A Synopsis on

Profile Based Room Automation Using Machine Learning

Submitted in partial fulfillment of the requirements
of the degree of

Bachelor of Engineering

in

Information Technology

by

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CERTIFICATE

This is to certify that the project Synopsis entitled ***"Profile Based Room Automation Using Machine Learning"*** Submitted by ***"Aniruddh patil (15104013), Namrata Joshi (15104049), Gargi Surve (15104039)"*** for the partial fulfillment of the requirement for award of a degree ***Bachelor of Engineering*** in ***Information Technology.***to the University of Mumbai,is a bonafide work carried out during academic year 2018-2019

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We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, we have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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Abstract

The objective of the proposed idea is to explore the ever expanding world Of IoT. IoT involves extending internet connectivity beyond standard de- vices, to a range of non-internet enabled physical devices like lights and fans. The planned system aims at giving users control over their environment and enhance their standard of living. The idea is implemented on the base of android things enabling the above mentioned physical devices to connect and exchange data. It also facilitates integration of data analytics and pattern recognition based on certain algorithms. The system adapts to the user pat- terns using machine learning with the help of TensorFlow. Following is a system which allows the user to control their environment over the internet learning the patterns and maintaining the profiles for every user and thus optimizing and reducing the effort of the user to get their preferred environment with the help of automation.

Introduction

As homo sapiens we have always felt at peace and happy when we have our life in control and when we have control over what happens around us and in our environment. Its in this state of being that we find ourselves the most productive. Also we as humans want the shortest , less taxing , less effort requiring way to get our desired results. Example we all want money without actually having to work for it. This is possible via Passive Income Stream. Just like with Passive income stream after the initial setup a very minimal interaction with the system is required to get desired results. We give you a solution which will give you total control over your immediate environment and gradually reduce the efforts required to get your optimal required environment set up with least amount of efforts. The way we go about doing this is we provide you an intelligent adaptive room control system which allows you to control your environment with the help of phone and the system tracks your usage patterns and then develops patterns ,and these patterns are then used to automate the work for you reducing your interaction with the system as time passes. We maintain a profile for each user so as to tend to the specific needs of each user.

Objectives

- To give users more control over their environment.
- To allow the system to learn about the variations in user profile with the help of various machine learning tools.
- To enable the system to learn and develop patterns that allow it to automate the respective room.
- To use motion sensing in the system for optimal usage of resources.
- To make use of user recognition module for better profile maintenance.

Literature Review

Sr.No.	Paper	Methodology	Advantages	Disadvantages
1	Towards the Implementation of IoT for Environmental Condition Monitoring in Homes-Sean Dieter Tebje Kelly, Nagender Kumar Suryadevara, and Subhas Chandra Mukhopadhyay, Fellow, IEEE, IEEE SENSORS JOURNAL, VOL. 13, NO. 10, OCTOBER 2013	ZigBee WSN Network using IPv6 Connectivity with packet Transmission and data storage with UDP packets	Moderate scalability, fault Tolerance low-cost solution and flexible connection greater control over routing of packets	IPv6 connectivity security issues for ZigBee Uncommon architecture
2	Smart Home and Smart City Solutions enabled by 5G, IoT, AAI and CoT ServicesK E Skouby, P Lynggaard - 2014 International Conference on Contemporary Computing and Informatics (IC3I)	Four layer model which join and interfaces these elements by deploying technologies such as 5G, internet of things, cloud of things, and distributed artificial intelligence	Ability to upgrade the smart homes and implement new service offered from cloud based repositories.benefits of centralizing all the big-data information on few cloud servers	Technology isnt availed at a consumer level
3	Mobile based Home Automation using Internet of Things(IoT) Kumar Mandula, Ramu Parupalli, CH.A.S.Murty, E.Magesh, Rutul Lunagariya -2015 International Conference on Control,lnstrumentation, Communication and Computational Technologies (lCCICCT)	Home automation using Bluetooth and Ethernet using Arduino	Low energy consumption and easy connectivity	Lack of standards for integrating various sensors, applications and other existing intelligent embedded devices. Providing unique IP addresses for connected devices and privacy and security

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Sr.No.	Paper	Methodology	Advantages	Disadvantages
4	A Remote Sensor Network using Android Things and Cloud Computing for the Food Reserve Agency in Zambia -Mulima Chibuye,Jackson Phiri (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 8, No. 11, 2017	Using Android things to enable IOT and cloud	Ease of interfacing and easy app integration	Lack of security standards
5	Implementation of Voice Based Home Automation System Using Raspberry Pi -Harshada Rajput1, Karuna Sawant2, Dipika Shetty3, Punit Shukla4, Prof. Amit Chougule5 International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 05 Issue: 05 May-2018	Voice Based Home Automation System using Raspberry Pi	Easy interaction with the system and increased comfort level	Authenticaton, accent recognition
6	Intelligent smart home energy efficiency model using artificial TensorFlow engine Jo and Yoon Hum. Cent. Comput. Inf. Sci. (2018) 8:9	Use of Tensorflow to optimize the use of energy consumption	Better result with least interaction,smart decision	Developing correct model can be difficult

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Table 1 – continued from previous page

Sr.No.	Paper	Methodology	Advantages	Disadvantages
7	IoT Based Home Automation System over the Cloud Ms. Fareha Firdous, Ms. Sumayya, Mr. Aseem Mohd Umair International Journal of Innovations	Advancement in Computer Science IJIACS ISSN 2347 8616 Volume 7, Issue 3 March 2018	Home automation using private cloud and mobile app	Reduced installation costs: System scalability and easy extension Integration of mobile devices and No voice support
8	IoT based Smart Home Automation System using Sensor Node Himanshu Singh, Vishal Pallagani, Vedant Khandelwal and Venkanna U. 4th Intl Conf. on Recent Advances in Information Technology	Sensor Network using microcontroller to sense data	Can be integration with other technologies easily	Lacks intelligence
9	Smart Gesture Control for Home Automation Using Internet of Things Sunil Kumar Khatri, Govind Sharma, Prashant Johri and Sachit Mohan Springer Nature Singapore Pte Ltd. 2018 S. Bhalla et al. (eds.), Intelligent Computing and Information and Communication,Advances in Intelligent Systems and Computing	Using gesture to control appliances	Gives the ability to improve user interaction and ease of action	Complex algorithms and high resource rerequirements

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Sr.No.	Paper	Methodology	Advantages	Disadvantages
10	Smart Home Automation System Using Bluetooth Technology Muhammad Asadullah, IEEE Student Member, Khalil Ullah 978-1-5090-3310-2	Using Bluetooth for communication	Easy compatibility , low energy	Low range, low data transfer rates

Problem Definition

Wastage of resources is the driving force behind implementing the system. Ubiquitous home environment is designed to regulate the consumption of a utility and to improve usage efficiency. User context aware energy devices can be designed to switch themselves on in a particular way, e.g. a light switches on, heating switches on when it detects the presence of a user otherwise it switches off. The problem of unoptimized power consumption is solved by this system, Thus this system provides optimized power consumption. The need of manually controlling the devices is diminished as people are becoming technologically sound which has also resulted in us becoming a bit lazy. Thus,the proposed system focuses on the above discussed points.

Proposed System Architecture

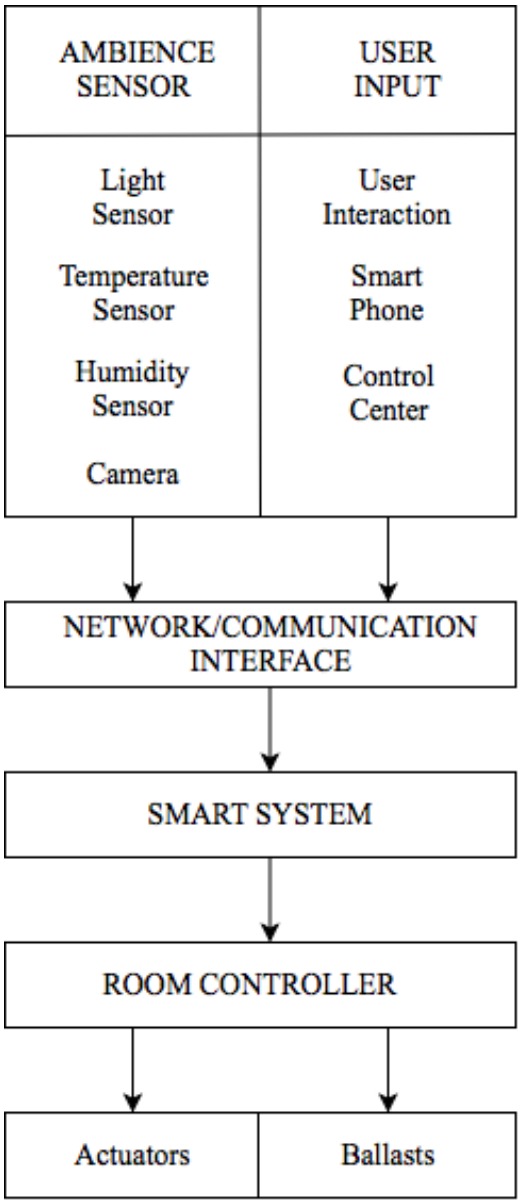

Fig.1 Basic architecture

Ambient Intelligent systems collect the data this process is known as sensing. Sensing plays an important role in the learning process. The data captured will greatly affect the learning process and the pattern that are then developed based on the data captured will alert accordingly. Raw data will not always be meaningful. To make sense different raw data has to be brought and analyzed to infer and recognize the activity. This data can be both sensor collected or user input. User input data, plays a major role in the learning process and help in

understanding patterns quickly. This data is transferred over to the Room Controller via a suitable network communication technology. The room controller has learning and cognition engine, energy management engine, prediction engine, devices profiles, user profiles, organization engine, task schedulers and storage which help in analyzing then data input, figuring out patterns, learn the patterns, learn to take decision based on the data input and previously analyzed patterns. This is the main control unit of the Ambient Intelligent Systems.

Summary

For proper and successful completion of the project it is necessary that the system recognizes its users efficiently. The system will be trained for registered users with the help of Keras, which is used for training the data sets. Hence, by using machine learning the system will identify user patterns and develop presets to create the required environment. The prototype will aim at automating the basic appliances like one of each ACs, fans, lights and PCs. We will make use of Raspberry pi 3B+ as our minicomputer on which the actual processing and decision making will take place. It is the brain of the system. This is connected to the ardunio which is the arms and legs of the system, it does the work of sensing and actuating. A sensor network linked to the arduino is used to gather data from the system a set of IR, receiver and transmitter is used to operate the AC whereas to control other appliances we use relay modules. Once the prototype shows optimal performance, we will opt to automate the complete lab. The system will facilitate the user with much more control over their ambience. Installation and configuration of the software on raspberry pi 3B+ has been completed. Further progress is made in terms of hardware in the project implementation along with learning the connections of various hardware components as well as the softwares required.

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[4] A Remote Sensor Network using Android Things and Cloud Computing for the Food Reserve Agency in Zambia Mulima Chibuye, Jackson Phiri (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 8, No. 11, 2017

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