

## Project Work Progress Report

Week No: 01      Date: From: 20/08/2018      To: 26/08/2018

Project Title: **IOT based Home Automation System over cloud**

Name of the Guide: Asst. Prof. Madhu B.R.

Name of the Student: Vaishnavi K R, Tushar Jain, Sohan Chopdekar, Dushyanth N Gowda

| Date       | Report  |
|------------|---|
| 20/08/2018 | <p><b>LITERATURE SURVEY:</b></p> <p><b>Title:</b> An Android based home automation system</p> <p><b>Author:</b> <u>Alper Gurek</u> ; <u>Caner Gur</u> ; <u>Cagri Gurakin</u> ; <u>Mustafa Akdeniz</u> ; <u>Senem Kumova Metin</u> ; <u>Ilker Korkmaz</u></p> <p><b>Abstract:</b><br/>In recent years, the number of networks enabled digital devices at homes has been increasing fast. With the rapid expansion of the Internet, the owners have been requesting remote control and monitoring of these in-home appliances. This leads to networking these appliances to form a kind of home automation system. In this paper, an Android based home automation system that allows multiple users to control the appliances by an Android application or through a Web site is presented. The system has three hardware components: a local device to transfer signals to home appliances, a Web server to store customer records and support services to the other components, and a mobile smart device running Android application. Distributed cloud platforms and services of Google are used to support messaging between the components. The prototype implementation of the proposed system is evaluated based on the criteria considered after the requirement analysis for an adequate home automation system.</p> <p><b>Conclusion</b><br/>The paper proposes an intelligent automation system using Google Cloud Messaging server and Android operating system as the emerging technologies used in home automation area. The system has three hardware components: a local device to transfer signals to home appliances, a web server to store customer records and support services to the other components, and a mobile smart device running Android application. The functionalities of each different component of the system are dissected and the communication infrastructures of the parts are explained. Distributed cloud platforms and services of Google are used to support messaging between the components. Such a design of service and data distribution through public and free Google platform makes the system cost-effective. The prototype implementation of the proposed system is evaluated based on the criteria considered after the requirement analysis for an adequate home automation system. According to the evaluation results, the proposed home automation system, which uses state-of-the-art cloud technologies and Android applications, is adequate in overall. The feature work may be to focus on how to measure those criteria in units rather than summarizing the result as “adequate” or “inadequate”.</p> |

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# Project Work Progress Report

Week No: 02      Date: From: 27/08/2018      To: 02/09/2018

Project Title: **IOT based Home Automation System over cloud**

Name of the Guide: Asst. Prof. Madhu B.R.

Name of the Student: Vaishnavi K R, Tushar Jain, Sohan Chopdekar, Dushyanth N Gowda

| Date       | Report   |
|------------|--|
| 27/08/2018 | <p><b>LITERATURE SURVEY:</b></p> <p><b>Title:</b> Smart GSM based Home Automation System</p> <p><b>Author:</b> <u>Rozita Teymourzadeh</u> ; <u>Salah Addin Ahmed</u> ; <u>Kok Wai Chan</u> ; <u>Mok Vee Hoong</u></p> <p><b>Abstract:</b><br/>This research work investigates the potential of 'Full Home Control', which is the aim of the Home Automation Systems in near future. The analysis and implementation of the home automation technology using Global System for Mobile Communication (GSM) modem to control home appliances such as light, conditional system, and security system via Short Message Service (SMS) text messages is presented in this paper. The proposed research work is focused on functionality of the GSM protocol, which allows the user to control the target system away from residential using the frequency bandwidths. The concept of serial communication and AT-commands has been applied towards development of the smart GSM-based home automation system. Home owners will be able to receive feedback status of any home appliances under control whether switched on or off remotely from their mobile phones. PIC16F887 microcontroller with the integration of GSM provides the smart automated house system with the desired baud rate of 9600 bps. The proposed prototype of GSM based home automation system was implemented and tested with maximum of four loads and shows the accuracy of <math>\geq 98\%</math>.</p> <p><b>Conclusion</b><br/>Recently, the home automation market is very promising field that is growing very fast and needs vast range of developments that can be carried out in the concept of smart home. In this project design and implementation of smart GSM house was considered. PIC16F887 microcontroller with the cooperation of GSM provides the smart automated house system with the desired baud rate of 9600 bps. The proposed prototype was implemented and tested with maximum of four loads and shows the accuracy of <math>\geq 98\%</math>.</p> |

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# Project Work Progress Report

Week No: 03      Date: From: 03/09/2018      To: 10/09/2018

Project Title: **IOT based Home Automation System over cloud**

Name of the Guide: Asst. Prof. Madhu B.R.

Name of the Student: Vaishnavi K R, Tushar Jain, Sohan Chopdekar, Dushyanth N Gowda

| Date       | Report  |
|------------|---|
| 03/09/2018 | <p><b>LITERATURE SURVEY:</b></p> <p><b>Title:</b> Bluetooth Based Home Automation System Using Cell Phone</p> <p><b>Author:</b> R.Piyare, M.Tazil</p> <p><b>Abstract:</b></p> <p>Technology is a never-ending process. To be able to design a product using the current technology that will be beneficial to the lives of others is a huge contribution to the community. This paper presents the design and implementation of a low cost but yet flexible and secure cell phone-based home automation system. The design is based on a stand-alone Arduino BT board and the home appliances are connected to the input/ output ports of this board via relays. The communication between the cell phone and the Arduino BT board is wireless. This system is designed to be low cost and scalable allowing variety of devices to be controlled with minimum changes to its core.</p> <p>Password protection is being used to only allow authorized users from accessing the appliances at home.</p> <p><b>Conclusion:</b></p> <p>In this paper we have introduced design and implementation of a low cost, flexible and wireless solution to the home automation. The system is secured for access from any user or intruder. The users are expected to acquire pairing password for the Arduino BT and the cell phone to access the home appliances. This adds a protection from unauthorized users. This system can be used as a test bed for any appliances that requires on-off switching applications without any internet connection.</p> <p>The full functionality of the home automation system was tested and the wireless communication between the cell phone and Arduino BT was found to be limited to &lt;50m in a concreted building and maximum of 100m range was reported to be applicable in an open range.</p> <p>Right now, the Symbian OS cell phones only support Python scripts. For future work it is recommended to develop the GUI application for the cell phone to be written in Java so that it can be supported by most of the cell phones available nowadays.</p> |

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# Project Work Progress Report

Week No: 04

Date: From: 11/09/2018

To: 17/09/2018

Project Title: **IOT based Home Automation System over cloud**

Name of the Guide: Asst. Prof. Madhu B.R.

Name of the Student: Vaishnavi K R, Tushar Jain, Sohan Chopdekar, Dushyanth N Gowda

| Date       | Report  |
|------------|---|
| 11/09/2018 | <p><b>LITERATURE SURVEY:</b></p> <p><b>Title:</b> Home Automation Using GSM</p> <p><b>Author:</b> Carelin Felix, I. Jacob Raglend</p> <p><b>Abstract:</b></p> <p>In recent years, the home environment has seen a rapid introduction of network enabled digital technology. This technology offers new and exciting opportunities to increase the connectivity of devices within the home for the purpose of home automation. Moreover, with the rapid expansion of the Internet, there is the added potential for the remote control and monitoring of such network enabled devices. However, the adoption of home automation systems has been slow. This paper identifies the reasons for this slow adoption and evaluates the potential of Zig-Bee for addressing these problems through the design and implementation of flexible home automation architecture. Device control is a process that is done in the day to day life of mankind. Usually there are a number of devices associated with home and an efficient control of these systems is a tedious task. The rapidly advancing mobile communication technology and the decrease in costs make it possible to incorporate mobile technology into home automation systems.</p> <p><b>Conclusions:</b></p> <p>This paper has reviewed the existing state of home automation systems, and identified and discussed five areas that have hindered consumer adoption of such technologies. Briefly, the areas include: the complexity and expense of the architectures adopted by existing systems, the intrusiveness of the system installations, the lack of interoperability between different home automation technologies, and the lack of interoperability between systems developed by different manufacturers that utilize the same technology. Interface inflexibility and the inconsistent approaches adopted towards security and safety are also problems. A novel architecture for a home automation system is proposed and implemented, using the relatively new communication technology ZigBee. The use of ZigBee communications technology helps lower the expense of the system and the intrusiveness of the respective system installation.</p> |

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# Project Work Progress Report

Week No: 05      Date: From: 18/09/2018      To: 25/09/2018

Project Title: **IOT based Home Automation System over cloud**

Name of the Guide: Asst. Prof. Madhu B.R.

Name of the Student: Vaishnavi K R, Tushar Jain, Sohan Chopdekar, Dushyanth N Gowda

| Date       | Report   |
|------------|--|
| 18/09/2018 | <p><b>LITERATURE SURVEY:</b></p> <p><b>Title:</b> Advanced Universal Remote Controller for Home Automation and Security<br/><b>Author:</b> Taewan Kim, Hakjoon Lee, and Yunmo Chung</p> <p><b>Abstract:</b></p> <p>There has been inconvenience in controlling each digital home appliance which requires its own remote controller. In this paper, we present an advanced universal remote controller (URC) with the total solution for home automation and security. All kinds of home appliances can be controlled with the URC, which can be also connected to a PC dealing with Internet as well. To use the URC, we need several receivers with wired or wireless communication methods to be connected to all appliances. The receivers have many channels and IDs to control many appliances at the same time and to support multi-zone services. In addition, we propose a PC-based interface for end-users to use the URC conveniently. With the proposed URC, we can easily construct a ubiquitous home automation and security environment with the total solution. Furthermore, this solution can be applied to the automated control of all kinds of appliances installed within buildings for companies, schools, hospitals, and so on.</p> <p><b>Conclusions:</b></p> <p>This paper, we propose an advanced URC for home automation and security based on various controlling techniques such as several RF receivers, Wi-Fi, ZigBee protocol to control all kinds of appliances in the ubiquitous environment. As a further study, we consider the smart URC with direct connection to all kinds of smart phones which will be leading the digital technology and industries in the future.</p> |

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# Project Work Progress Report

Week No: 06      Date: From: 26/09/2018      To: 1/10/2018

Project Title: **IOT based Home Automation System over cloud**

Name of the Guide: Asst. Prof. Madhu B.R.

Name of the Student: Vaishnavi K R, Tushar Jain, Sohan Chopdekar, Dushyanth N Gowda

| Date       | Report  |
|------------|---|
| 26/09/2018 | <p><b>LITERATURE SURVEY:</b></p> <p><b>Title:</b> Embedding Internet Technology for Home Automation</p> <p><b>Author:</b> Matthias Kovatsch, Markus Weiss, Dominique Guinard</p> <p><b>Abstract:</b></p> <p>As more and more digital appliances populate our homes, networking them to form a home automation (HA) system not only becomes an option, but almost a necessity. While comfort, security, and energy efficiency can be provided by many existing systems, they all remain complex islands that are difficult to expand and customize. We propose Internet technology to remedy the situation and to become the future solution for HA. For this, we analyze the feasibility of today's Internet technology with regard to traditional HA solutions. Furthermore, we present two case studies that substantiate the benefits of our proposal.</p> <p><b>Conclusions:</b></p> <p>In this paper, we presented the requirements of home automation systems and evaluated how current Internet technology compares to the capabilities of traditional standards. Where Internet technology was once seen too heavy-weight and expensive for low-cost hardware, recent advances, such as 6LoWPAN and embedded Web servers, foster our belief in Internet technology to become the future standard of home automation utilizing IPv6 as a 'virtual installation bus hat is able to cover all emerging aspects. To summarize, IPv6 forms an established and proven system whose features are well-suited for HA. Utilizing existing LAN infrastructures lowers the installation overhead while 6LoWPAN extends the network to inexpensive wireless embedded devices. Web technology on top eases development and ensures usability as it is already part of the users' daily life. Furthermore, the Internet's ubiquity and wide range of application possibly turns 6LoWPAN devices into mass market products which then will outrank specialized systems in price and reliability. We also resented two case studies that demonstrate further benefits of Internet technology in the home. The Web application layer allows for loosely coupled services following the REST paradigm. This way, the development process of applications is eased as standard components, libraries, and toolkits are available. For users, well-known concepts like scripting and mashups enable unprecedented customization options. For mobile access, in our case smart meter feedback on the iPhone, a standalone 'app' that fully exploits the devices' features can be better suited than a Web page. Thanks to a RESTful API and widely available support for Web programming, vendors can easily port the presentation layer to different platforms.</p> |

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# Project Work Progress Report

Week No: 07      Date: From: 02/10/2018      To: 09/10/2018

Project Title: **IOT based Home Automation System over cloud**

Name of the Guide: Asst. Prof. Madhu B.R.

Name of the Student: Vaishnavi K R, Tushar Jain, Sohan Chopdekar, Dushyanth N Gowda

| Date       | Report  |
|------------|---|
| 02/10/2018 | <p><b>LITERATURE SURVEY:</b></p> <p><b>Title:</b> Smart home automation.</p> <p><b>Author:</b> Mihaly Saga, Dejan Mijić, Dejan Milinkov, Bojan Bogovac</p> <p><b>Abstract:</b></p> <p>This paper elaborates the idea of using an adaptive control system for managing household electricity consumption. The proposed solution aims at reducing the overall electrical energy consumption per household, thus decreasing their monthly electricity bills. The solution is based on a component-oriented architecture that provides a high degree of adaptability to different types of users in terms of ways to access the application (smart phones, web browser), the interaction with the individual devices and independency from various types and configurations of devices. It leverages the benefits of available tools and technologies such as device controllers, web services, mobile platforms, together with well-known concepts of artificial intelligence and some of the services that will be available in the near future, such as meter data management systems. Beside previously mentioned decrease of energy consumption, this solution can manage and monitor grid energy storage and household renewable energy sources, if available, and therefore its application results in offloading power grid starting from the lowest level of granularity - the end user.</p> <p><b>Conclusions:</b></p> <p>The proposed solution combines already existing technologies and emerging solutions in a new and innovative way that strives to optimize power management within modern households, tackling the problem of high global energy consumption at the lowest level of granularity, the end user. Extensible, component-based architecture, together with adaptable controlling system is what makes this solution perfectly fit to various types of users. It allows the final user to have complete control over the system with minimum amount of time required to be spent on monitoring the system activity. The primary task of proposed solution is scheduling device activities in an optimal way, in order to minimize total power consumption without disrupting user comfort and commodity. In the long run, reducing of power consumption on a daily level would result in decreasing monthly electricity bills. Further research on this topic includes development of platform independent client application, and designing suitable user interface for it, in order to make this solution available to a wider set of users.</p> |

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# Project Work Progress Report

Week No: 08      Date: From: 10/10/2018      To: 17/10/2018

Project Title: **IOT based Home Automation System over cloud**

Name of the Guide: Asst. Prof. Madhu B.R.

Name of the Student: Vaishnavi K R, Tushar Jain, Sohan Chopdekar, Dushyanth N Gowda

| Date       | Report  |
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| 10/10/2018 | <p><b>LITERATURE SURVEY:</b></p> <p><b>Title:</b> Optimization of Home Automation Systems Based on Human Motion and Behavior</p> <p><b>Author:</b> Taha Mehrabi, Alan S. Fung, and Kamran Raahemifar</p> <p><b>Abstract:</b></p> <p>Given the reduction in cost and power supply of wireless systems along with the increasing demand for conserving energy when controlling consumer electronics and home appliances, smart home automation systems are more popular than ever before. A home automation system designed for reducing electricity consumption typically uses different sensors located in different areas of the house that communicate with a process unit to control the lights, HVAC system, consumer electronics, etc., so that the process unit turns these systems on only when needed. Additionally, other automated tasks may include setting the HVAC to an energy saving setting while the house is unoccupied, and restoring the normal setting when an occupant is about to return. To optimize current home automation systems, it is proposed that by considering the behavior of the residents inside a house, the power consumed on a daily basis will be significantly reduced. Such a power reduction could be achieved by both the sensors that monitor the motions of the residents inside a house and the adaptive control system that promptly adjusts itself to the most efficient level to further reduce electricity consumption based on different actions, habits and lifestyle of the residents.</p> <p><b>Conclusions:</b></p> <p>A new system optimization was proposed that firstly suggested the requirement of solidly programming the process unit to further improve system reliability and reduce power consumption. In other words, different areas in the house must be categorized based on the roles they play for the people inside them. Once this is achieved, algorithms have to be developed to run on the process unit for each of these groups separately. For example, the type of sensor used in a washroom was suggested to be a motion detection sensor only (infrared or ultrasonic), and a specific code for the washroom must be run that covers all the possible cases without causing any discomfort for the residents. The main idea is to avoid the one extreme of using the same components, such as sensors, in every area of the house and the other extreme of giving a unique code to each area on the central controller. Rather, a few codes and components would be enabled to match the purpose of a particular area.</p> |

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## Project Work Progress Report

Week No: 09 Date: From: 18/10/2018 To: 25/10/2018

Project Title: **IOT based Home Automation System over cloud**

Name of the Guide: Asst. Prof. Madhu B.R.

Name of the Student: Vaishnavi K R, Tushar Jain, Sohan Chopdekar, Dushyanth N Gowda

| Date       | Report   |
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| 18/10/2018 | <p><b>LITERATURE SURVEY:</b></p> <p><b>Title:</b> Design and Realization of Home Appliances Control System Based on The Android Smartphone</p> <p><b>Author:</b> Annan Zhu, Peijie Lin, Shuying Cheng* School of Physics and Information Engineering, and Institute of Micro-Nano Devices &amp; Solar Cells, Fuzhou University</p> <p><b>Abstract:</b> The remote appliances control system based on the Android smart phone is designed and realized. A user logs into the smart phone interface, and clicks the buttons gently to send message commands which will be transmitted to home information center through the GSM network. Then the ARM processor recognizes the specified command, and controls the home appliance switches in the wireless radio frequency manner to achieve remote control of appliances ultimately. This paper focuses on the design of Android terminal, the communication between ARM and GSM module, the realization of the wireless module device's driver, the difficulty in supplying the appropriate low-voltage DC for MCU and wireless module just by a single live wire. The system has the features of easy installation and low cost, and the hardware and software can be customized and extended. What's more, the users can manipulate appliances anytime, anywhere, letting our houses become more and more automated and intelligent. Keywords-home appliances control; android phone; GSM; wireless switch; JNI.</p> <p><b>Disadvantage:</b></p> <p>1) Detecting accidental changes to raw data and achieve the nearly error-free reception.</p> <p>2) Can't access if devices are out of coverage area.</p> <p><b>Advantage:</b></p> <p>1) The client terminal and the processing center are based on Android OS which has lots of advantages, such as humane interface, customizable and extendible applications and so on.</p> |

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## Project Work Progress Report

Week No: 10 Date: From: 26/10/2018 To: 02/11/2018

Project Title: **IOT based Home Automation System over cloud**

Name of the Guide: Asst. Prof. Madhu B.R.

Name of the Student: Vaishnavi K R, Tushar Jain, Sohan Chopdekar, Dushyanth N Gowda

| Date       | Report   |
|------------|--|
| 26/10/2018 | <p><b>LITERATURE SURVEY:</b></p> <p><b>Title:</b> Large-scale and Real-time Remote-Control Architecture for Home Appliances</p> <p><b>Authors:</b> Hiroshi Kawazoe, Daisuke Ajitomi, Keisuke Minami Corporate R&amp;D Center, Toshiba Corporation, Kawasaki, Japan</p> <p><b>Abstract:</b> Abstract—This paper presents the system architecture of bidirectional communication for remote control of home devices. The system architecture is designed in view of the requirements such as feasibility for typical home users, scalability, and responsiveness of interactive operations. The proposed architecture, named Mediation architecture, features use of WebSocket and the hosting of connections from a home device and a user application at the same server to achieve low-latency communication. The experimental results obtained in a testbed environment indicate that the proposed system provides low latency that is practical for an actual service. Keywords—remote control; home appliance; smart home; WebSocket; AWS; cloud; HEMS; Iot.</p> <p>Advantages:</p> <ol style="list-style-type: none"><li>1) Use of internet to control the home devices, scalability of devices, responsiveness of interactive operations.</li><li>2) Low latency for practical use.</li></ol> <p>Disadvantages:</p> <ol style="list-style-type: none"><li>1) No assurance for the security of the device is given.</li><li>2) Connection made thorough the web socket may or may not be secured.</li></ol> |

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## Project Work Progress Report

Week No: 11 Date: From: 03/11/2018 To: 10/11/2018

Project Title: **IOT based Home Automation System over cloud**

Name of the Guide: Asst. Prof. Madhu B.R.

Name of the Student: Vaishnavi K R, Tushar Jain, Sohan Chopdekar, Dushyanth N Gowda

| Date       | Report  |
|------------|---|
| 03/11/2018 | <p><b>LITERATURE SURVEY:</b></p> <p><b>Title:</b> Home Appliances Control Using Mobile Phone</p> <p><b>Abstract:</b> In this paper a remotely operated mobile phone-controlled home appliances system is proposed. It is a dual toned multiple frequency-based system.</p> <p><b>Advantages:</b></p> <ol style="list-style-type: none"><li>1) This system can be used to control any types of electronic devices in addition to home appliances.</li><li>2) The proposed system does not have any security issues as the mobile phones have call blocking facility.</li></ol> <p><b>Disadvantages:</b></p> <ol style="list-style-type: none"><li>1) Need of at least two mobiles of same configuration devices for the system to work.</li><li>2) Home appliances are to be within the cellular network range.</li></ol> <p><b>Working Principle:</b> Communication is established between Unit-I and Unit-II by initiating a call from Unit-I to the Unit-II mobile phone that resides at home. Unit-II mobile phone is kept in auto answer mode so that the incoming call can be received automatically. When the incoming call is received by Unit-II mobile phone, in the course of a call, if any button is pressed by Unit-I mobile phone, a tone corresponding to the button pressed is heard at the other end of the call. This tone is called dual-tone multiple frequency (DTMF) tone. The DTMF decoder IC MT8870 is a full DTMF receiver that integrates both band split filter and decoder functions into a single 18-pin DIP or SOIC package. The received DTMF tone is processed by the MT8870 decoder IC and a set of digital output is produced corresponding to the keypad button pressed by Unit-I mobile phone. The output digital output of the DTMF decoder circuit is compatible to ATmega8 microcontroller. The output of the decoder circuit is used to tell the preprogrammed microcontroller which load to be turned on or off. Most of the household loads are alternating current (AC) load and microcontroller cannot control AC load directly. In order to control AC load electromagnetic relays are used. Again a microcontroller cannot drive a relay as microcontroller has low output current, so transistors are used to energize the relay coil for the purpose of load control. Electromagnetic relay driving circuit is shown in Fig. 2. The output of DTMF decoder circuit is 4-bit digital value with 12 distinct combination, so 12 different control signals can be obtained from the decoder circuit.</p> |

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## Project Work Progress Report

Week No: 12 Date: From: 11/11/2018 To: 19/11/2018

Project Title: **IOT based Home Automation System over cloud**

Name of the Guide: Asst. Prof. Madhu B.R.

Name of the Student: Vaishnavi K R, Tushar Jain, Sohan Chopdekar, Dushyanth N Gowda

| Date       | Report   |
|------------|--|
| 11/11/2018 | <p><b>LITERATURE SURVEY:</b></p> <p><b>Title:</b> Study of Smart Home system based on Cloud Computing and the key technologies</p> <p><b>Author:</b> Yuan lin School of Design and Arts, Beijing Institute of Technology, Beijing , China</p> <p><b>Abstract:</b> As the development of the Cloud computing and Internet of Things the standards of material life are continually improved. The requirements of safe, comfortable and convenient are also raised. In recent years, there are huge changes on the concept of family house on people's mind; and the smart home will be the trend of modern house. The research and development of it is about the automatic control, wireless connection and wireless communications study subjects. This article is based on the combined development of the Cloud computing and Internet of Things, with studying the requirement of smart home, especially for the aged person. Based on the technology of the Internet of Things, and knowing that the key technologies include RFID identify the network technology, sensing technology, M2M and cloud computing ability, this paper designs a new smart home system. Analysis of key technology of intelligent home based on cloud computing and simulation in the experiment environment user data to the cloud-based smart home and general analysis of the processing capabilities of intelligent home and draw relevant conclusions.</p> <p><b>THE ANALYSIS OF KEY TECHNOLOGY IN SMART HOME SYSTEM A.</b> Access to the cloud computing center Cloud computing center is a cluster of servers to provide cloud computing services, can through the network to receive data from the family gateway and store, according to the established strategy or from the control command to calculate and to send home gateway results (that is, instruction); To living in big data mining, to seek further knowledge of the available: Based on the analysis of the alarm system, the important warning to the old children or relevant treatment units, such as hospitals, police station, street agency, send according to different level. Cloud computing center system structure.</p> |

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## Project Work Progress Report

Week No: 13 Date: From: 20/11/2018 To: 28/11/2018

Project Title: **IOT based Home Automation System over cloud**

Name of the Guide: Asst. Prof. Madhu B.R.

Name of the Student: Vaishnavi K R, Tushar Jain, Sohan Chopdekar, Dushyanth N Gowda

| Date       | Report   |
|------------|--|
| 20/11/2018 | <p><b>LITERATURE SURVEY:</b></p> <p><b>Title:</b> An Unsupervised User Behavior Prediction Algorithm Based on Machine Learning and Neural Network FOR SMART HOME</p> <p><b>Author:</b> Tiankai Liang<sup>1</sup>, Bi Zeng<sup>1</sup>, Jianqi Liu<sup>1</sup>, *, Linfeng Ye<sup>1</sup>, Caifeng Zou<sup>2</sup></p> <p><b>Abstract:</b> The user operates the smart home devices year in year out, have produced mass operation data, but these data do not be utilized well in past. Nowadays these data can be used to predict user's behavior custom with the development of big data and machine learning technologies, and then the prediction results can be employed to enhance the intelligence of a smart home system. In view of this, this paper proposes a novel Unsupervised User Behavior Prediction (UUBP) algorithm, which employs an artificial neural network (ANN) and proposes a forgetting factor to overcome the shortcomings of the previous prediction algorithm. This algorithm has a high-level of autonomous and self-organizing learning ability while does not require too much human intervention. Furthermore, the algorithm can better avoid the influence of user's infrequent and out-of-date operation records, because of the forgetting factor. Finally, the use of real end user's operation records to demonstrate that UUBP algorithm has a better level of performance than other algorithms from effectiveness.</p> <p><b>Conclusion:</b> One of the biggest challenges faced by a smart home system is how to successfully mine the potential value of the user operation records, and concurrently try to be a confidant of the user. So, user behaviors prediction is still a valuable and challenging area for research. This paper aims to tackle this challenge and overcome the shortcomings of the previous user behaviors prediction algorithms to improve the current state of the prediction task. The proposition of a novel user behaviors prediction algorithm based on machine learning and mathematical knowledge, namely the UUBP algorithm. In this improved algorithm, a forgetting factor model based on the equal probability model and the Ebbinghaus forgetting curve is integrated in order to remove the influence of out-of-date records and attain a much more satisfactorily predictive behavior. Additionally, in order to let the learner, have a strong autonomous learning ability, a novel ANN is used to helps initialize the learner. Finally, the experimental results show that compared to the previous reduction algorithms, the UUBP algorithm is much more excellent.</p> |

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# Project Work Progress Report

Week No: 14      Date: From: 29/11/2018      To: 06/12/2018

Project Title: **IOT based Home Automation System over cloud**

Name of the Guide: Asst. Prof. Madhu B.R.

Name of the Student: Vaishnavi K R, Tushar Jain, Sohan Chopdekar, Dushyanth N Gowda

| Date       | Report   |
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| 29/06/2018 | <p><b>LITERATURE SURVEY:</b></p> <p><b>Title:</b> Sensors in Smart Homes for Independent Living of the Elderly<br/><b>Author:</b> Pireh Pirzada, Neil White, Adriana Wilde</p> <p><b>Abstract:</b></p> <p>A rapidly ageing population requires support systems which would enable them to preserve dwellers' independence without compromising on their safety or their quality of life. Smart homes for the elderly have the potential to offer unobtrusive health and wellness monitoring. The aim is to provide a safe, independent living environment which can identify and predict problems by monitoring the activities of daily living (ADLs) of the inhabitants. For this, a system able to handle continuous streams of data is required. Such a system can extract the information by using appropriate classification and learning algorithms and thus allow the remote monitoring of health and wellbeing at a high level. The implementation requires: the use of appropriate sensing technologies, identification of ADLs, data pre-processing techniques and machine learning algorithms. This is challenging due to individual differences: such a system must be able to personalize individual needs. Our contribution was the design and implementation of a platform to smartly monitor health condition of elderly using sensor data from a smart home, through an interactive user interface which is user-friendly and multiplatform. This proof-of-concept used off-line data, with the view to extend to real-time data collection in the future, which could then be used to inform support providers remotely.</p> <p><b>Conclusions:</b></p> <p>In this paper, we have presented a design and implementation of a system that could monitor health conditions of elderly person living alone using sensors in unobtrusive manner. Allowing caretakers or loved ones to be in touch and monitor health and environment status remotely. The main purpose of smart homes for elderly was to allow non-invasive and unobtrusive monitoring without affecting their dignity while being at comforts of their homes. For future work, the system currently caters single person's activities which could widely differ if multiple elderly persons live in a smart home. Along with that extending this system to gather data on Realtime basis from an elderly home with monitoring anxiety, depression and other such mental health factors could extend the features of the system.</p> |

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# Project Work Progress Report

Week No: 15      Date: From: 07/11/2018      To: 15/12/2018

Project Title: **IOT based Home Automation System over cloud**

Name of the Guide: Asst. Prof. Madhu B.R.

Name of the Student: Vaishnavi K R, Tushar Jain, Sohan Chopdekar, Dushyanth N Gowda

| Date       | Report  |
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| 07/06/2018 | <p><b>LITERATURE SURVEY:</b></p> <p><b>Title:</b> Prediction of Human Actions in a Smart Home Using Single and Ensemble of Classifiers</p> <p><b>Author:</b> Basman M. Hasan Alhafidh, Amar I. Daood, William H. Allen</p> <p><b>Abstract:</b></p> <p>There is a growing need for home automation systems that monitor and control a smart home environment to produce an efficient system that accurately predicts the needs of the human occupants. Past research has focused on the accuracy of prediction of a user's future action. However, much of that work uses synthetic datasets which do not always reflect the real-world interactions that occur between an individual and the home environment. In addition, a focus on prediction accuracy often comes at the cost of slower processing time. This paper focuses on the prediction of future human actions in an intelligent environment with the goal of achieving both high prediction accuracy and response times that are appropriate for a real-time application environment. We performed experiments using the MiPad dataset, which was gathered from a fully-instrumented home environment and compared several different machine learning algorithms that included both single and ensemble classifiers. This study investigates whether an ensemble approach will satisfy the condition of real-time application much better than the performance of a single classifier. The results show that using a Support Vector Machine as a single classifier approach achieves the best results when using a group of sensors within a local zone, while the Random Forest classifier as an ensemble classifier approach achieves a higher performance when using sensors that are distributed across all zones inside the environment. The results lead us to the conclusion that dividing the environment into smaller zones assures the best performance of machine learning algorithms which is represented by the combination of maximum accuracy with a minimum time response for the prediction process.</p> <p><b>Conclusions:</b></p> <p>This paper presented an investigation of the use of two different approaches to machine learning techniques, single and ensemble of classifiers, for the prediction of user actions in a real-time automated home environment. The MavPad dataset was used to train several well-known MLAs for each approach in 30-days period followed by a 7-days dataset used to test the effectiveness of the proposed system after dividing the environment into two different space zones. We demonstrate several significant contributions from our results. First of all: using SVM as a single type of binary classifier gives the best results when using a small number of sensors in a specific zone (Local Zone) with minimum prediction time. The second conclusions: SVM shows inconsistent results when using all of the sensors in the global zone of the home environment. Therefore, the Random Forest (RF) ensemble classifier approach gave the best combination of accuracy and execution time.</p> |

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