexibility increases with the use of Wi-Fi technology as adding additional peripherals or sensors becomes easier and cheaper than on wired communication.
- C. Home PC continuously monitors sensors values and control the devices accordingly. If problem found it report to cloud server. Here user can modify some settings and see the devices functionality and working.
- D. We build one Registration form where Technicians, super market vendors and other service provider will fill the form. They provide their details like type of service (Sales/Service) and their service timing etc.
- E. Finally Cloud Server will apply data mining on data sets. It will mail or SMS Technician and send details to the owner (mail or SMS).

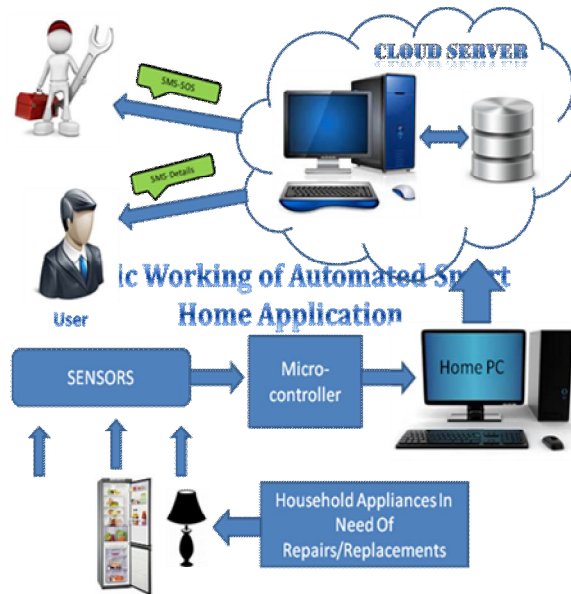
F. Proposed Home Automation Functions

The proposed home automation has the capabilities to control the following components in users home and monitor the following alarms:

- 1) Temperature and humidity
- 2) Motion detection
- 3) Fire and smoke detection

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- 4) Light level
- 5) The proposed home automation system can control the following appliance:
- 6) Lights on/off/dim
- 7) Fan on/off
- 8) On/off different appliance.



VI. RESULTS

The system allows user to control appliances and lights and their maintenances with the help of a Smartphone or a PC from anywhere in the world with the use of an internet connection.

In this paper we use data from the sensors and devices which are interconnected with the help of Wi-Fi Technology. If any devices need any replacement or repairs or if any appliances needs to be switched on or off without the user going ahead and manually doing it, the Smart home will take the required actions.

VII. SCOPE AND FUTURE WORK

In our system we have SMS and e-mail notifications to the user but in future we can add also some voice alerts. This system can be expanded to include various other options which could include home security features such as biometric scanning, voice activated devices and motion detection, energy monitoring.

VIII. CONCLUSION

The home automation using Internet of Things can be used to connect simple appliances to it and the appliances can be controlled remotely through internet. The designed system not only monitors the sensor data, like temperature, gas, light, motion sensors, but also actuates a process according to the requirement, for example switching on the light when it gets dark. This will help the user to analyze the condition of various parameters in the home anytime anywhere.

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