

# Design And Implementation Of Smart Home Environment System

<sup>1</sup> B.NAGALAKSHMI, <sup>2</sup> P.VENKATESWAR REDDY

<sup>1</sup>M.Tech Student, Dept. of ECE, Vikas group of institutions, Nunna, Vijayawada, A.P

<sup>2</sup> Associate Professor, Dept. of ECE, Vikas group of institutions, Nunna, Vijayawada, A.P

**ABSTRACT:** Automation is the current need of smart environment. Various numbers of technologies are introduced for the purpose of good automation. Here ARM based industry automation system using GSM communication is presented. In this proposed system we use centralized controller, sensors and relays. Centralized module is the main unit which collects the information from sensors and sends information to the end user using GSM communication. The temperature and gas sensors are also used in this system. The ARM is used as monitoring and controlling unit for different parameters. To control the process in Real- Time, samples are dumped in to ARM controller. By using Embedded C language ARM is programmed. The output is displayed on the LCD display.

**KEY WORDS:** Internet of Things, service Composition, smart factory, smart home, web of things

## I.INTRODUCTION

Things are physical objects with sensors that are interconnected with each other to form an extensive global network. In framework, things communicate with each other with minimal requirements of human interaction. The Machine-to-Machine interaction enhances human experience and acts as a backbone of IoT paradigm. With the advancement in IoT, already several start-ups and corporations have realized the potentials of a smart home and are manufacturing starter kits and smart appliances. However, most of the available products are vendor specific, using propriety architectures, operating Systems, and communication standards. As the demand for smart device increases, it leads to the introduction of new challenges like

heterogeneity, interoperability, and controlling smart devices remotely from a common platform. For example, in a smart home, a user may like to control all the smart appliances with a single remote or interface without using multiple controlling mechanisms for different devices. A device registers the device and driver service with specific attributes which are used to match services. Context service provides a mechanism in which acquiring contexts is distributed to all the smart home nodes which have some context providers and processing context is located on the central smart home node which contains the context model and rules. Workflow engine service and unit registry service let context applications separate business logic and implementation and execute their processes on any smart home nodes.

Along with the growth of the smartphone, a large number of embedded devices have been developed to provide various services. Especially, the smart home, smart city, smart health care and smart car services have been receiving the spotlight throughout the society in recent years. For this reason, various sensors, small embedded devices and home appliances have been studied and developed continuously through several companies, universities and research institutions. And then they have been gradually intellectualized in order to provide smart services to the users. However, an increment phenomenon of user privacy

data leakage and security vulnerability should not be overlooked in the IoT (Internet of Things) environment. A number of significant research needs, including security and privacy, for future IoT systems is described and the general definitions for the main security aspects within the IoT domain was depicted. If the service infrastructure is designed without considering predictable security flaws, user privacy data leakage, social infrastructure paralysis, and economic losses as well as a risk of human life as severe cases can be occurred by the attacks of outsiders with malicious purpose. To establish the service infrastructure that provides security features, it is necessary to define the appropriate security features required for each component that make up the service infrastructure. In addition, various services require a different security issue that is suitable for individual characteristics. For example, data (e.g. user's privacy data) security is essential to the intelligent transportation service and intelligent medical service, while authentication scheme is more important in the case of smart city and intelligent farm services. Therefore, we should carefully scrutinize the security requirements and necessity for a specific IoT services.

## II. RELATED WORK

The essence of pervasive computing processing depicted by Mark Weiser is to improve the earth by installing numerous PCs that are nimbly coordinated with human clients. To accomplish the objective of inescapable figuring, applications should be setting mindful. The advancement of setting figuring contains three phases, specially appointed strategy, toolbox technique and framework technique. In the phase of specially appointed strategy, analysts regularly assembled setting mindful frameworks for every application. Dynamic gave the telephone redirection benefit dependent on the area of a man in an office. The Cool town venture of HP is an electronic setting

mindful technique. In view of the lower re-usability of these techniques, individuals built up some tool boxes to make the setting mindful applications all the more effectively. A work process show for business benefits in conventional disseminated figuring conditions can be connected as an administration model to interface administrations with others related in omnipresent registering situations and expedited benefit streams. Contrasted and customary conveyed processing conditions, work process benefits in pervasive registering conditions must choose an administration progress as indicated by the client's circumstance data that is powerfully created from different sensors in universal situations. Typically in the omnipresent figuring situations, the data progressively happens, and every now and again changes an underlying condition for administration executions. Be that as it may, the current work process frameworks can't make a difference the progressively happened changes into a continuous administration work process. Along these lines, when changes of a client's administration demand or his circumstance data happen progressively, we require a strategy that can reapply the adjustments in a situation and supply a setting mindful administration journalist with the changes.

With the advent of the information era, people have increasingly high demand for home environment. Not only fond of comfort, people also require a smart home system which is both intelligent and informatization. The appearance of the Internet of things accelerates the improvement of the smart home system. In the environment of smart home, many intelligent objects can communicate with each other, which is just the meaning of things connected by Internet. In recent years, the conception of smart home technology has been rooted among people and many melding products have been into markets. Because of the lack of unified standards, though many products have

completed all-IP in the whole system, the control part is not good enough: some systems can only work in LAN (Local Area Network), not in WAN (Wide Area Network); and some are equipped with control function in WAN, but cost a lot resulting from analysing IP address provided by manufacturers or choosing routers with the function of dynamic name server. At the same time, the servers provided by manufacturers are not stable enough, which results in problems in the whole system. This paper designs and implements a control system in the smart home system of transplanting which is dynamic name server software into the core controller based on ARM.

### III. SERVICES IN SMART HOME ENVIRONMENT

For implementing the proposed framework, we consider a common platform that can communicate with different home equipment, irrespective of underlying communication protocol and the operating system. To bring all these heterogeneous home appliances from various manufacturers under one roof, we need to integrate their embedded. We select three target scenarios for experiments that provide residents with reliable services in our smart environment considering current technological progress.

(1) Cleaning up objects scenario: This scenario starts with cleaning up an untidy living room in the morning by a service robot after the master goes to work. The robot should identify objects to arrange, put them in order and traverse the room with the help of a position recognition sensor installed on the ceiling of the room. It navigates within the room and identifies the requested objects by using RFID signals, pick up, carry and put the object down on the designated position. This scenario aims to intelligently execute given tasks such as putting clothes in a laundry bag, putting mugs in the sink, etc.

(2) Executing errands scenario: This scenario intends to identify and fetch a

requested object. Since a target object is a smart item with an RFID tag, the smart devices such as a smart table, a smart shelf, and a smart bookcase can detect the presence of requested items around them. Once detected the RFID code of the smart item is transferred to the home server through wireless networks. If the master issues a command "Fetch me my cup," the robot sends a request for the position of the cup to the home server. The home server searches for the status information of the device and then sends the position data to the robot. After downloading the data from the home server, the robot moves to the place where the target object is laid, grasps, brings it to the master.

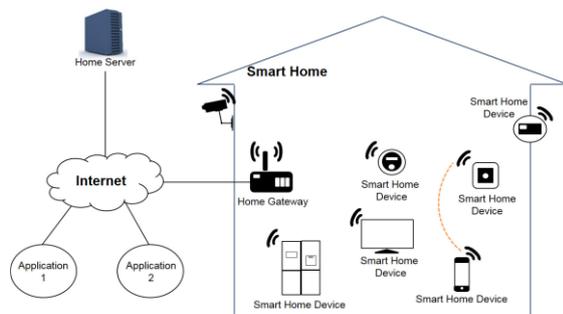
(3) Security service scenario: This scenario deals with intelligent services carried out by a communication between smart devices. When an intruder is detected by a smart security sensor, this event is immediately reported to the home server. The home server makes the robot move to a position where the sensor detects the intruder. After the robot moves to the sensor it turns on the smart lamp and video-capture the scene. If the intruder is detected, the recorded clips are transmitted according to the master's request.

### IV. EXISTED SYSTEM

Building context-aware applications is as yet unpredictable and tedious because of lacking infrastructure support. So a fine setting mindful framework can effectively diminish the multifaceted nature and time to create setting mindful applications and be effortlessly tweaked to different spaces by plug gable parts. The highlights of our home foundation incorporates a cosmology based on ontology based context model, a workflow based programming model and a middle ware which coordinates setting and work process offices to help assemble setting mindful applications. We fabricate our home setting mindful work process demonstrate by utilize the foundation.

In general, smart home system can be configured as shown in Figure 1. As

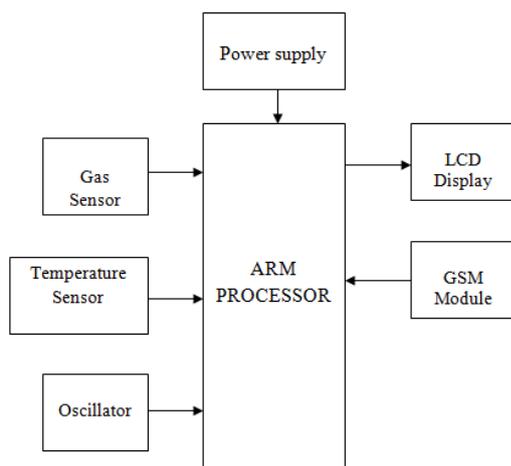
shown in Figure 1, smart home system consists of largely three components, home server, home gateway, and smart home devices. First, the home server provides storage, integration and distribution function of the information collected from various media in the home as a kind of computer device.



**Fig.1: Existed system**

Next, the home gateway performs a relay function connect function between the subscriber access network and a wired/wireless home network. Finally, smart home devices can intelligently provide the information exchange function between the devices, and external internet access function.

**V. PROPOSED SYSTEM**



**Fig. 2: Proposed system**

From above figure (2) we can observe the block diagram of proposed system. The devices used in proposed system are GAS sensor, temperature sensor, oscillator, ARM processor, LCD display and GSM. The descriptions of these devices are given

below. Firstly oscillator will oppose the error signals and transmits the pure signals into the system. Power supply gives sufficient power to operate the system. As we know that ARM processor is one of the family of CPU. ARM processor can operate at a higher speed, performing more millions of instructions per second. From LCD display we can observe the output.

Temperature sensor is one of the important parameter which will describes how hot or cold a body is. Gas sensor is a device which detects the presence of gas in an area. These two devices plays important role in entire operation. GSM (Global System for Mobile communication) is an open, advanced cell innovation utilized for transmitting voice and information services. GSM (Global System for Mobile communication) is a computerized cell that is generally utilized in Europe and different parts of the world. GSM utilizes a variety of Time Division Multiple Access (TDMA) and is utilized of the three advanced remote phone innovations (TDMA, GSM, and CDMA).

Here firstly, a power supply is given and then system gets operated. Now the gas sensor will oppose the dangerous gases present in the air and temperature sensor will cool the process if it gets overheated as discussed earlier. The GSM module will detects the location and send it to ARM processor. After this entire process the operation is performed according to the given system and output is displayed in LCD. Now, Security functions for the smart home system components in proposed system are given below:

**A. CONFIDENTIALITY**

In case of data communication between devices as well as sending data to the outside, the transferring data should be converted into cipher text form. That is, the data confidentiality should be provided. And, we recommend to use hardware security module to enhance security of device which has a specification capable of providing a

security feature by mounting a hardware security module.

### B. INTEGRITY

Low capacity smart home devices (e.g., tiny sensors and actuators, etc.) and a home server can use the access control function and mutual authentication function provided by the home gateway. In consideration of the device specification, the critical data (user's privacy data, key information, and access control Authentication data, etc.) Should be stored securely using a hardware security module.

### C. AVAILABILITY

To defend cyber-attacks including hacking from the outside, the firmware integrity verification feature should be provided. Also, we recommend the integrity verification function having fast execution speed and ease of implementation for a low capacity smart device. In case a secure software update, verification of the software update file and software update server should be provided. At last it can say that compared to existed system, proposed system gives effective results.

## VI. RESULTS



Fig. 3: OUTPUT-1



Fig. 4: OUTPUT-2

## VII. CONCLUSION

In this paper, we specifically proposed the smart home system security requirements reflecting the environmental characteristics. Basically, a formal method can provide the theoretical foundation for achieving high reliability in system property. Our framework is scalable, and new smart devices can easily integrate into the smart home Environment. The evaluation results show that the performance of the proposed framework is better when compared to existed system.

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**B.NAGALAKSHMI** completed B.Tech in Nimra women's college of Engineering and M.Tech in vikas group of institutions. Her specialization is Digital Electronics and Communications.



**P.VENKATESWAR REDDY** working as associate professor in vikas group of institutions.