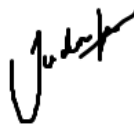# Home Automation

Submitted in partial fulfillment of the requirements for the award of degree of

BACHELOR OF ENGINEERING
IN
COMPUTER SCIENCE & ENGINEERING

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INTRODUCTION

What is the Internet of Things?

The Internet of Things, or IoT, refers to the billions of physical devices around the world that are now connected to the internet, all collecting and sharing data. Thanks to the arrival of super-cheap computer chips and the ubiquity of wireless networks, it's possible to turn anything, from something as small as a pill to something as big as an aeroplane, into a part of the IoT. Connecting up all these different objects and adding sensors to them adds a level of digital intelligence to devices that would be otherwise dumb, enabling them to communicate real-time data without involving a human being. The Internet of Things is making the fabric of the world around us more smarter and more responsive, merging the digital and physical universes.

Why Is Internet of Things (IoT) so important?

Over the past few years, IoT has become one of the most important technologies of the 21st century. Now that we can connect everyday objects—kitchen appliances, cars, thermostats, baby monitors—to the internet via embedded devices, seamless communication is possible between people, processes, and things.

By means of low-cost computing, the cloud, big data, analytic, and mobile technologies, physical things can share and collect data with minimal human intervention. In this hyper-connected world, digital systems can record, monitor, and adjust each interaction between connected things. The physical world meets the digital world—and they cooperate.

What are the applications of the IoT?

Just as the internet at large affects a broad spectrum of users, so does the IoT. Depending on the scale of connectivity and the number of devices involved, the IoT can have significant and specific applications, be they for a single user or for an entire city. Common applications of the IoT include the following.

People and homes. People make direct use of IoT devices through technology that can be worn, such as smartwatches and fitness trackers, and devices that help make receiving and collecting information possible in real time. Applied to households, IoT devices can be used for a more connected, energy-efficient, and conveniently run home. Different aspects of a connected home can also be remotely accessed and controlled by home owners through a computer or a handheld smart device.

Automobiles. Sensors within a moving vehicle make it possible to collect real-time data about the vehicle and its surroundings. Autonomous vehicles use different sensors in combination with advanced control systems to assess their environments and consequently drive themselves.

Factories. With the application of IoT in factories, manufacturers can automate repetitive tasks as well as access information on any part of the entire manufacturing process. Information provided by sensors on factory machinery can help in devising ways to make the entire production line more efficient and less accident-prone.

Businesses. On a larger scale, with the adoption of IoT technologies, businesses can be more cost-effective, efficient, and productive. For example, office buildings can be fitted with sensors that can monitor elevator traffic or overall energy consumption. Different industries naturally have different applications of the IoT: In the healthcare industry, IoT devices may be used to gain instant and accurate updates about the condition of patients, while in the retail industry, IoT devices may be deployed to help shoppers locate products and to monitor inventory.

What is Home Automation?

A home automation system is a technological solution that enables automating the bulk of electronic, electrical and technology-based tasks within a home.

It uses a combination of hardware and software technologies that enable control and management over appliances and devices within a home.

Home automation is also known as domestics, and a home with an automation system is also known as a smart home.

We are experiencing a new era of Internet of Things (IoT), where many electronic devices surrounding us are interconnected by a network. This paradigm enables copious amounts of data to be stored, processed, and conferred in a proficiently interpret-able form without human invention. The emerging of IoT also sheds new light on the concept of a "smart home." IoT-enabled house equipment allows for a smart home to be more intelligent, remote controllable, and interconnected.

FEASIBILITY STUDY

Once upon a time in April 1986, when the hazardous incident of Chernobyl took place, the whole world was shook and the effects of that nuclear disaster still exists. It was found out that along with the graphite tips of the control rods, tremendous increase in the rate of reaction and thus increase in temperature was the major cause of the disaster.

At that time people were not aware about the exciting technology of internet of things since it came into play much later after the incident.

What if at that time we have applied IOT and could have get an alert message on phone and via email, this huge disaster could have been avoided. Mr. Razor thought to apply this idea of IOT and avoid any such future miss happening. So, he decided to make an IOT device which sends alert sms and emails when the temperature of the nuclear reactor changed anomalously. He applied his knowledge of machine learning and Z-Score Analysis to get through this.

Significance

This project is about monitoring the temperature of the room. It alerts you with an SMS if there is any sudden raise or drop in the temperature and also when the temperature goes below certain minimum value. It also predicts the temperature values from the history data and thus can help you with many things accordingly. The ultimate goal of IoT utilized in building environment is the indoor climate data collected from massive deployed sensors and the intelligence generated and mined from sensory data. In this study, we intend to integrate novel anomaly detection methods based on machine learning into the specific application, a cloud-based temperature monitoring system, to actively detect the anomalous indoor temperature so as to further enhance the automation, ease the administrator's responsibility in maintenance, improve the reliability and scalability of the temperature monitoring system.

Possible scenario (example)

Due to some medical reasons my doctor have advised me to avoid staying in a room with temperature below 33 degree and also sudden change in temperature affects my skin adversely, so, I thought of building an IOT device which would alert me as soon as the above mentioned events take place and could predict the upcoming values so that I could take precautions accordingly.

METHODOLOGY

Why Choose Python for Your Project

The worldwide spending on the IoT indicate that it is a new stage in the development of technologies that will completely change our lives and affect both the consumer and industrial segments.

The advent of the IoT is driven by the development of wireless and sensor technologies and entails the emergence of completely new tasks, such as:

- To develop new communication standards in the IoT network
- To lower the cost of successful sensors integration
- To manage energy consumption, etc.

Machine Learning and IoT (Internet of Things)

Recently Internet of Things(IoT) is growing rapidly, various applications came out from academia and industry. Machine learning can also help machines, millions of machines, get together to understand what people want from the data made by human beings. Also machine learning plays an essential role in IoT aspect for handle the huge amount of date generated by those machine. Machine learning gives IoT and those machines a brain to think, which is called "embedded intelligence" by some scholars.

Programmers use Linux

Tell me that you are a programmer without telling that you are one? Our team's answer is "We use Linux!"

Linux is different from other operating systems in many important ways. First, and perhaps most importantly, Linux is open source software. The code used to create Linux is free and available to the public to view, edit, and—for users with the appropriate skills—to contribute to. You probably already use Linux, whether you know it or not. Depending on which user survey you look at, between one- and two-thirds of the web pages on the Internet are generated by servers running Linux.

WiFi Module

The ESP8266 WiFi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any micro-controller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. We've have use Bolt's WiFi module for our project. The Bolt Cloud lets you remotely configure and initialize the pins on your Bolt WiFi module, write code and update the firmware of all your device codes over the air.

MODULE & TEAM MEMBER WISE DISTRIBUTION OF WORK

Planning	Designing	Building	Coding	Testing	Deployment
Harsh Anand			Harsh Anand	Harsh Anand	Harsh Anand
Keshav Kant Mishra	Keshav Kant Mishra	Keshav Kant Mishra	Keshav Kant Mishra		
Bobby Sharma	Bobby Sharma		Bobby Sharma	Bobby Sharma	
Shubham Kumar		Shubham Kumar	Shubham Kumar	Shubham Kumar	

SOFTWARE AND HARDWARE REQUIREMENTS

Software:

1. Operating System : Linux (VMware Workstation version 12on Windows 10)

2. Programming language : Python

3. VMware Workstation

Hardware:

1. Laptop or PC:- minimum requirements mentioned below

   - i5 processor INTEL/AMD(equivalent)

   - Windows 8 or 10

   - RAM:- 4GB with integrated graphic card (necessary)

2. Smartphone (Any android based)

3. WiFi Module (we have used BOLT WiFi module in this project)

4. Assorted Connecting Wires

5. USB Cable

6. Temperature Sensor

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