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Android App Developmemt To Control IOT Devices

A Project Report of Capstone Project-2

Submitted by

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Under the Supervision of

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APPENDIX 2

SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

BONAFIDE CERTIFICATE

Certificate that this project report **"Android App Development to Control IOT Devices"** is the bonafide of **"Vikrant Singh (1613114055)"** who carried out the project work under my supervision.

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APPENDIX 3

Abstract

The main purpose of this Android App is to control IOT devices that are used in Home Automation. This project presents a low cost, flexible and reliable home control and monitoring system using an embedded micro-web server, with IP connectivity for accessing and controlling   devices and appliances remotely using Android based Samart Phone app. The proposed system does not require a dedicated server PC with respect to similar systems and offers a novel communication protocol to monitor and control the home environment with more than just the switching functionality. The Architecture presents in this work can be customized in differsnt ways in order to accommodate different application scenarios with minimum recording and design i.e. each time a new device is added to the micro web-server, a new thread dediated to the device is automatically created in the smart phone app.

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Chapters

1. INTRODUCTION

Now a days because of modern technology Home Automation System has become very useful for handicapped people. It is very useful to the user for control and handle all the appliance that are connected to the system, from a controlling devices. "Easy use of appliance" 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 appliance like fans, lights, switches are remotely controlled through a main control board. By using of the Internet of Things (IoT), the developing of home automation are going to become simpler and more popular. IoT is nothing but connecting different real world objects to provide proper communication, synchronization, and inter-connection between various devices or physical appliances is also known as "Things".

Smart Home
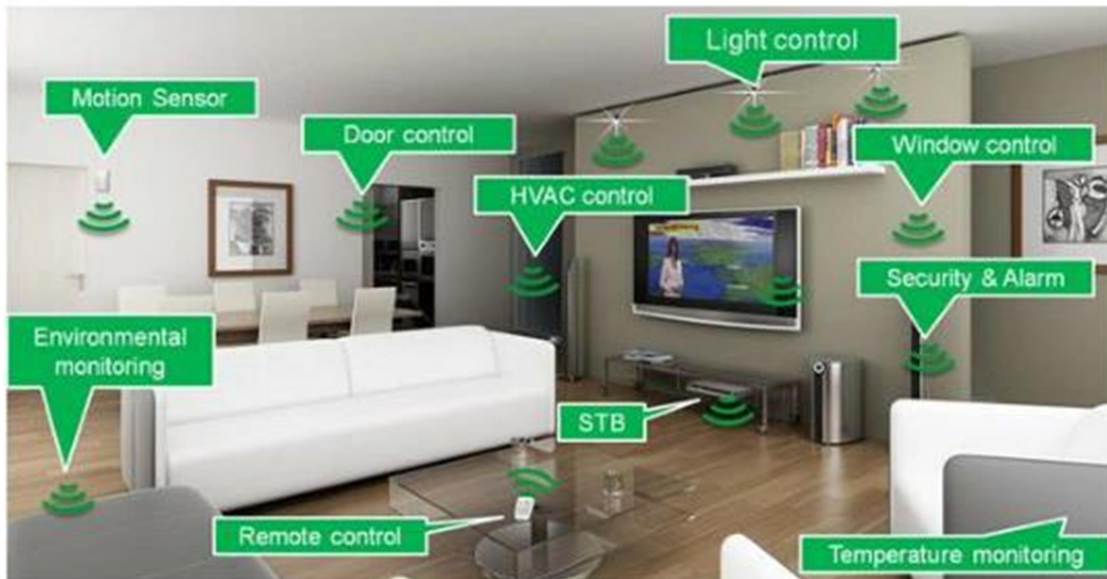
The IOT market is huge, and it has something to offer many other markets. It seems like Internet of Things devices will soon be everywhere, from smart home to smart cities. We are focusing on consumer IOT because it's the area where mobile apps will be most needed because people have their mobile phone at hand all the time. Smart homes are probably the first thing that comes to mind when you think about IOT for people reliability. And smart home technologies are becoming more populer each year.

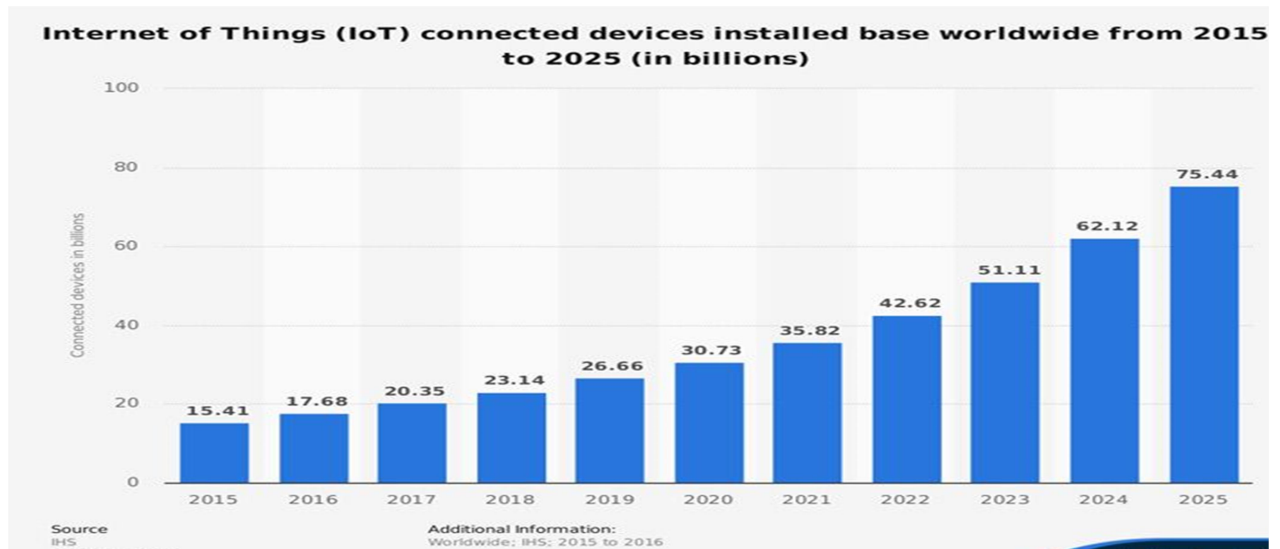According to an IDC forecats, sales of wearable devices have grew 31 percent from 2016 to 2020, all the way to 82.5 million units.

Internet of Things (IoT) connected devices installed base worldwide from 2015 to 2025 (in billions)

Source: IHS

Additional Information: Worldwide; IHS; 2015 to 2016

2. LITERATURE SURVEY

In current situation home automation system is developing using many technology like IoT and cloud etc. There are many systems in market like

2.1 Sensor Based Home Automation and Security System.

This is a web based home automation system in which user can interact with the system through a web-based interface over the Internet. The system connected to home appliance. The main processor interacts with external components, viz.sensors, appliances and devices.

2.2 I-Learning IoT: An Intelligent Self Learning System for Home Automation Using IoT.

In this system, Home automation is working on cloud principle. With the help of different sensors, monitoring is done. Home pc is going to report that problem to Cloud Server. Cloud server will store the information into the database and will take actions according to output.

2.3 Java-Based Home Automation System.

In this system home appliances can be monitored and controlled locally via the embedded system board, or remotely through a web browser from anywhere in the world using Internet. This system is scalable that can add any appliances and it is also secured by password.

3. MOTIVATION AND SCOPE

IoT mobile applications are on the rise. This fully integrate technology in many aspects of people's lives and free them from worries, daily chores, and the necessity to remember little things.

The most important considerations when building internet of things apps are:

- Security

- Network stability

- Speed

Without these, it's nearly impossible to get loyal users who will not only download and use your app but also leave great reviews and recommend it to friends. To ensure that your app is secure, stable, and fast

In some cases there may be handicapped people in house and they are not able to move frequently for controlling appliances in house, so using home automation system these people can easily control all the appliances. For handicapped people it is essential to develop home automation system which required less and easy user interaction.

4. PROPOSED MODEL

This section deals with the proposed system. Here, we modulate the proposed system into only one module that is Programming Module: to deal with Python programming with Kivy, because in this project we are only concerned about to develop Android App to control and monitor smart devices that is generally used in Home Automation:

- ➢ Improve Security: As the IoT devices are going to control manually through the android application, we need to assure more security to prevent from others to enter into the system and control the appliances. So we have to provide authentication of the user using the android application.
- ➢ Reduce Technical Inconsistency(By using Integration of third party services-IFTTT): In this project we tried to reduce technical inconsistency , technical inconsistency means we can't be sure a mobile app will connect to all smart devices inside a home unless they are also made by same company.

  For example, if a customer buys smart light bulbs from one company and a thermostat from another, they probably won't work together. So, consumers are restricted to using only one producer's device, which makes the whole IoT industry fragmented: each company hs its own standards, APIs, and connection and security standards.

4.1 Technical Requirement

➢ Preferred Programming Language: We used Python programming language to develop this android app.
➢ Suitable Plateform/Tool: For python Kivy is the best option.
➢ Android Phone: 2 Gb RAM, 8 GB ROM
➢ Communication: Satellite, Wi-Fi
➢ Protocols:http, MQTT, WebSocket, XMPP, CoAP, IFTTT

4.2 Software Architecture

Hub Centric Archtecture:

The Hub in hub-centric architecture is working as an intermediary for connecting a bulb to the smartphone and to the Internet, since it usually connects to the home Wi-Fi or Ethernet network. A smart lightbulb is totally independent of a smartphone and could be smart on it's own.
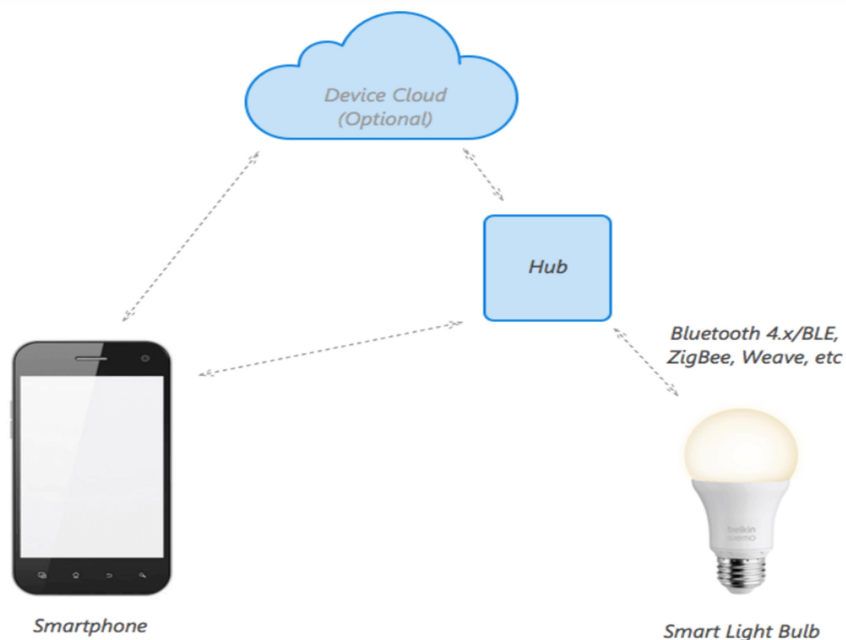

With the hub-centric architecture it is easier to organize the grouping and seamless connection of the many light bulbs and other appliances in a house. Every connected device can be controlled from anywhere and at any time. Background smart triggers, from integrations to the third party services (IFTTT, stock market dynamics, etc), are easily achievable, as well as controlling devices from any smartphone belonging to the home owners.

A device cloud in this architecture is optional because many smart features could be set up without having a dedicated cloud infrastructure. But with a cloud features become more robust and reliable because there is a lot more computational power available in a cloud for complex tasks than on a hub device itself.
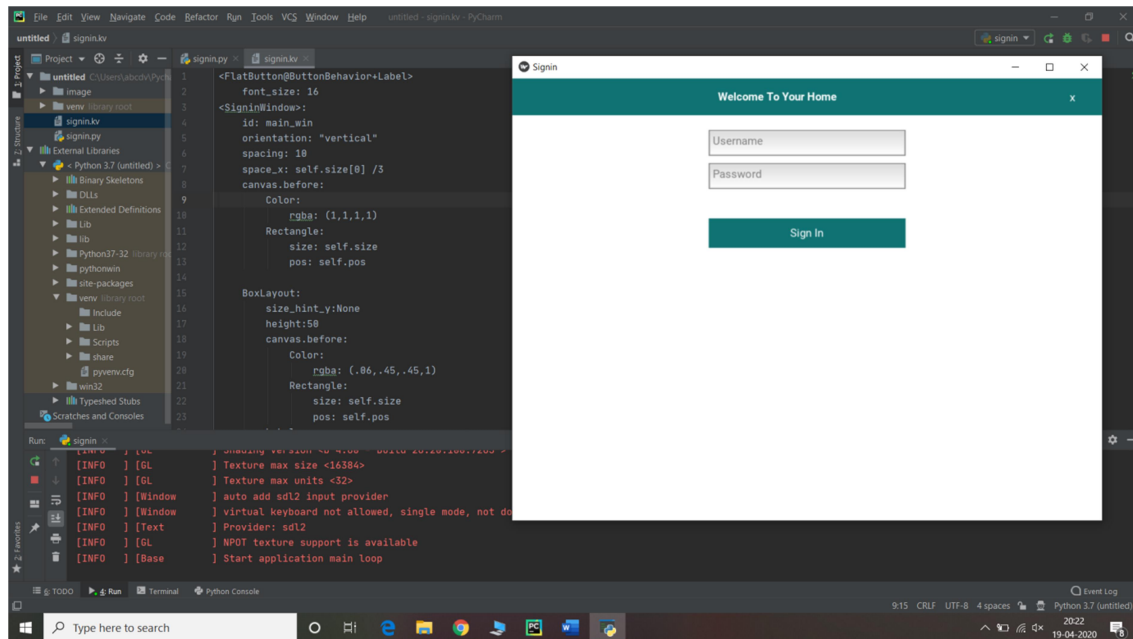
The drawback of hub-centric architecture lies in the need to add another device to the system that needs to be delivered to the customer's home and installed correctly.

And this is also the architecture broadly used by Google, Apple and Amazon in approaching the smart home market today. Read more on their hubs below.

4.3 Software Framework
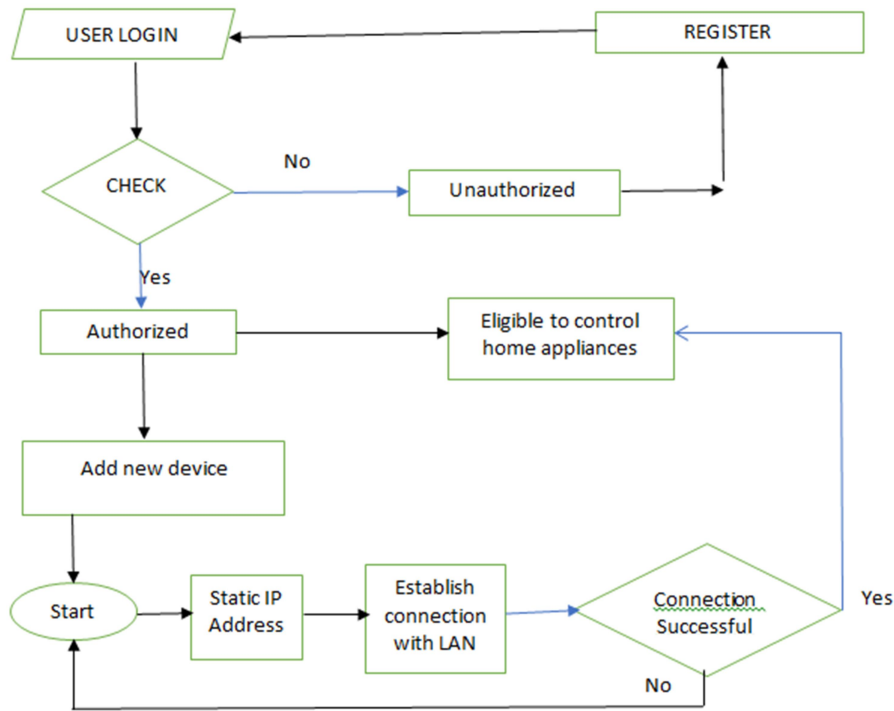
5. IMPLEMENTATION

6. CONCLUSION

In this project we are trying to solve the fragmentation of IoT devices by centralizing their management in one single app. So far, it supports the most common IoT devices on the market. Hopefully, they will support even more devices in future. The app delivers what it promises. Despite a few problems, in the end the app works well and seems to be ready for every day usage.

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