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A Review on Smart Kitchen System

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ABSTRACT: The technology is evolving at a very fast pace and has revolutionized every sphere of human existence. Researchers have made significant contribution in changing the face of the kitchens. Right from automated appliances to customized kitchens, everything has been revolutionized. We have reviewed and analyzed the different schemes or methodologies which have been proposed by different researchers concerned with different types of Monitoring with a goal of creating a customized system which monitors kitchen environment parameters such as light intensity, room temperature, fire detection, motion detection and LPG gas level.

In this review we have tried to analyze only those schemes or methodologies where the researchers have added to subsequent improvement in the existing methodologies. The review includes research papers, publications, web sources and other available literature to provide a comprehensive comparative analysis.

KEYWORDS: Wireless Sensor Networks, GSM, I.O.T., Monitoring

I. INTRODUCTION

Every day the modern people expect new device and new technology to simplify their day to day life. The innovators and researchers are always trying to find new things to satisfy the people but the process is still infinite. In the 1990s, Internet connectivity began to proliferate in enterprise and consumer markets, but was still limited in its use because of the low performance of the network interconnects. In the 2000s Internet connectivity became the norm for many applications and today is expected as part of many enterprise, industrial and consumer products to provide access to information. However, these devices are still primarily things on the Internet that require more human interaction and monitoring through apps and interfaces. KITCHEN environment monitoring is one of the important measures to be closely monitored in real-time for safety, security and comfort of people. With the advancements in Internet technologies and Wireless Sensor Networks (WSN), a new trend in the era of ubiquity is being realized. Enormous increase in users of Internet and modifications on the internet working technologies enable networking of everyday objects. Web-enabled systems have offered great promise to consumers.

Smart home environments have evolved to the point where everyday objects and devices at home can be networked to give the inhabitants new means to control them. Advances in digital electronics have enable the development of small in size and communicate in short distances sensor nodes. They are low-cost, low-power and multifunctional. The sensor nodes consist of sensing, data processing, and communication components, leverage the idea of Wireless Sensor Networks (WSN) based on collaborative effort of a large number of nodes. There are a large number of researches dealing with WSN applications, but it is still possible to explored in WSN development and maintenance.

The design and development of a smart monitoring and controlling system for kitchen environment in real time has been reported in this paper. The system principally monitors kitchen environment parameters such as light intensity, room temperature, fire detection, motion detection and LPG gas level, has been developed. The system can monitor the status of kitchen and send an email and/or an alert SMS via GSM network automatically, if the conditions get abnormal, to a concerned authorities mobile phone. The concerned authority can control the system through his mobile phone by sending AT Commands to GSM MODEM or by taking the necessary steps in user email, which is password protected. Users can monitor and control transducers on active Web pages enhanced with Embedded C. This system finds a wide application in areas where physical presence is not possible all the time. The system offers a

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complete, low cost, powerful and user friendly way of real-time monitoring and remote control of kitchen. A prototype model is developed and tested with high accuracy result.

II. SOME APPLIANCE MONITORING SYSTEMS

Smart home environments have evolved to the point where everyday objects and devices at home can be networked to give the inhabitants new means to control them. The sensor nodes consist of sensing, data processing, and communication components, leverage the idea of Wireless Sensor Networks (WSN) based on collaborative effort of a large number of nodes. There are a large number of researches dealing with WSN applications, but it is still possible to explore in WSN development and maintenance. This paper examines the possibility of integration WSN and the service robots into a smart home application. The service robots can be considered to be mobile nodes that provide additional sensorial information, improve/repair the connectivity and collect information from wireless sensor nodes. On the other hand, the WSN can be considered as an extension of the sensorial capabilities of the robots and it can provide a smart environment for the service robots.

Using ultrasonic signal coding of ultrasonic sensors with multiple pyroelectric infrared sensors (PIR) can be used to detect an intruder in a home or a storehouse. The PIR sensors are placed on the ceiling, and the ultrasonic sensor module consists of a transmitter and a receiver which are placed in a line direction; however, ultrasonic sensors with the same frequency are subject to interference by crosstalk with each other and have a high miss rate. To overcome these disadvantages of the ultrasonic sensor, designs have been developed that reduce the miss rate from the environmental interference by using an ultrasonic coding signal. Both ultrasonic sensors and PIR sensors are managed by the majority voting mechanism (MVM).

In 21st century the people want the world at their hands. It outlets the revolutions of computing and smart environment. Some technologies like Ubiquitous/pervasive and ambient intelligence satisfy the maximum need of smart world but these technologies are not tightly coupled with internet, so the people needs another technology extension. Internet of Things (IoT) is an ideal emerging technology to influence the internet and communication technologies. Simply "Internet of Things" connects „living and non living things“ through „internet“. Traditionally in the object oriented paradigm everything in the world is considered as an object, but in the IoT paradigm everything in the world is considered as a smart object, and allows them to communicate each other through the internet technologies by physically or virtually.

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Table 1 Some monitoring schemes

S.No	Author	Name of paper	Description
1.	Mrutyunjaya Sahani, Avinash Nayak, Rishabh Agrawal and Debadutta Sahu	A GSM, WSN and Embedded Web Server Architecture for Internet Based Kitchen Monitoring System ICCPCT(2015 IEEE)	A prototype model is developed Which monitors kitchen environment parameters such as light intensity, room temperature, fire detection and LPG gas
2.	Wang Huiyong, Wang Jingyang.	Building a Smart Home System with WSN and Service Robot	a Smart Home System with WSN and Service Robot
3.	Ying-Wen Bai, Chen-Chien Cheng ,Zi-Li Xie.	Use of Ultrasonic Signal Coding and PIR Sensors to Enhance the Sensing Reliability of an embedded Surveillance System.	An embedded surveillance system by use of ultrasonic signal coding of ultrasonic sensors with multiple PIR to detect an intruder in a home or a storehouse
4.	S.Pandikumar, R.S. Vetrivel	Internet of Things Based Architecture of Web and Smart Home Interface Using GSM.	This paper proposes architecture to enable the users to control and monitor smart devices through internet.

IoT allows people and things to be connected Anytime, Anyplace, with Anything and Anyone, by using ideally in Any path/network and Any service. An architecture to enable the users to control and monitor smart devices through internet has been developed which creates an interface between users and smart home by using GSM and internet technologies, or it simply creates GSM based wireless communication from the web server into the smart home. In this architecture the users give commands through web then the users inputs are converted into GSM-SMS commands.

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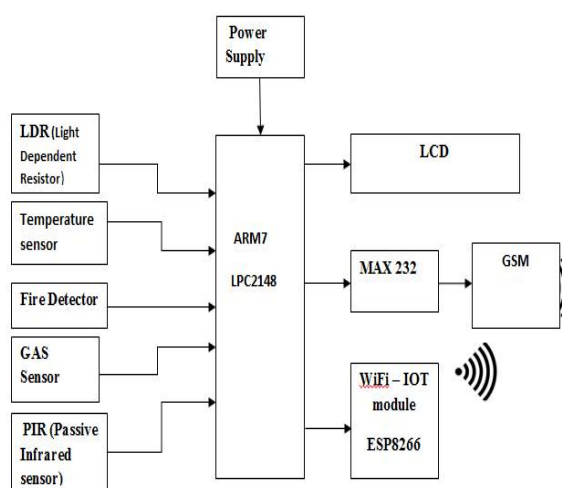
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These commands are sent to embedded system module (embedded system directly connect with devices) through GSM network, and finally the user commands are parsed and executed by microcontroller to control any electronic objects like home appliances, lights, etc and it sends the acknowledgement. The embedded system module can place anywhere in the world and it will controlled by IoT Agent through GSM network.

III. RESEARCH METHODOLOGY



The Figure above shows the block diagram of the proposed system. On the basis of the review carried out we come to a conclusion that a smart monitoring and controlling system for kitchen environment in real time can be developed. The proposed system will principally monitor kitchen environment parameters such as light intensity, room temperature, fire detection, motion detection and LPG gas level. The system can monitor the status of kitchen and send an email and/or an alert SMS via GSM network automatically, if the conditions get abnormal, to a concerned authorities mobile phone. The concerned authority can control the system through his mobile phone by sending AT Commands to GSM MODEM or by taking the necessary steps in user email, which is password protected. Users can monitor and control transducers on active Web pages enhanced with Embedded C. This system can find wide application in areas where physical presence is not possible all the time. The system is expected to offers a complete, low cost, powerful and user friendly way of real-time monitoring and remote control of kitchen.

IV. CONCLUSION

On the basis of the literature review carried out we can conclude that it would be possible to design and the implement an interactive kitchen monitoring system with the GSM, communication and Web-enabled measurement and control systems. The Web based monitor and automatic control of equipment is forming a trend in automation field. Replacing PC with low-cost single chip processor can make administrators to get parameters of different remote sensor and send control information to field equipments at any time through Internet. The GSM is an excellent choice for this due to its extensive coverage. Since SMS is a text based protocol, even the most basic GSM systems can have an access to the status of the devices or make changes on these states. The complete system is secured through a login and Webpage password based authentication. The proposed design would be completely wireless and integrated with the software to form a low cost, robust and easily operable system. The GSM and Web based controlled duplex communication system is expected to provide a powerful decision making device concept for adaptation to several smart kitchen scenarios.

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