

Intelligent Home Systems for Ubiquitous User Support by using Rule Based Approach

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Abstract: - Today we are living in the 21st century. It is necessary to control the home from desire location. Home automation is the control of any electrically and electronics device in our home and office, whether we are there or away. There are hundreds of products available that allow us to control the devices automatically using hardware but now we implement the smart web based application based on notification and alert system to user with the help of artificial algorithm. In our project we design like chat bots, Chat bots typically provide a text-based user interface, allowing the user to type commands and receive text as well as text to speech response. Chat bots are usually state full services, remembering previous commands in order to provide functionality. When chat bots technology is integrated with popular web services it can be utilized securely. In Our project we implement the Automation Remainder system to user for simplify the life Also in this project we implement the Door Notification close or open based on time, Food Ordering , Shopping, LPG Gas Booking alert, when someone in front of door using camera verify the person, Every day meeting and Events Alerts.

Keywords:

I INTRODUCTION

Ubiquitous computing environments provide access to information and computing resources for users at anytime and anywhere [1, 2]. Since home is the place where everybody lives, smart home aim to provide the best services to home habitants [3, 4]. In this environment, applications must be self-adaptive to the environment within which they operate. For researchers, it is difficult to work in the real smart home since home appliances are very expensive. Besides, collecting information from sensors, reasoning from known databases, and determining appropriate activities are the main steps for self-adaptive applications. Actually, the main key to those applications is context information. However, there should be various sensors and devices for constructing ubiquitous computing environments for self-adaptive applications. Furthermore it is expensive to construct fully the environment. Furthermore, before installing in the real system, we need home simulation to test, to verify first. Also, the smart home simulator is an ideal place to apply various context awareness approach such as rule based, ontology based, case based reasoning. Therefore, prior to development of self-adaptive applications, it is necessary to demonstrate that it is possible to obtain valid context information from virtual sensors instead of physical sensors.

In this paper, we propose a context aware simulation system called Interactive Smart Home Simulator aka ISS. By using ISS, we automatically collect the context information from a smart home and validate the reactions in ways that fit in with the environment. This is the main design goal of the context aware system. Finally, we can improve the productivity and quality of a smart home realization.

II LITERATURE SURVEY

Paper 1: Systematic Survey on Smart Home Safety and Security Systems Using the Arduino Platform

Description: That could help researchers and developers better understand these systems and their applications in different contexts. It is therefore crucial that research evidence published in this area is presented. In this study, 63 research papers that examined smart home safety and security systems using the Arduino platform from popular literature databases were thoroughly surveyed to extract useful data. Then, the extracted data were analyzed to answer many Smart home safety and security systems have gained much importance over the last few years owing to their notable impact in reducing and preventing losses in resources and human life caused by unwanted situations that could occur while homeowners are far away from their homes. To date, there is a lack of an in-depth literature analysis research questions concerning state-of-the-art applications of these systems, their architectures, their enabling technologies, their components, etc. In addition, several challenges that these systems currently face and how future research could enable better implementation and use of these systems were discussed.

Paper 2: An Intelligent, Secure, and Smart Home Automation System.

Description: The idea of a smart home is getting attention for the last few years. The key challenges in a smart home are intelligent decision making, secure identification, and authentication of the IoT devices, continuous connectivity, data security, and privacy issues. The existing systems are targeting one or two of these issues whereas a smart home automation system that is not only secure but also has intelligent decision making and analytical abilities is the need of time. In this paper, we present a

novel idea of a smart home that uses a machine learning algorithm (Support Vector Machine) for intelligent decision making and also uses block chain technology to ensure identification and authentication of the IoT devices. Emerging block chain technology plays a vital role by providing a reliable, secure, and decentralized mechanism for identification and authentication of the IoT devices used in the proposed home automation system. Moreover, the SVM classifier is applied to classify the status of devices used in the proposed smart home automation system into one of the two categories, i.e., “ON” and “OFF.” This system is based on Raspberry Pi, 5 V relay circuit, and some sensors. A mobile application is developed using the Android platform. Raspberry Pi acting as the server maintains the database of each appliance. The HTTP web interface and apache server are used for communication among the Android app and Raspberry Pi. The proposed idea is tested in the lab and real life to validate its effectiveness and usefulness. It is also ensured that the hardware and technology used in the proposed idea are cheap, easily available, and replicable. The experimental results highlight its significance and validate the proof of the concept.

Paper 3: A Survey on the Security of Smart Homes: Issues and Solutions

Description: Today we are witnessing a new concept that is growing fast: The Internet of Things (IoT). We can see all devices we use in any field, are transformed into a smarter version such as smart homes, smart beds, smart coffee machines and smart everything. According to the American Research Firm Gartner there will be nearly 50 billion connected devices in 2020. However, the security aspect is still at the top of the prioritized tasks in this concept.

In this paper we present a review about some categories of popular security issues in the IoT and the solutions proposed by other researchers to these issues. In addition, we investigated security attacks in smart homes and identified some possible security solutions in those environments.

Paper 4: Smart Homes System Using Internet-of-Things: Issues, Solutions and Recent Research Directions

Description: Smart home has evolved from exclusively referring to the centralized and semi-automated control of environmental systems whereas Internet-of-Things (IoT) is the expansion of internet services. Applications of IoT are increasing. Uses of new technologies in IoT environment are increasing rapidly. It has been already developed in Industrial Wireless Sensor Network (WSN). A smart home is also one of the applications of IoT. Rapid growth in technologies and improvements in architecture comes out many problems that how to manage and control the whole system, Security at the server, security in smart homes, etc. This paper presents the architecture of IoT. Smart homes are those where household devices/home appliances could monitor and control remotely. When these household devices in smart homes connect with the internet using proper network architecture and standard protocols, the whole system can be called as Smart Home in IoT environment or IoT based Smart Homes. Smart Homes ease out the home automation task. This paper presents not only the problems and challenges come in IoT and Smart homes system using IoT but also some solutions that would help to overcome on some problems and challenges.

Paper 5: A Survey on Home Automation Systems

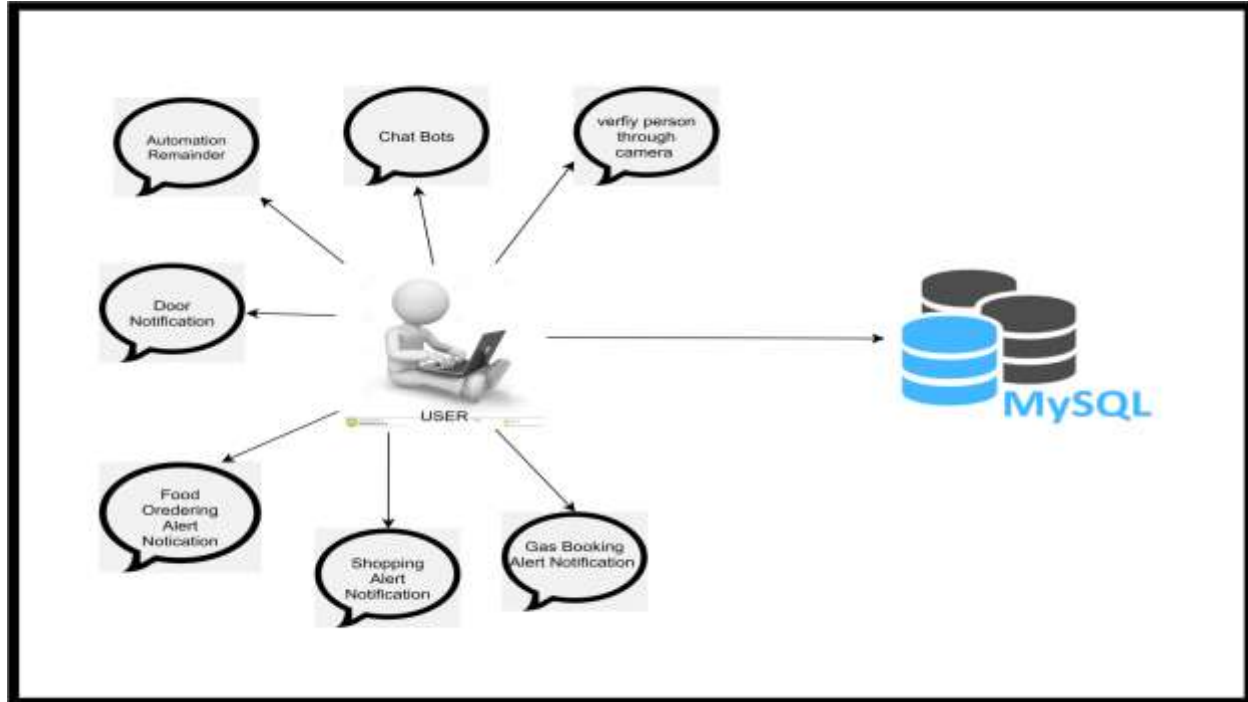
Description: The purpose of this survey paper is to present the Home Automation Systems (HAS) currently available over the world. It is very useful to the user for control and handle all the appliances that are connected to the system, from a controlling devices. “EASY USE OF APPLIANCES” is main motive of this system. In this system home appliances can be monitored and controlled, and the user can interact with the system through a user friendly interface. The home appliances like fans, lights, switches are remotely controlled through a main control board. It becomes too tedious to every time manually turn the switches ON or OFF. According survey we found that this is a big problem in case of disabled or handicapped people. For that reason home automation system is useful.

III PROPOSE SYSTEM

The aim of our proposed simulator is to provide the interactive actions in smart home environment and attempt to solve the listed problems. The important components interacting towards the others in general. Sensor Retriever: requests and receives sensed information from virtual sensors. There are many kind of sensors in reality can be listed as light, temperature, humidity, location, person, etc. Reasoning: queries and concludes the appropriate actions to the current context. Smart Home UI: is the tool which helps user to interact with the smart home. Home Server: controls the virtual home appliances such as TV, Air conditioner, gate, curtain, electric-based devices like neon light, fan, etc. Home Environment: simulates the real environment. Like the real home, home simulator is the container environment consists of smaller environments like living room, bathroom, dining room, etc. Extrinsic factors influence the environment. Exchange of message among extrinsic factors and the environment.

Advantages:

1. Cost: The biggest problems, con or disadvantage of a Intelligent home systems is the cost .There are quite a number of companies that provide the Intelligent home systems , but all of them are quite expensive. This is something that only a few can afford. You would be able to have a good savings and income to install this system.
2. Dependency on Internet: The basic requirement for the Intelligent home systems is the internet. Without a good and strong internet connection, you will not be able to take control of this. If there is no internet connection for some reason, there is no other way through which you can access and control your system.
3. Dependency on Professionals: In case there is a problem with the Intelligent home systems , you cannot simply call a handyman or someone similar to repair or manage the bug. You will have to depend on the professionals. Only the company professionals can help you to handle the problems. A professional would be able to take care of the disadvantages of home appliances.

**IV CONCLUSION**

With all these pros and cons of smart homes, it will be easier for you to decide whether you want to install this system in your house or not. Certainly this installation would help you to upgrade your house to a great extent. It will increase the property price for your home hugely.

The only thing that you need to make sure is that you choose a good company that offers this system. Ask people who have already used this system and have installed it in their flats in Calicut. There are quite a number of companies that offer the smart home system nowadays.

All of those companies offer some special feature or the other. Of course the prices vary. You need to decide the priorities that you have and the things that you are looking for. For small to big, all apartment sizes, there is one or the other smart home system that you can choose. Decide what you are looking for and what your budget is and you will be able to find one system that is suitable for you.

V REFERENCES

- [1] Mainetti, L.; Patrono, L.; Rametta, P. Capturing behavioral changes of elderly people through unobtrusive sensing technologies. In Proceedings of the 2016 24th International Conference on Software, Telecommunications and Computer Networks (SoftCOM), Split, Croatia, 22–24 September 2016; pp. 1–3.
- [2] Da Silva, F.G.; Galeazzo, E. Accelerometer based intelligent system for human movement recognition. In Proceedings of the 5th IEEE International Workshop on Advances in Sensors and Interfaces IWASI, Bari, Italy, 13–14 June 2013; pp. 20–24.
- [3] Chernbumroong, S.; Cang, S.; Atkins, A.; Yu, H. Elderly activities recognition and classification for applications in assisted living. *Expert Syst. Appl.* 2013, 40, 1662–1674.

- [4] Wang, L.; Gu, T.; Tao, X.; Chen, H.; Lu, J. Recognizing multi-user activities using wearable sensors in a smart home. *Pervasive Mob. Comput.* 2011, 7, 287–298.
- [5] Szeliski, R. *Computer Vision: Algorithms and Applications*; Springer Science & Business Media: New York, NY, USA, 2010.
- [6] O'Neill, E., Klepal, M., Lewis, D. O'Donnell, T., O'Sullivan, D., and Pesch, D., "A testbed for evaluating human interaction with ubiquitous computing environments", *Testbeds and Research Infrastructures for the Development of Networks and Communities Conference*, pp. 60- 69, Feb. 2005.
- [7] InSu K., HeeMan P., BongNam N., YoungLok L., SeungYong L., and HyungHyo L., "Design and Implementation of Context Awareness Simulation Toolkit for Context learning" , *IEEE International Conference on Sensor Networks, Ubiquitous, and Trustworthy Computing*, vol. 2, pp. 96-103, 2006.
- [8] J. Kaye, D. Castillo, "FlashTM MX for Interactive Simulation", ISBN:14-0181-291-0, THOMSON, 2005
- [9] Craig Swann, Gregg Caines, "XML in FlashTM", ISBN:0-672-32315-X, QUE Publishing, 2002
- [10] JoonSeok Park, Mikyeong Moon, Seongjin Hwang, Keunhyuk Yeom, "CASS: A ContextAware Simulation System for Smart Home", in *Proc. of Fifth International Conference on Software Engineering Research, Management and Applications*, 2007
- [11] SharpDevelop homepage, <http://www.icsharpcode.net/OpenSource/SD/>
- [12] Roy Want, "An Introduction to RFID Technology", *PERVASIVE computing Journal*, 2006
- [13] G. Ferrari, P. Medagliani, S. Di Piazza, M. Martalò, "Wireless sensor networks: performance analysis in indoor scenarios", *EURASIP Journal on Wireless Communications and Networking*, Volume 2007 Issue 1, January 2007

