INTERACTION OF INTERNET OF THINGS WITH SOCIAL NETWORKS

Project report submitted in partial fulfillment of the requirement for the degree of Bachelor of Technology

in

Computer Science and Engineering/Information Technology

By

Shruti Singhal (131302)
Hima Bhatia (131317)

Under the supervision of

Ms. Ruchi Verma

to

Department of Computer Science & Engineering and Information Technology
Jaypee University of Information Technology Waknaghat, Solan-173234, Himachal Pradesh

CERTIFICATE

Candidate's Declaration

I hereby declare that the work presented in this report entitled **" Interaction of Internet of Things with Social Networks."** in partial fulfillment of the requirements for the award of the degree of **Bachelor of Technology** in **Computer Science and Engineering/Information Technology** submitted in the department of Computer Science & Engineering and Information Technology**,** Jaypee University of Information Technology Waknaghat is an authentic record of my own work carried out over a period from August 2016 to May 2017 under the supervision of **Ms. Ruchi Verma (Assistant Professor, Computer Science Department)**.
The matter embodied in the report has not been submitted for the award of any other degree or diploma.

Shruti Singhal, 131302

Hima Bhatia, 131317

This is to certify that the above statement made by the candidate is true to the best of my knowledge.

Ms. Ruchi Verma
Assistant Professor
Computer Science Department
Dated:15 December,2016

ACKNOWLEDGEMENT

We owe our profound gratitude to our project supervisor **Ms Ruchi Verma**, who took keen interest and guided us all along in our project work titled **—Interaction of IoT with Social Networks**, till the completion of our project by providing all the necessary information for developing the project. The project development helped us in research and we got to know a lot of new things in our domain. We are really thankful to her.

TABLE OF CONTENTS

LIST OF FIGURES

ABSTRACT

Social networking concepts have been applied to several communication network settings, which span from delay-tolerant to peer-to-peer networks. More recently, one can observe a flourish of proposals aimed at giving social-like capabilities to the objects in the Internet of Things. Such proposals address the design of conceptual (and software) platforms, which can be exploited to easily develop and implement complex applications that require direct interactions among objects. The major goal is to build techniques that allow the network to enhance the level of trust between objects that are “friends” with each other. Furthermore, a social paradigm could definitely guarantee network navigability even if the number of nodes becomes orders of magnitude higher than in the traditional Internet. Objective is to analyze the major opportunities arising from the integration of social networking concepts into the Internet of Things.

CHAPTER 1

INTRODUCTION

1.1 Introduction

1.1.1 What is Internet of Things (IoT) ?

IoT (Internet of Things) is a system that is automated and analytic which has its working on domains such as networks, big data,sensing of data, and AI technology for sending complete systems for services and products. These systems are efficient enough to give greater clearity, control, and performance when provided to any industry or system. IoT systems have systems across industries through its unique adaptability and ability to get suited in any environment. It enhances data collection, mechanization , operations, and many other smart devices and powerful technology.

IoT systems permits users to achieve high automation, analysis and integrate it within a system. They improve the reachability of these systems and their accuracy. IoT uses existing and coming up new technology for sensing, networks, and robotics. IoT imposes recent advances in software, falling hardware costs, and latest attitude towards technology. Its new and modern elements bring huge changes in the delivery of products, goods, and services; and the social and economic affect of these changes.

Figure 1.1 Internet of Things

1.1.2 Key Features of IoT

The most important features of IoT includes:

- AI (Artificial Intelligence)
- Connectivity
- Sensors
- Active Engagement
- Small Devices

1.1.3 Advantages of IoT

- Improved Customer Engagement
- Technology Optimization
- Reducing Waste
- Enhanced Data Collection

1.1.4 Disadvantages of IoT

- Security
- Privacy
- Complexity
- Flexibility
- Compliance

1.1.5 What are Social Networks?

Social networks are just networks of social dealings and personal relationships. A social network is a website that brings humans together to interact, share ideas and interests, or make new bondings. This type of league and sharing is called social media. Not like the traditional media that is majorly created by not more than ten people, social media websites contain data created by hundreds or even millions of people.

1.1.6 Types of social networks

- Whatsapp
- Twitter
- Facebook
- Gmail
- Telegram

Figure 1.2 Social Media

1.1.7 Interaction of IoT with Social Networks

The objectives taken by the Social Internet of Things (SIoT) paradigm are very clear: to keep a separation between the two levels of people and things; to allow objects to get their own social network platforms and to allow people to create rules to save their privacy and only use the result of automatic inter-object interaction which occurrs on the object's social network platform. In our view smart objects (though are extremely intelligent) will not create a difference, but social objects will create it.

The literature provided by scientific research gives a wide variety of examples of how latest technology is able to achieve the definition of devices, all thanks to their ability, we may be able to call "smart objects" and consider, without having any doubt, the component elements of the IoT . Other than, software frameworks to build user-centric extensible smart object systems, they are the subject of very interesting research activities. Nevertheless, smart objects are the initial step of an evolutionary process that is affecting latest communication devices and has been activated by IoT in the telecommunication environment. We are

currently understanding a generational leap from objects with some degree of smartness to objects with an actual social consciousness.

In the scientific environment there have been, and still are, varied discussions on what an object actually has to say to another object for which you really need an IoT system and how these “conversations” between objects may be promoting the development of human society.

Figure 1.3 Social Media Platforms

1.1.8 Introduction to Raspberry Pi

It is a credit card sized computer which can plug into any HDMI input device or RCA video input device and a keyboard is required for operation. Once it is initialized the HDMI and keyboard are also not required for its operation as you can then operate it by other means such as ssh for command line interface and VNC if graphical user interface is required. The main specifications of the our model of Raspberry Pi also known as model B+ have the following features:

- 1 Gigahertz ARM CPU
- 512 Mb SDRAM
- 4x USB 2.0
- HDMI and composite RCA
- 40 GPIO pins
- Full HDMI port
- Ethernet port
- Combined 3.5mm audio jack and composite video
- Camera interface (CSI)
- Display interface (DSI)
- Micro SD card slot (now push-pull rather than push-push)
- VideoCore IV 3D graphics core

1.1.9 Advantages of Raspberry Pi B+

- Low Power
- Fanless Design
- 24x7 operation
- I/O Pins
- Works in headless mode

Figure 1.4 Raspberry Pi B+

1.1.10 Open issues in SIOT

- **Data management perspective**

The first issue that the developer of IoT needs to understand is the data collection which can be considered as the work on how to gather the data from the appliances and then to collect important information from the gathered data. Apparently, how data is collected will have a huge impact on the performance of such a system, especially when the number of objects are increased to a certain limit. The size of the memory , computational power, and bandwidth of the network can be used to find whether we need to redesign the completesystem. However, the study shows that the issues of data management (i.e., data acquiring, depositing,

analysing, and integrating) may widely impact the IoT performance . Different from the issues of data extraction , the representation of data is another important topic of research because the common representation of data may be facilitative to the exchange of information between others and the IoT system , like semantic web technologies.

- **Computational intelligence perspective**

When the management of the data is done efficiently by the IoT, another keystone is how to make it smarter and is able to make useful decisions. Even though the smart objects of IoT have been considered, the data mining and other computationintelligence technologies are still at their initial stage. The current situation is that though there exist many successful smart home approaches and their important technologies that can be used for smart city, there are many things to do for a flourishing and complete smart city. Since the computational intelligence for IoT is also still at its initial stage, most studies tried to apply the easy or original intelligent method to IoT. This is the reason, the advanced intelligence technologies are expected to be applied to IoT to provide efficient services.

1.1.11 Python Language

The language which we have used for this project is python. Python is a general purpose high level programming language. The designing philosophy of python focuses on readability of code, and python's syntax which permitsthe programmer to mention its concepts in minimum lines of code which is not that much possible in major languages like java and C++. The language python is a constructive language which lets clearer programs on small and large scale as well.

Python has its support for techniques withmultiple programming which includes object oriented, procedural or functional style of programming . It containsa system which has automated management of memory and a large standardized library.

The Python language interpreters have their feasibility for installation on many Operating Systems which allows execution of the code on variety of systems. By Using tools such as Pyinstaller or Py2exe, python code can be converted into packages which makes stand alone

programs for execution for some of the most prestigious OS which allows python distribution based system for use in all areas without any requirement of the python interpreter installation.

1.2 Problem Statement

1.2.1 To create awareness about any disaster and making social networking sites more useful.

With the evolution of social media as majorly used data and communication technologies (ICT) platform , it is possible to attain the primary time real - time data regarding matters at the time of a crisis or disaster from the affected area itself. Instead of watching the nongovernmental organizations (NGO) and governmental organizations to use technology to try and do the measurement and intelligence of matters for managing the disaster relief efforts, the place that is affected can have the access to social media platform and can directly supply data to the desired organization.

1.2.2 To try to avoid spreading of rumours on social media by doing real time analysis

In cases of disasters, the device detects the disaster and distributes reliable information and at identical time, management manages collective anxiety within the folks to suppress the spreading of unplanned rumour information. Since the device would mechanically aware the folks concerning the disaster, the unwanted rumours relating to the disaster are avoided and therefore the awareness will come back.

1.3 Objectives

Due to enhanced affordability of information and communication technology (ICT), available the most nowadays, there is an endeavour to not only connect everybody, but also everything. Besides the Internet, all other networks are also connecting things increasingly everywhere and every day . These connected things contain a variety of devices and a specific group of them is called machines. Communication between machines originally came from telemetry technology, and the main purpose of this technology was to measure data and transmit it automatically from remote sources majorly through a cable or a radio. These days, new varieties of sensors are being created, which will have the abilities to perceive things better than humans and can detect information easily that humans cannot.

The objective being proposed by us is very clear that is to keep the two levels of people and things separately; to allow objects to use the different social networks; to allow humans to impose rules to get awareness and can access the results obtained from the autonomous inter-object interactions occurring on the social networks. According to us, smart objects which are though very intelligent will never make a remarkable difference, but the social objects will always make the difference that is required.

1.4 Methodology

The following method was adopted to design the application :

- Created Raspberry Pi up and running
    - Installing the operating system : First go to RaspberryPi.org and download the noobs installer for raspbian and after downloading unzip the file.
    - SD card formatting : For this SD card formatter 4.0 tool is used. After formatting unzipped file is then pasted on the SD card.
    - Connecting Raspberry Pi to PC : Since Raspberry Pi is designed by a UK based company we had to first convert its working to US.
    - Set Permissions for proper access to all platforms to operate flawlessly.
- Created accounts on all platforms
    - For Twitter : apps.twitter.com
    - For Telegram : talk to botfather
    - For Gmail : installed packages (smtplib) , then configured files for Emails /Password and smtp port service (587)
- Authenticated tokens
    - For Twitter : Consumer Key, Consumer Secret, Access Token, Access Token Secret
    - For Telegram : Telepot.bot
- Deployed these tokens on the required segments of code.

- Updated the code
- Set up the code for reading hardware inputs.
- Automated code for various test conditions of hardware inputs.
- Executed the script and varied the physical inputs
- Analysed the results.

1.5 Organisation

- In Chapter – 1 we gave an introduction about our project and briefly described Internet of Things , Social networks and their interconnection. Also we gave a brief description about Raspberry Pi and the methodology used for the same.

- In Chapter – 2 we gave the detailed literature review from the research papers, books, journals and conferences.

- In Chapter – 3 we covered the system development in which we described about the requirements for the project and the related parameters are emphasized.

- In Chapter–4 we gave the simulation of implemented results with relative performance analysis. Screenshots are revealed to depict the proposed work.

- In Chapter – 5 we have ended with the detailed conclusion and scope of the future work which guides upcoming students and research scholars to enhance the current work with higher efficiency and effectiveness

CHAPTER 2

LITERATURE REVIEW

Kun Wang[7] suggested that for performing certain tasks which are complex, croudsourcing principles had to be applied for the construction of a mobile network croudsourcing with large number of people's participation and smart phone devices. Along with this, through the "Social Internet of Things (SIoT)" , the ability of people and smart devices to find out and use those objects with their accelerated services. Hence, SIoT became an encouraging network for the discovery of services and their composition. With the introduction of SIoT, they expanded the previously used crowdsourcing of mobile networks and attain wider application of crowdsourcing. But there are also some threats which were heightened in the environment of SIOT. For handling those challenges, they first presented a model which was trustworthy crowdsourcing model of SIoT. The model, social cloud gave computation and storage functionalities,which worked as a provider of services to the end users across the bridge which have the sensing entities.these sensing entities received works and they were rewarded by the service providers and gave feedback . They also introduced the concept of social awareness for forwarding of messages in SIoT objects, which also provided links for social data. Also," a reputation-based auction mechanism " was incorporated into crowdsourcing to perform selection of the and determination of payment by calculating the reliability of crowdsourcing participants. Lastly, few challenges in trustworthy crowdsourcing were discussed.

Awais Ahmad[8] gave his idea into the IoT in which he witnessed that there is a huge interaction and variety of communication between different types of devices which are connected through the Internet.As a result of it a large volume of big data was generated by the devices. There has been some analyzation of this data by theory of complex network , which illustrated a unique branch which they called "human dynamics".Here the goal was to judge human behavior under real time analytics. The aim was to make it useful by using the amount of data made available by smart mobilephones, social media networks, and smart cities. They aim to create the environment much more smarter and offered some space which is intelligent enough to sense all the activities and actions that are required for the

ecosystemto evolove. For all these needs, they presented the concept of " SmartBuddy" which had its focus on analyzing the ecosystem which is given by smart cities, the wearable devices (like body area network), and big data for determining the human behaviors and human dynamics.

Luigi Atzori[9] gave an idea that these daysthere has been many research activities that have been conducted independently and it also investigated the capabilities for the integration of Iot concepts into the social networks. As a result of which , Social Internet of Things (SIoT) came up, which had the potential for supportingthe novel applications and providing much more effective and efficient Iot services in social networking.They contributed in the following :

(i) Identification of appropriate policies for establishing and the managing the social relationships amongst the objects in a way which results in navigability of social network.

(ii) Description of an architecture which is possible in IoT and also includes the functionalities which are required for integration of things into a social network.

(iii) Analyzing the characteristics of the structure of SIoT network by using some simulations.

Luigi Atzori[10] suggested that the concepts of Social networking are applicable to various settings of the communication network, that varies from peer-to-peer to delay-tolerant networks. It has been observed that various proposals are aiming to give social-like abilities to the Internet of Things objects. These proposals have their addressing in the designing of software platforms which are conceptually strong that can be easily exploited for developing and implementing applications which are complex and also has requirement for direct objects interactions. They had a wide goal for building techniques which would allow the network to increase the trust level among objects which considered themselves to be "friends" . Also, a social network would surely guarantee navigability of the network even when the number of nodes comein the orders of magnitude which is higher than the earlier Internet. Their main

objective was to analyze the various opportunities that would arise by integrating the social networks with the Internet of Things.

Vivek Kumar Sehgal[11] suggested that the emerging technology where communication between machine to machine is applicable by using the intelligent sensors on machine for smart interaction among them . The Internet of things (IoT) gave a wider scope in many application domains where the number of smart devices for individual person is enhancing with time exponentially. The vehicular sector is amongst one of the application domains where autobiles could be made intelligent using IoT. The paper presented the interface of Arduino Uno R3 development board, smartphones and sensor shied. The schematic which was proposed was for car security that gave the access of car through GPS and internet , to the car owner, if the car is damaged or stolen.

CHAPTER 3

SYSTEM DEVELOPMENT

3.1 Requirements

3.1.1 Hardware Requirements

- Raspberry Pi
- Sensors
- SD Card
- Wifi
- Adapter
- Wires
- HDMI cable
- Ethernet cable
- USB Keybooard
- USB Mouse
- Monitor or TV

Sensors

Bimetallic sensor- For fire

Loop test sensor-for bridge brokage

Secure Digital (SD) Card

Since there is no hard drive on the Pi; everything is stored on the SD Card. One reason we want some sort of protective case urgently is that the joints on theSD socket may fail if the SD card gets accidentally bent or broken.We need the SD card of atleast 8GB, and it should be a Class 4 card. Class 4 cards are efficient enough to transfer atleast 4MB/sec. The

initialRaspberry Pi boards had certain issues with Class 6 and abovecards, which havecapility of high speed but are not much stable. The microSD card adapter can also be efficiently used.

Wifi

WiFi-Direct eliminated the need to get an access point. It allowed P2P (peer-to-peer) connections with the fast speed of WiFi and with much lower latency. Also WiFi-Direct eliminated an element of a network that often brought it down, and it did not compromise on throughput or speed.

Adapter

It is the most crucial part of Pi that has to be gotten right; we used a microUSB adapter that provides 5V and at least 500mA of current.

Wires

HDMI cable

Since we areconnecting the Pi to the monitor we need this. HDMI cables vary wildly in price. Since we are just running a cable three to six feet to a monitor, the HDMI cable cost less. For running on long lengths, one should definitely research the higher quality cables and avoid the cheap generics**.**

Ethernet cable

It is used on wired networks which is used to connect devices together within a LAN like routers and PCs.

USB Keyboard

USB Mouse

Monitor or TV

It is the one which efficiently supports HDMI or a composite video.It is possible to use an older composite video display, but HDMI's work is better and it effectively support audio transfers.

3.1.2 Software Requirements

- **Raspbian :** It is an operating system which is based on Debian that is optimized for the Raspberry Pi hardware. An OS is a set of basic programs and utilities which makes the Raspberry Pi run.

- **Python :**Python is a very clear and powerful object-oriented programming language, which is comparable to Ruby, Perl or Java.

- For accessing Raspberry Pi(on Windows)

  - **Advanced I.P. scanner**: It is used for scanning the I.P. address of Raspberry Pi.
  - **PuTTY** : It is S.S.H. client for entering Raspberry Pi's software interface(command line, initially)

3.2 Installations on Raspberry Pi

Raspberry Pi is not just a small computer but it has the ability to connect with the outside world. Using Raspberry Pi one can make use of sensors, camerasand many other I/O devices to design applications that interact with the outside environment. WhatsApp, Twitter, Telegram, Gmail being the most famous medias for interaction between smartphone users so using all of them on Raspberry Pi will be very useful for the ones who will use these applications.

Steps for using WhatsApp on Raspberry Pi

Step 1:- Installation of necessary packages

For Raspberry Pi to have whatsapp to be used on it, we needed to useYowsup thatis considered to be a famous Python library which permitted usto use all the services and functions of WhatsApp on Pi just as we would have operated on the official client based app on our phones. It is recommendedthat each and every package should be updated. It was done with the help of apt – package manager which is used in Debian and Debian-based operating systems.

Once the updation of the packages was done we updated the firmware.

The command used was : sudo rpi-update

For the installation of the Yowsup we needed to install certain packages. Since apt is the package manager in Raspbian we used the apt-get install tool to install packages.

The commands used to install Yousup were as follows:

sudo apt-get install python-dateutil

sudo apt-get install python-setuptools

sudo apt-get install python-dev

Use cd command to get into the Yowsup folder and install the library.

Commands :-

cd yowsup

sudo python setup.py install

Step 2 :- WhatsApp registration

To register with WhatsApp you do not have a GUI but you can make use of a command line utility provided by Yowsup – yowsup-cli. To use it you need to know your country code(cc), mobile country code(mcc) and mobile network code(mnc). You may be familiar with the country code which you see in the beginning of phone numbers.

Command used was python yowsup-cli registration --requestcode sms --phone 91xxxxxxxxxx --cc 91 --#mcc 405 --mnc 035

Command used was python yowsup-cli registration --register xxx-xxx --phone 91xxxxxxxxxx --cc 91

Step 3:- Using WhatsApp

To use WhatsApp you will need to enter your phone number and password. You can save them on a config file inside the Yowsup folder. Use nano, a command line text editor for the same.

Command :- sudo nano /home/pi/yowsup/config

Add the following lines into the config file.

Actual config starts below

cc=39 #if not specified it will be autodetected

phone=39xxxxxxxxx

password=xxxxxxxxxxxxxxx

To begin using WhatsApp use the yowsup-cli demo.

Command :- yowsup-cli demos --yowsup --config config

You will be greeted with the Yowsup prompt. To login you may enter '/L' and enter your login credentials you saved in the config file. You can see a list of commands by typing '/help'. Use the /message command to send a message to your desired number.

Command :- /message send 91xxxxxxxxx "Your message"

The replies will be displayed on your Raspberry Pi.

Figure 3.1 Whatsapp

Steps for using Telegram on Raspberry Pi

- **Step 1 : Installed Telegram on our cellphones**

  From app store (for iPhone) or play store (for Android), we downloaded the app and installed Telegram on our phone. The Telegram app reserves a special type of accounts for machines which is called bot accounts. Being the owner of our own Pi, we had to obtain a bot account for it.

- **Step 2 : Text/newbot to BotFather**

  We opened Telegram on our phones, searched for a user which is called BotFather. As the name tells , it is the Father of All Bots.As wehad noticed that it was not of our own species, but it istypically a machine. It had accepted special commands just because it did not understand simple English very well.

  To obtain a bot account,we texted it /newbot. (we needed the slash '/' in front of it) It then asked us few questions. We called out bot "PuppetBot" and “FirePuppetBot”. We had seen that in a few moments. And we could have given it any name we wanted.At the end of process, we were given two tokens for the respective bots. Those tokens represented the bot accounts. We had put those tokens on the Pi.

- **Step 3 : Installed Telepot on Raspberry Pi**

  Once we entered the Raspberry Pi, through SSH we installed telepot which is a package of Python language which allowed the Pi to talk to API of Telegram Bot.

  There were two commands to be typed on command line interface

  The first one was : sudo apt-get install python-pip and

  The second one was : sudo pip install telepot

- **Step 4 : Test Token**

  In this we entered into python and typed commands:

  Import Telepot

  Bot=telepot.Bot (“bot token”)

  Bot.getMe()

  This resulted in return statement of dictionary. After this we exited from the python.

- **Step 5 : PuppetBot and FirePuppetBot**

  The PuppetBot replies to /alive whenever there is any breakage in the bridge. It send a text message regarding the location of the bridge with its image.

  Similarly, FirePuppetBot replies to /alive whenever the fire is experienced. It sends the location of the place caught with fire as well as the image of the location.

- **Step 6 : Run it and text it**

  Saving the .py file and running it will run the script and the corresponding results will be obtained.

- **Step 7 : BotFather saved us typing**

  Only small set commands with slash in front have to be typed to get the results.

Figure 3.2 Telegram

Steps for using Twitter on Raspberry Pi

- **Step 1**

  We added our mobile phone numbers to our Twitter accounts before we created the application. For this the we opened settings under which there was Add Phone category. In that we Added our number and confirmed and saved it.

- **Step 2 : Setting up of the new application**

  For this we first went to Twitter Apps. Under that we opened Create New App .It was better to Leave the Callback URL as empty. After this we created our Twitter application.

- **Step 3**

  Since By default, the access level of app is read only. For sending tweets, it was required to be changed to write permission.

For that we opened Permissions tab under which it asked What type of access were required by our application.In that we took Read and Write permission and Updated our settings.
The permission settings were updated successfully

- **Step 4 :Time required to get all the keys and the access tokens for OAuth.**

  For this we went to Keys and Access Tokens tab .Under that we saw a message "Your Access Token". Since we had not authorized our application for our own account yet.For creating our access token here we needed to certain API calls . The access tokensthat were supposed to be generated will be applied on application's current permission level.
  For this we openedCreate my access token tab.
  We saw a message saying that our application access token was successfully generated. This access token was used to create API requests through our own accounts.

  We needed to verify that we have an access token or secret and the permission is made to "read and write".From here we needed to keep our Access Token, the Access Token Secret, the Consumer Key (API Key), the Consumer Secret (API Secret).The Consumer Key and Secret help twitter identify the application and Access Token and Secret will help twitter to identify us.

- **Step 5**

  For this we used tweepy to use Twitter's API. We could have installed it using command pip as pip install tweepy as well.

Figure 3.3 Twitter

Steps for using Gmail on Raspberry Pi

- **Step 1 : Opening the connection**

As we know Python comes with the smtplib, that has the capability to handle the various parts of the protocol like establishing connections, authenticating them, validating them, andsending the emails.
Using thelibrary, there were a few different methods that we could create a connection to our mail server. In this part, we focused on creating a simplest insecure connection. That connection was unencrypted and had its default port 25. However, the protocolwhich was used for submission of mail used 587, which was what we had used.Those connections were very easy to create with smtplib. There wasn't much more in it than was to pass the address

of server, its port, and calling .helo(), which identified us to the SMTP server. By using that server object we could send emails over the connection.

- **Step 2 : Using secure connection**

The SMTP connection when gets secured using TLS/SSL, this is done over port number 465 which is called SMTPS. It is a very secured connection.
Since there are many different ways through which we can secure the SMTP connections in the smtplib library. The first way that we used was to make an insecure connection and then doing its upgradation to TLS. The method which was used for doing this was .starttls() method.
Though it was very similar to the insecure connection that we previously created, The different that lies in it is that we used the .starttls() method for the upgradation to a secure connection.
There is another option also available to create an SSL connection from the very beginning. For this we used the .SMTP_SSL() method.
We used the SMTPS port 465, though we could have left the port parameter out of it and smtplib will be set to default to 465.
After this the connection was established.

- **Step 3: Email Creation**

Since the emails are strings of text which are connected by newline characters. Almost all emails atleast have fields “To”, "From", "Subject" and body.

Since every line contained data in a new field. There were no binary protocol or any XML or JSON but onlysome strings in separate lines.

For parameterizing the fields, Python string formatting is useful.

Now the email text string is passed to smtplib.

- **Step 4: Authentication with Gmail**

Some steps were taken before we could send emails with SMTP via Gmail and those were regarding the authentication. For Gmail as the service provider we needed to inform Google so it allowed us to connect using SMTP that is a less secure method.

We needed to have our plain-text password for it to work properly. But it is different from the OAuth protocol where a token is issued and another way has to be found out to keep it assured that no other unauthorized parties can access it.

For this we needed to :

Not allow lesser secured apps to have an access to our accounts

Since we had a 2-step verification method applied on our accounts, we needed to create password which was specific for our app so that no less secured app can access our app.. The instructions for it are as follows:

Signing in using the password assigned for our app.

And if we still get an SMTPAuthenticationError which has an error code number 534, then we are require to do another step for it to work.

Displaying the Captcha for unlocking

> We needed to wait for some time before we could try the 'Display Unlock Captcha' link.

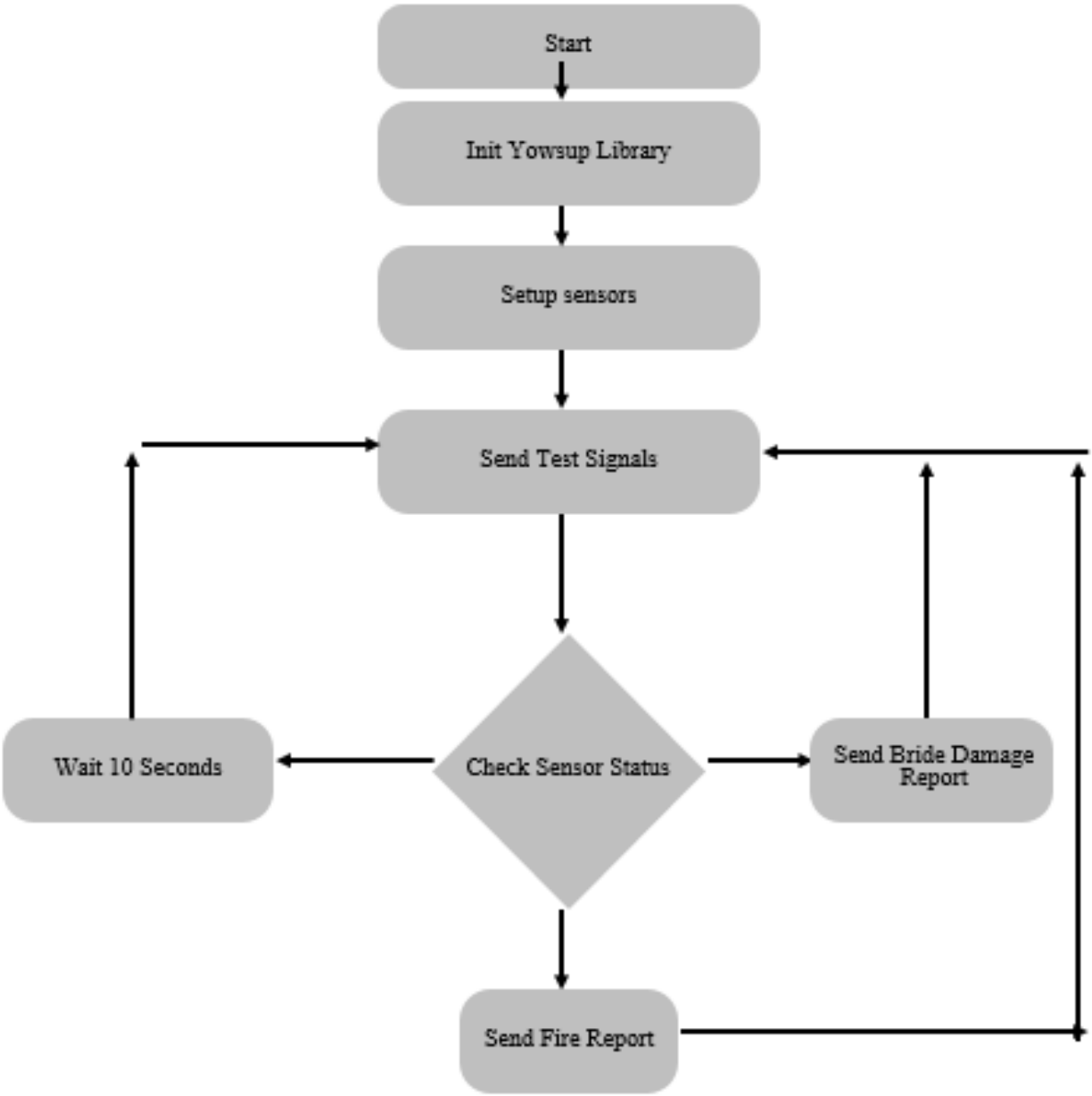
Step 5 : Sending the Email

After theSMTP connection was created and Google provided the authorization to the app, we used Python to send email through Gmail.

By email string that we created, and the authenticated and connected server object, we used the .sendmail() function.

Figure 3.4 Gmail

3.3 Flowchart



3.4 Algorithm

Step1:Import all the important libraries pertaining to the APIs and their access tokens.

Step2:Set modes for all the input pins after defining them.

Step3:Define credentials for login(for email) and target emails.

Step4:Set up access tokens for defining communication methods for certain exclusive

Step5:Devices using access tokens and validation keys.

Step6:Define functions for simplifying thins for the above.

Step7:Set up messags to be delivered.

Step8:Inside an infinite loop, take inputs from the pins.

Step9: check conditions defined for activation of certain devices, and then execute the specified code

Step10: Use the above for comparisons based on if else loops.

3.5 System Design and Schematic Diagram

System Design

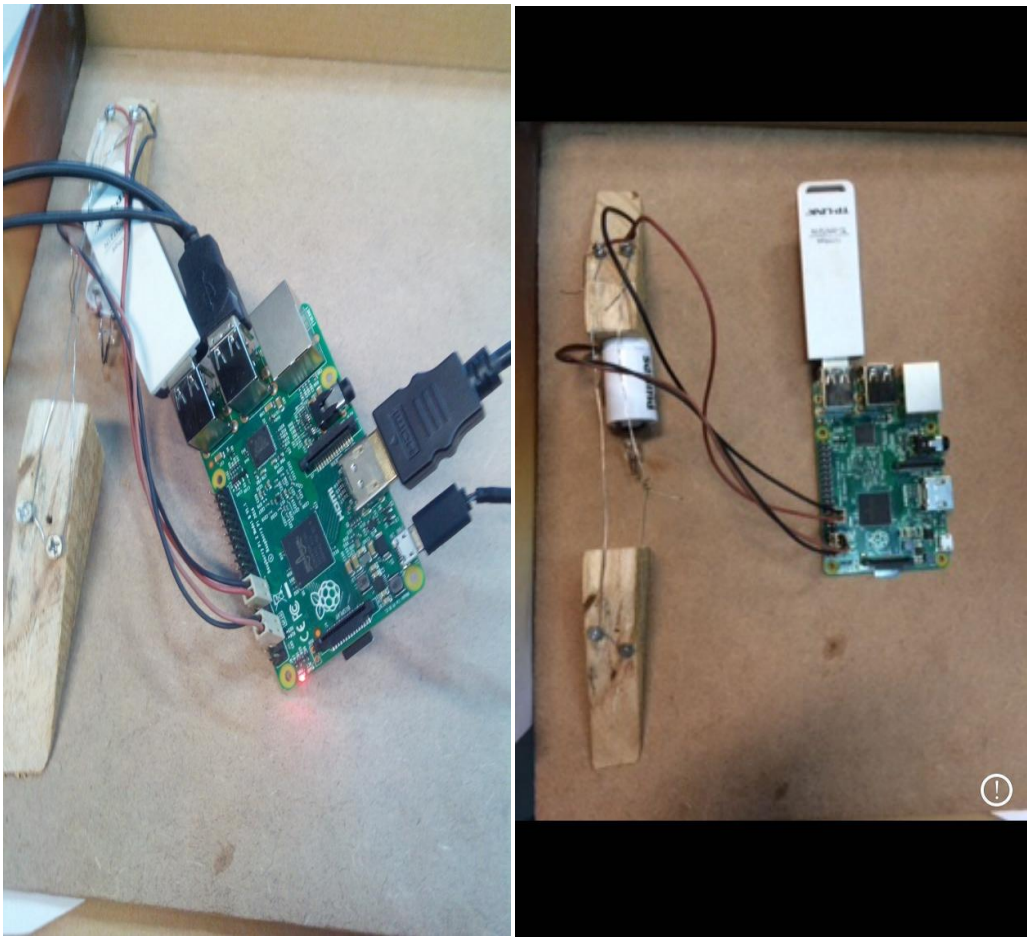


Figure 3.5 System Designs

Schematic Diagram

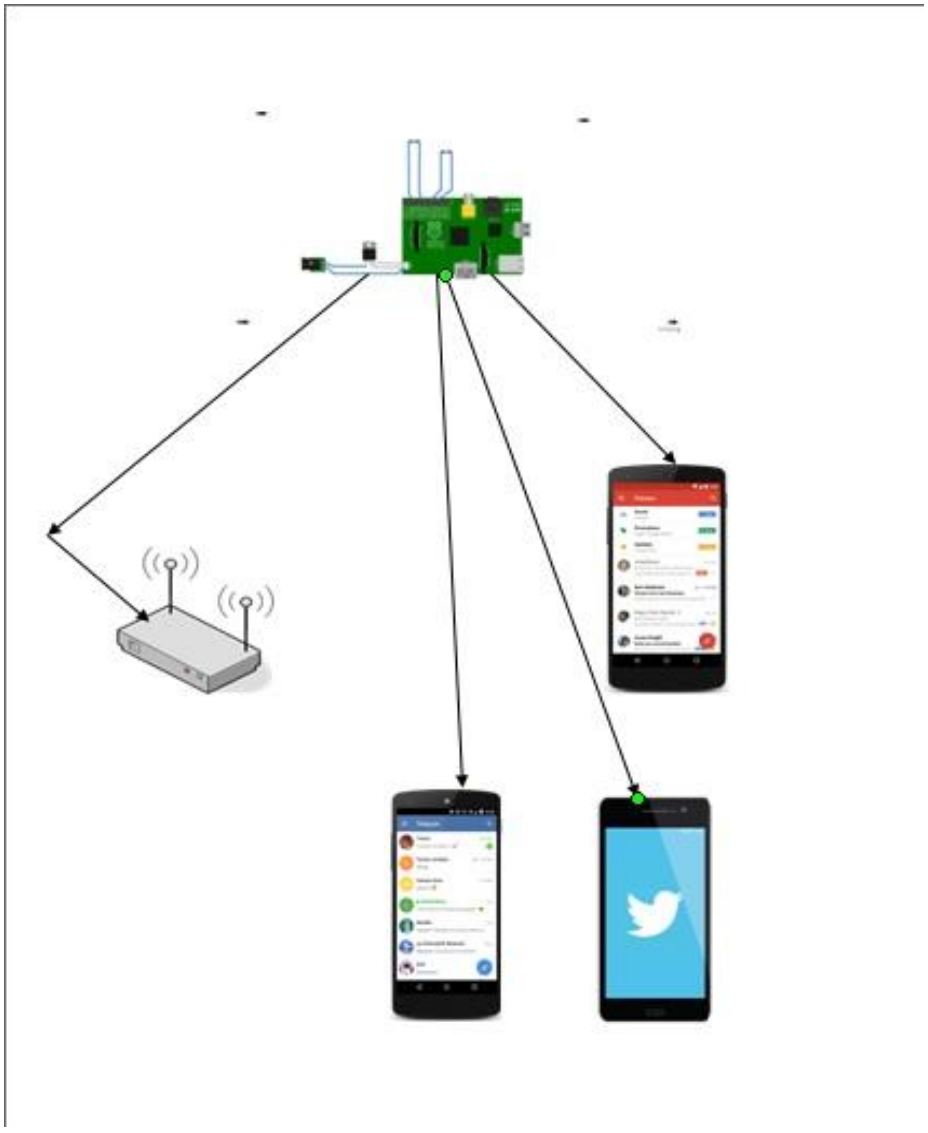


Figure 3.6 Schematic Diagram

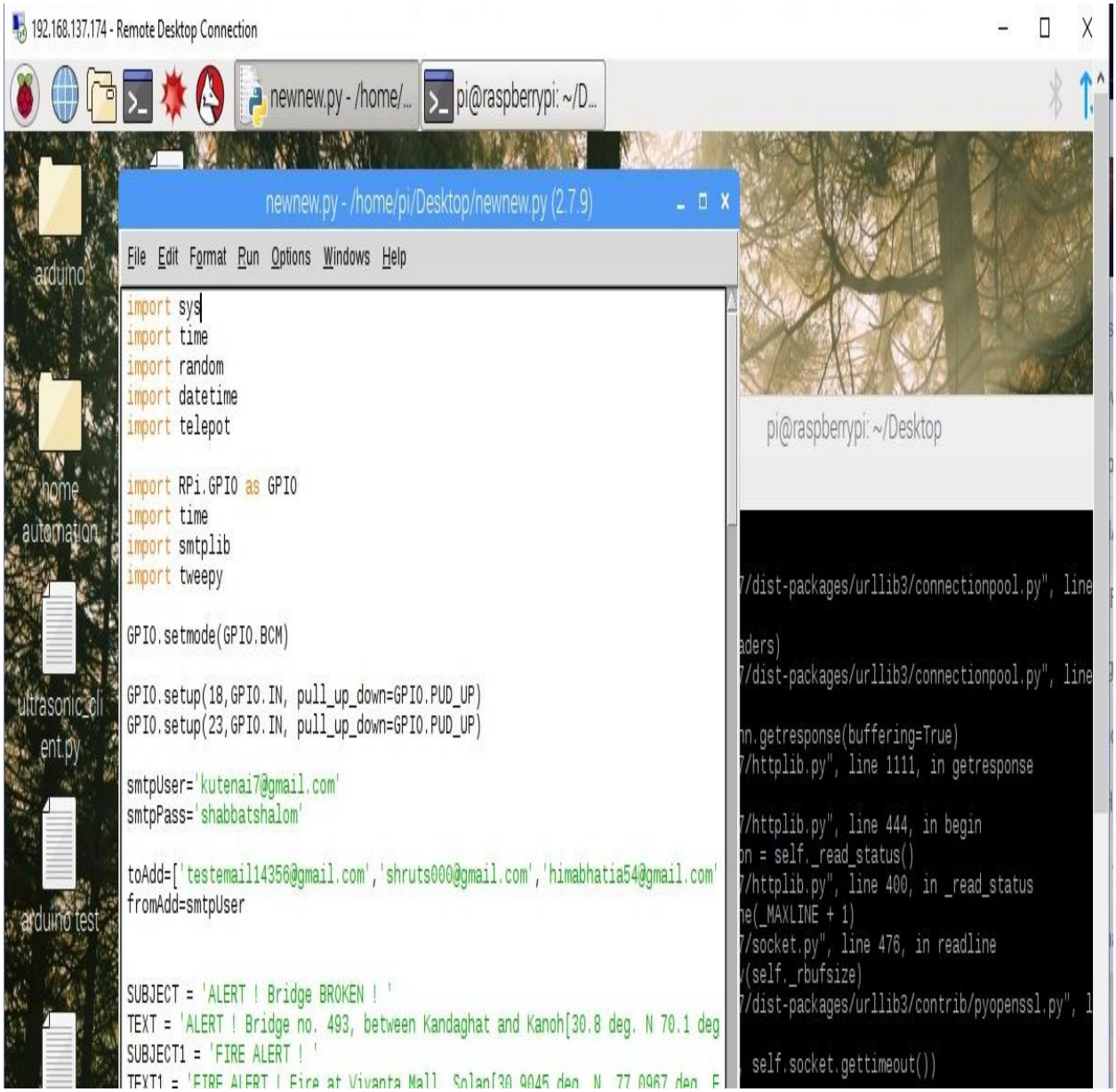


Figure 3.7 Running Program

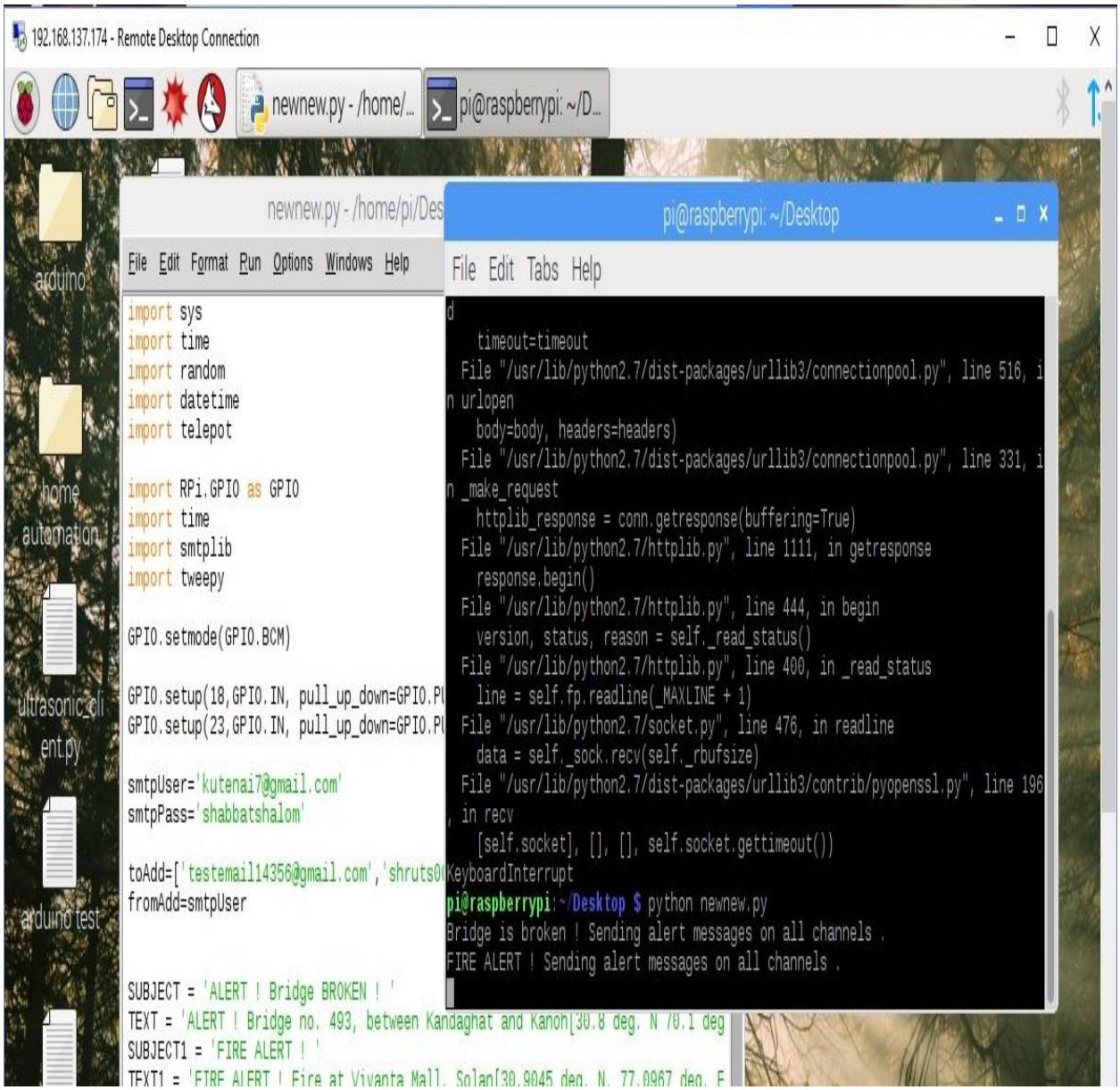


Figure 3.8 Running Code on Rasbian

CHAPTER 4

PERFORMANCE ANALYSIS

4.1 Results obtained on whatsapp

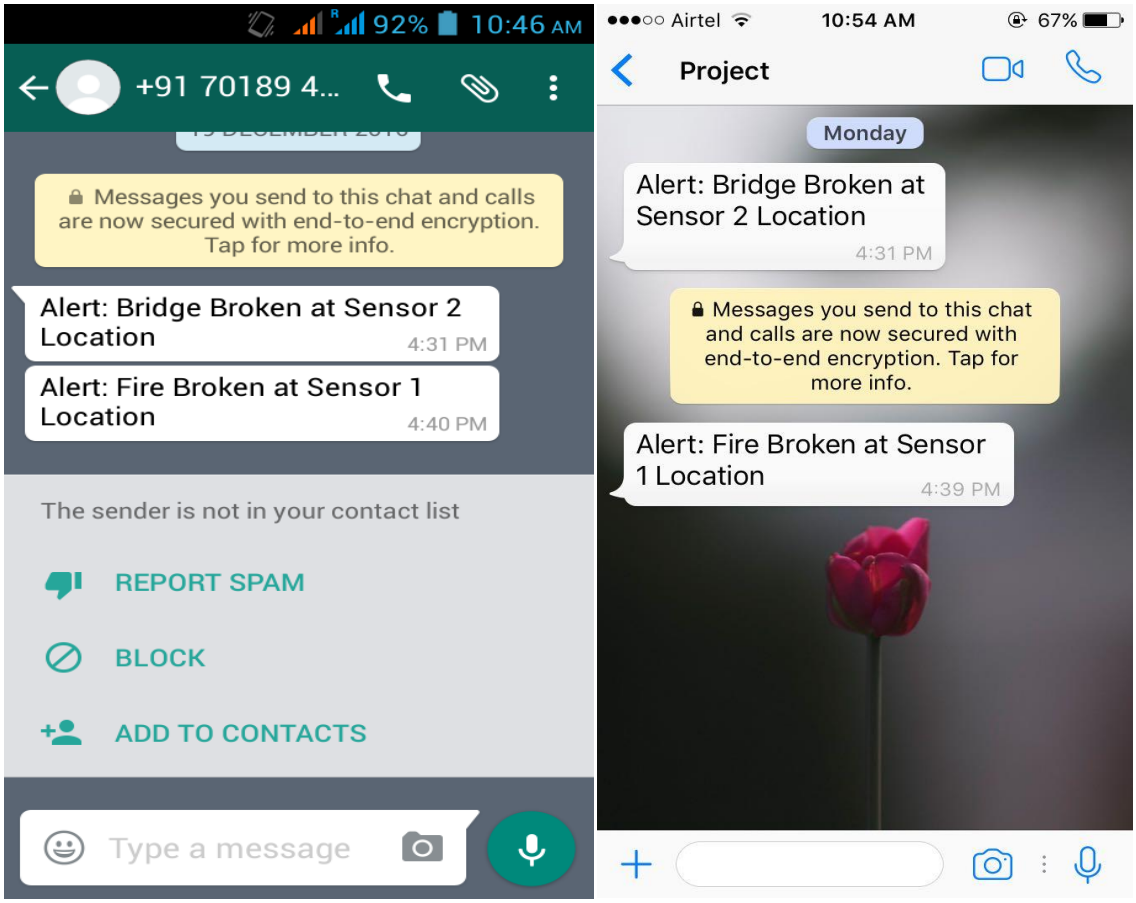


Figure 3.9 Result of whatsapp on android and iphone

4.2 Results obtained on Telegram

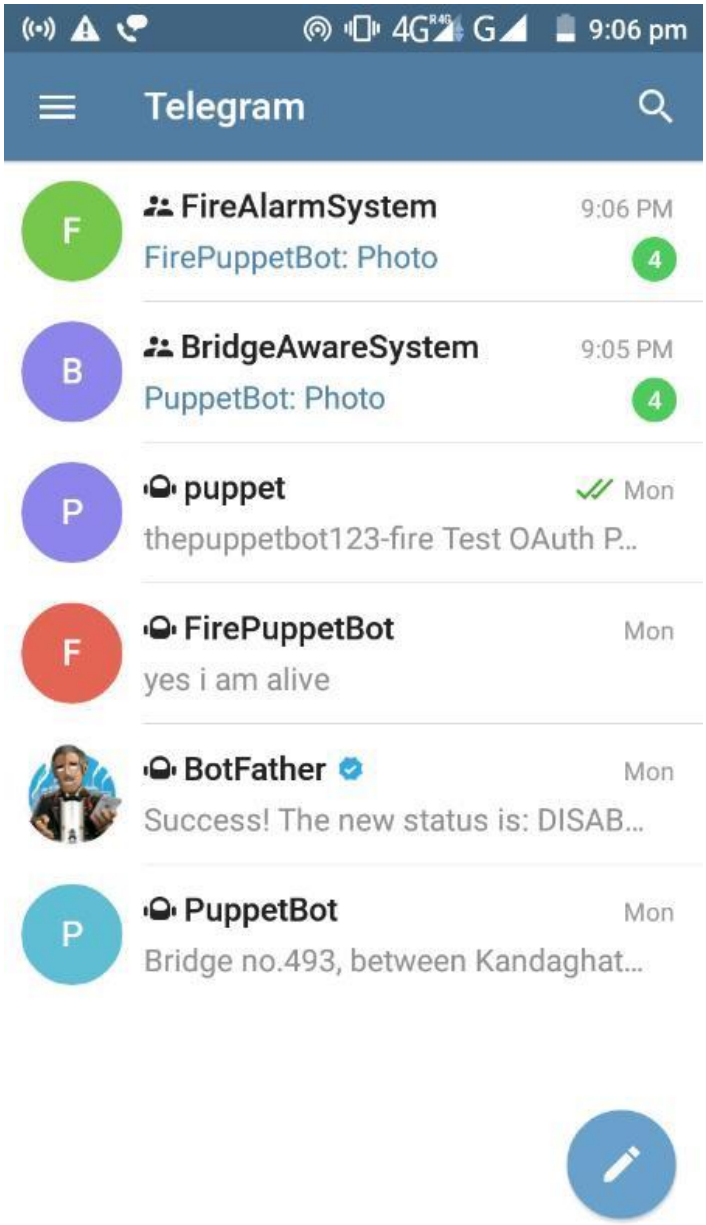


Figure 4.0 Telegram Application

4.2.1 Results obtained from bridge breakage system

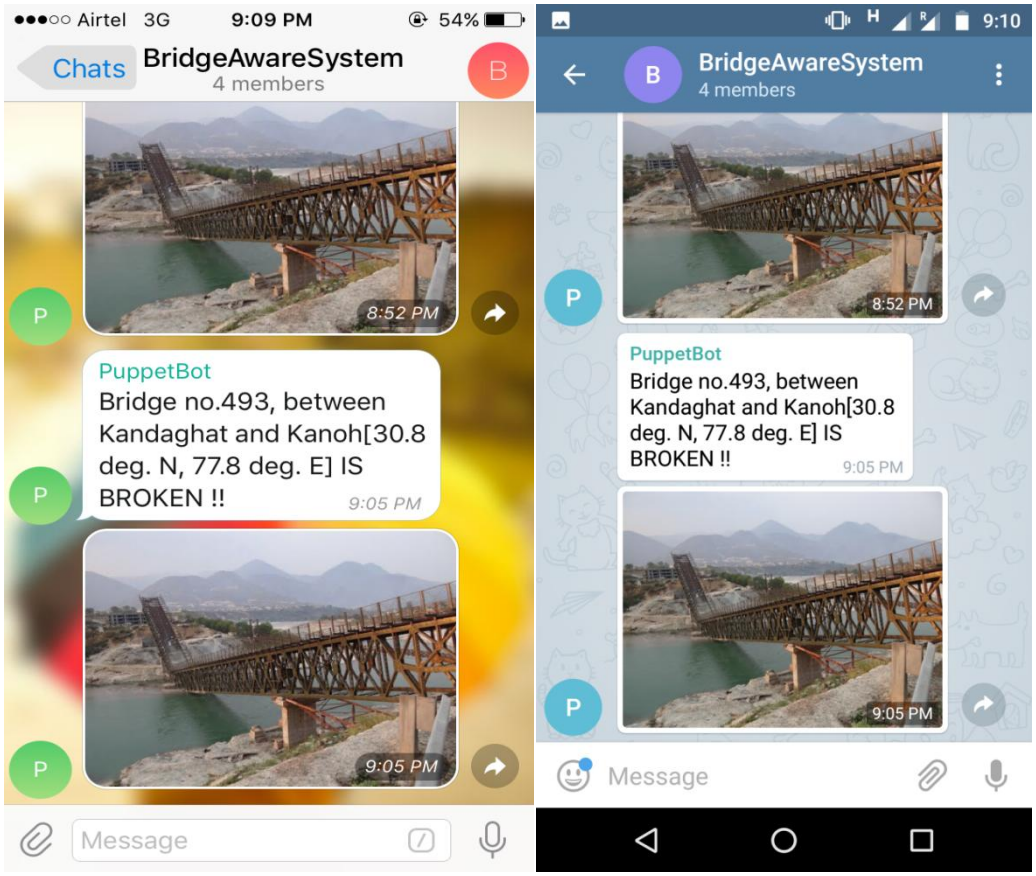


Figure 4.1 Results of Bridge on Telegram on Iphone and Android

4.2.2 Results obtained from fire brokage system

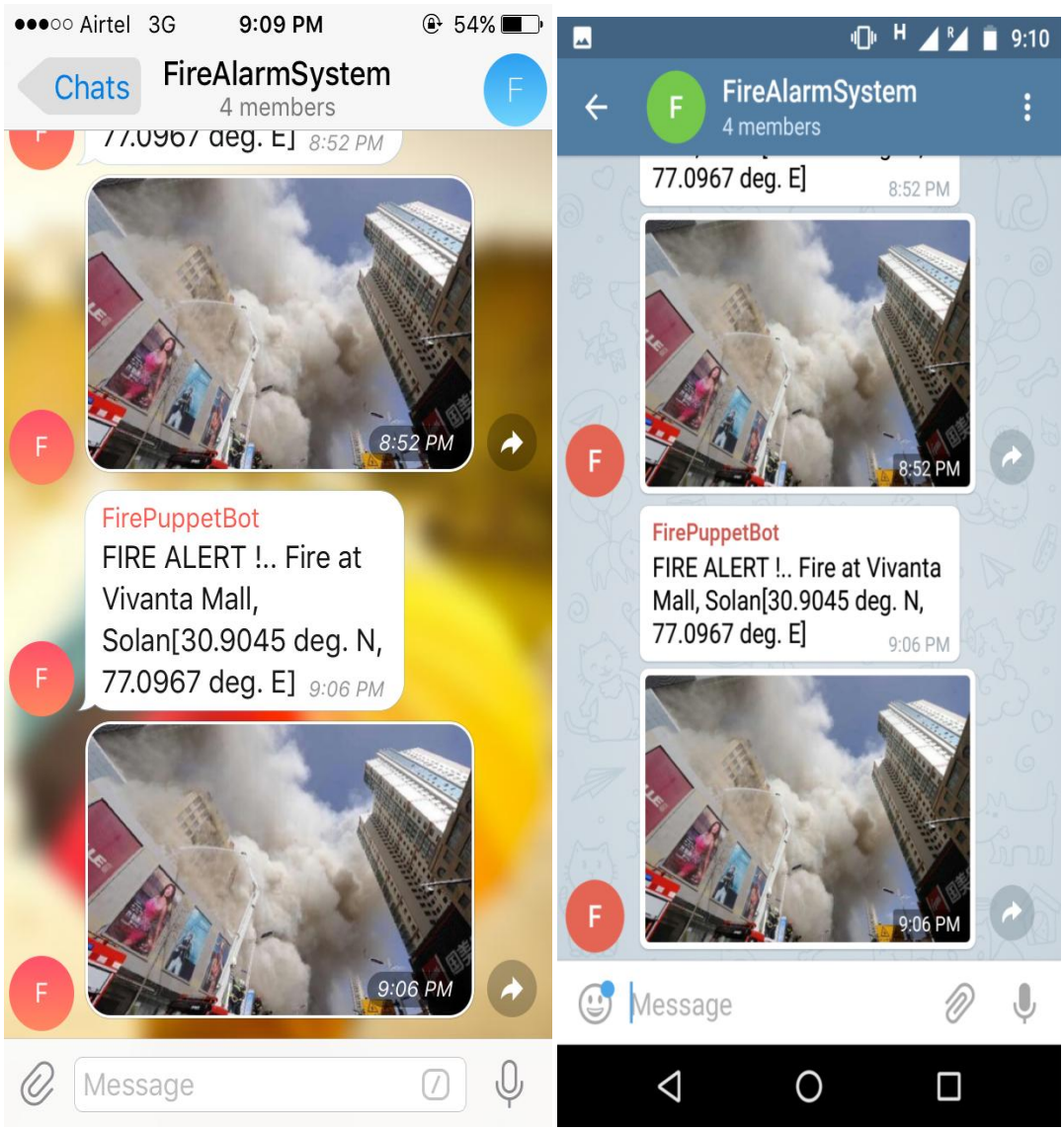


Figure 4.2 Results of Fire on Telegram on IPhone and Android

4.3 Results obtained from Twitter

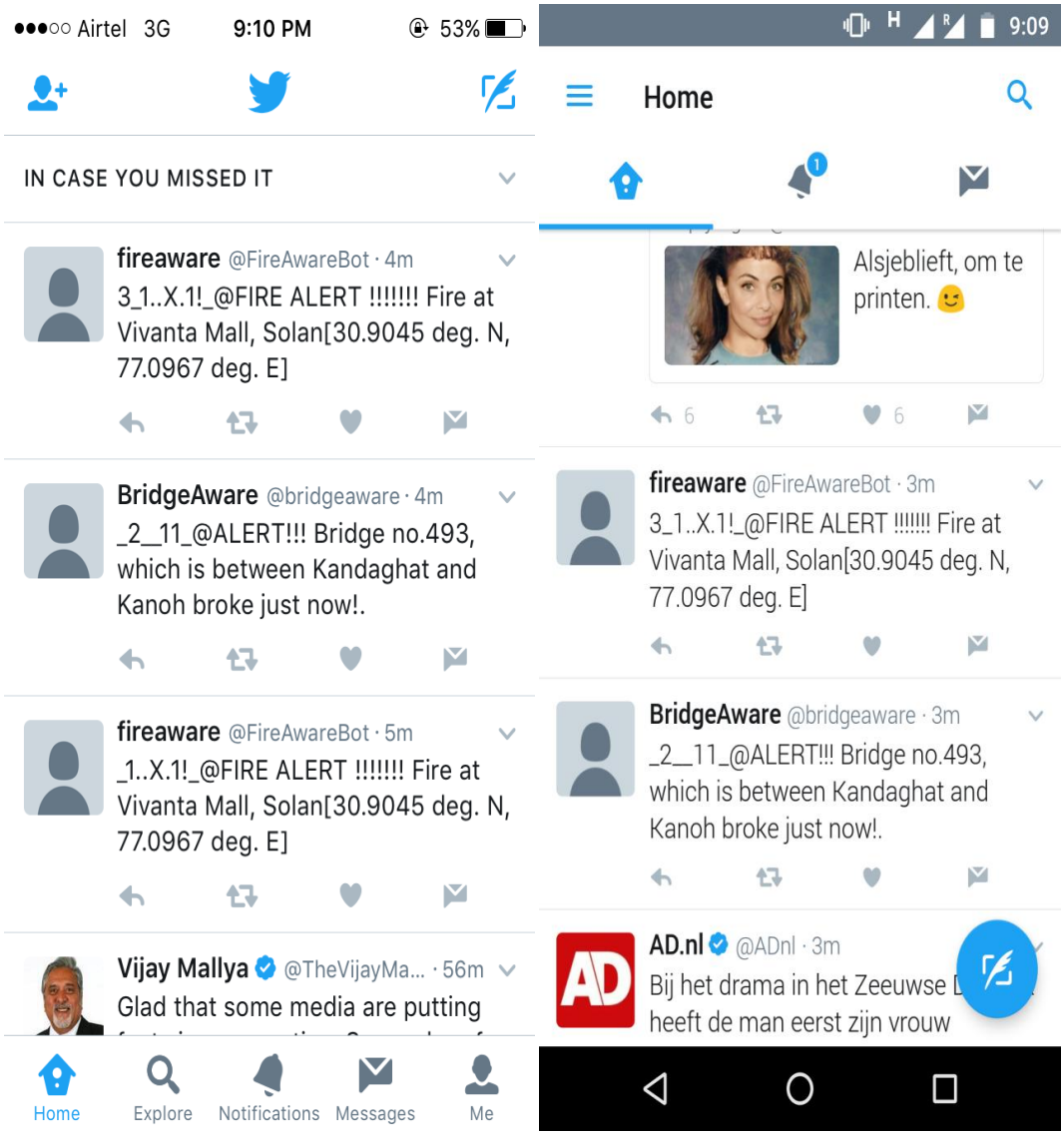


Figure 4.3 Results of Twitter

4.4 Results obtained from gmail

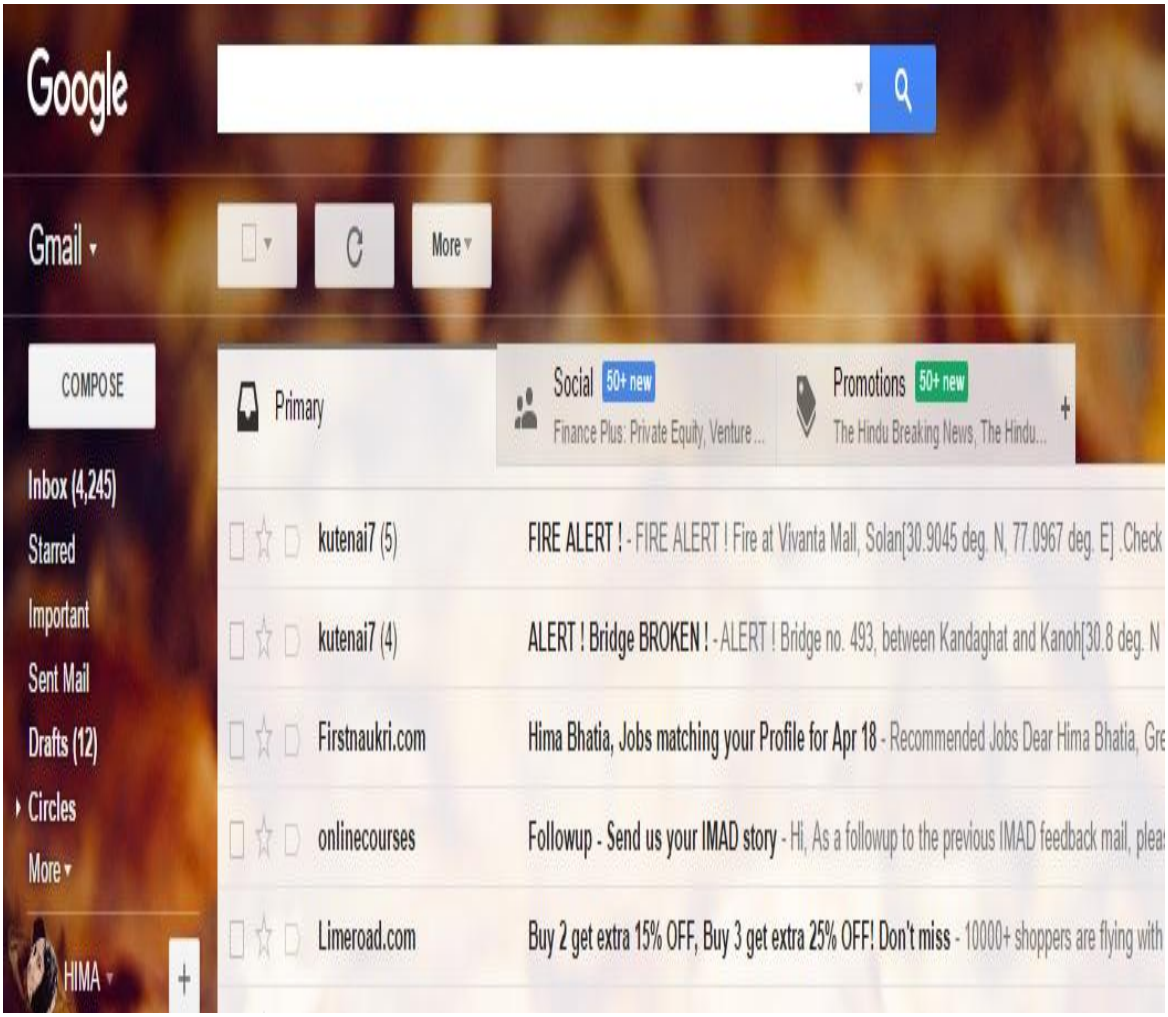


Figure 4.4 Email Alert

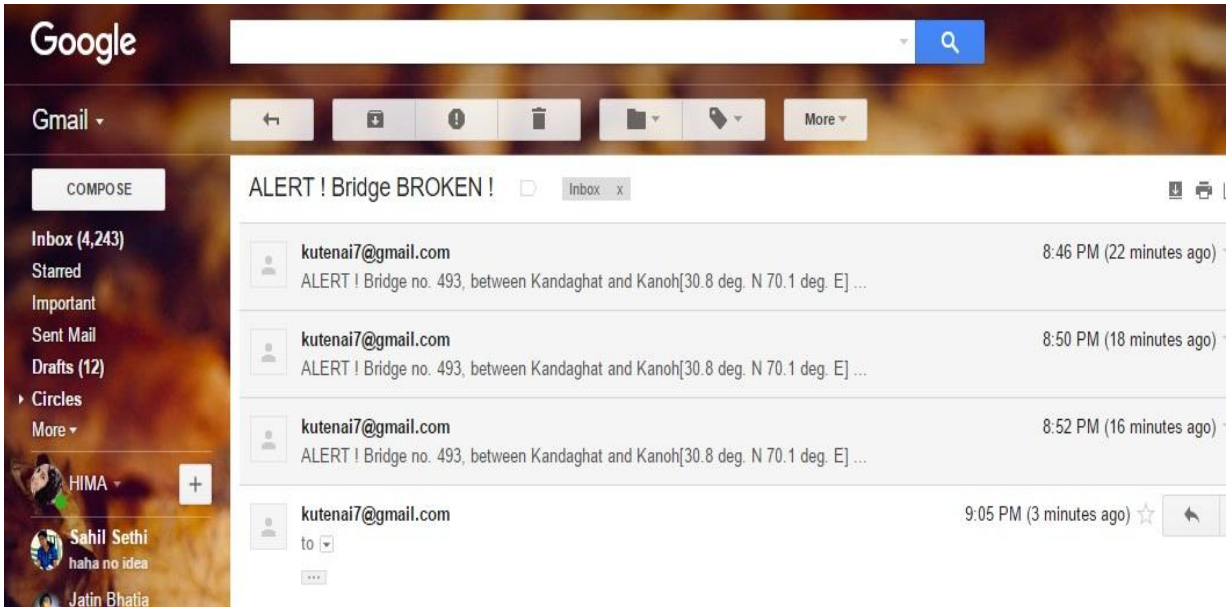


Figure 4.5 Emails of Bridge Alert at different time intervals

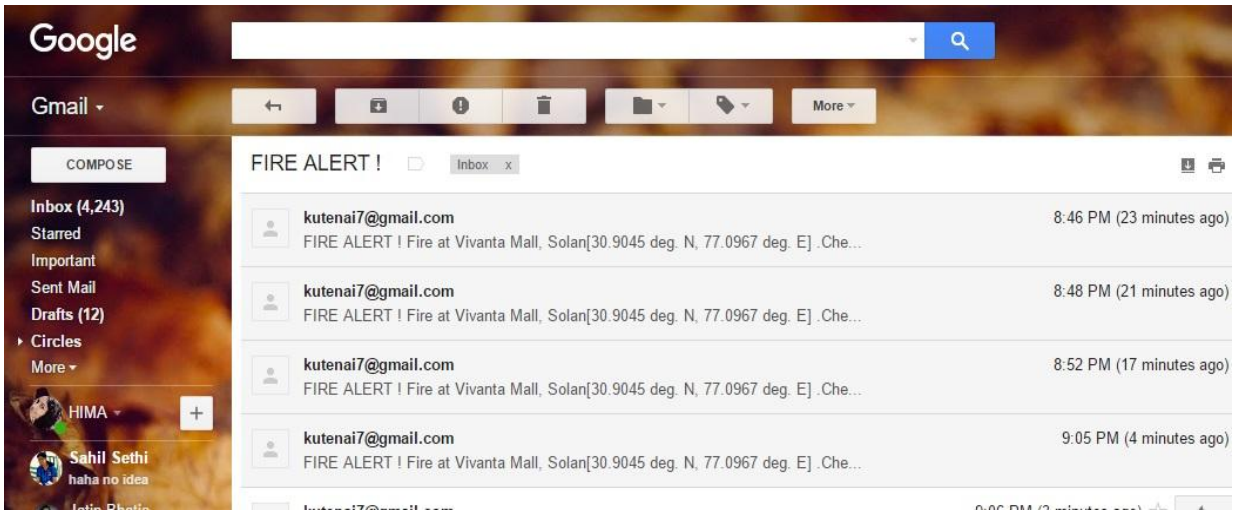


Figure 4.6 Emails of Fire Alert at different time intervals

4.4.1 Email obtained from bridge breakage

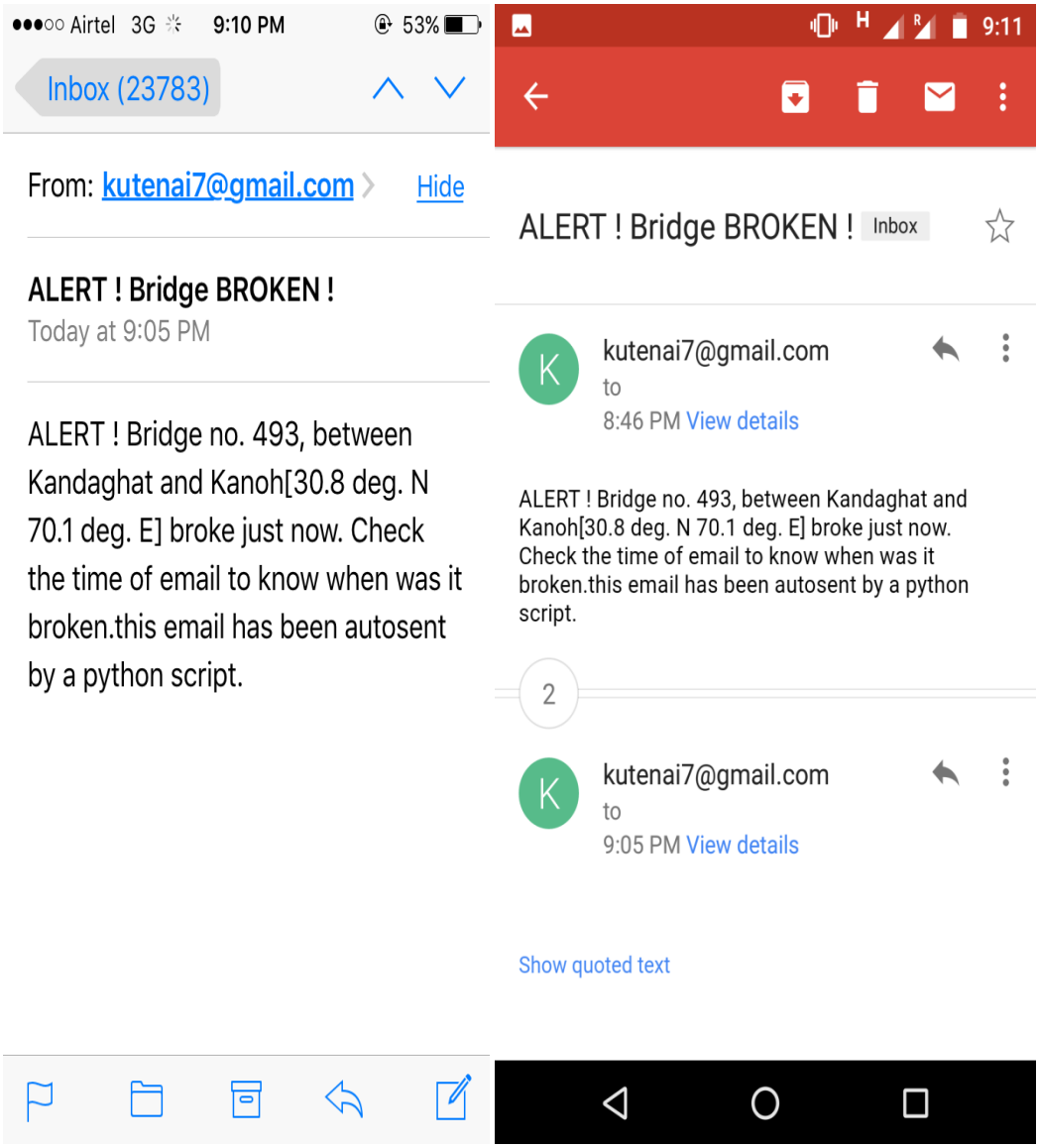


Figure 4.7 Bridge Email Alert at IPhone and Android

4.4.2 Email obtained from fire brokage

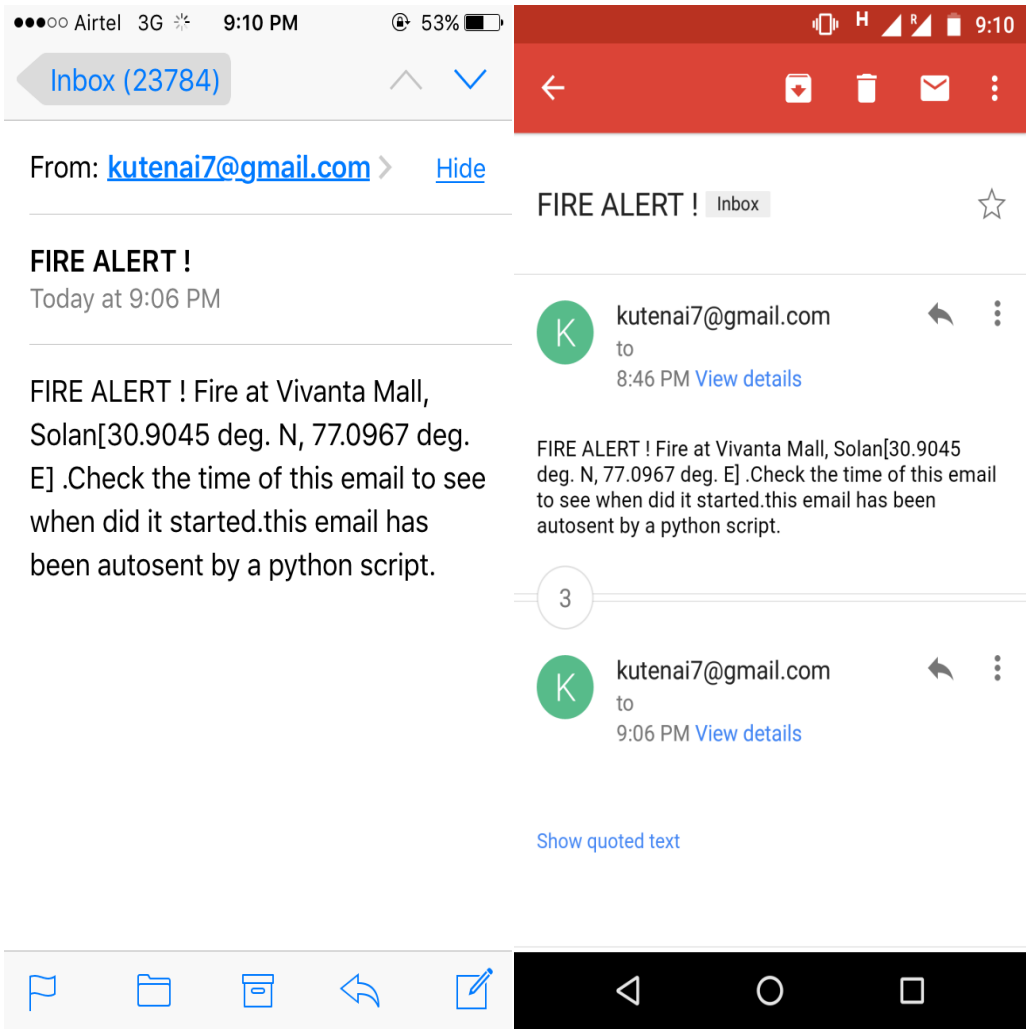


Figure 4.8 Fire Email Alert at IPhone and Android

4.5 Analysis of Time and Feasibility

Time Lag

The estimated time lag (which was calculated by finding the approximate time difference between the initiation fo the python script and the immediate time of display of message on all the platforms) was found to range from 5- 10 seconds.On an average, this time lag was close to 7 seconds.

Feasibility

The feasibility and usability of the following project has been mapped on the following factors: -

a). Complexity in production of the system .

b). Complexity and effort required in installation of this system.

c). Time investment required for production of this system.

d).Efficiency provided by the system.

e). Practicality and scope of application of this project(system).

a) Complexity in production of the system

This project was created using A raspberry Pi board, wired connections, python programming language,services of various platforms like Twitter etc. and all this was deployed and used over an internet connection. Since this system doesnt require much assemply of multiple hardware parts and a basic understanding of python language and application of tokens and APIs was enough to prepare the used code, this project can be considered as a medium level project with major effort required for execution of the main python script.

b) Complexity and effort required in installation of this system.

In this project, raspberry pi had to be connected to an internet service providing device- for ex. a router or an ethernet connection, and also script execution was required everytime the device was to be used (once the mishappening occured), along with providing continuous power supply . So, here these 3 are the only things required for conveniently setting up the device. Since power supply includes a myriad of options including solar cells, or rechargable batteries, or supply from main line of poles. SO this is not a complex problem . Provision of internet is very easy in places like shopping malls or any public place, for the bridge-arangements can definitely be made which include setting a dedicated router for this system-getting internet from telephone lines available around the city etc. For script execution, once the script is executed, it needs to be reset only when the mishappening has occurred.

c) Time investment required for production of this system.

Time invested will not be huge as this project involves assembling trivial number of parts, and writing python code will be the only challenge which once written, will be enough for any specific place for which it is written. Only the GPS coordinates will change, along with location and some other details, which will still keep the system stable.

d) Efficiency provided by the system.

Since the time lag created by the system in sending the messages vs the actual mishapp happening is very small(8 seconds – provided a decent internet connection which is easily available), the efficiency provided by the system will be highly appreciable and under no circumstances the system will be bound to fail as this consumes minimal amount of power supply, has a complete mini computer installed which manages all the inner physical parameters(processor heating etc.) by itself, therefore, provided the system is not physically beaten up, will run for long durations without any maintenance demand.

e) Practicality and scope of application of this project(system).

Combining all the above stated advantages and taking into consideration all the conditions described above(mention the conditions here) , this system has high scope of practical application and usage. Due to its versatile code adaptability and menial amount of hardware assembly and also low space consumption, this device can be deployed to many platforms under any sort of condition and can be brought to any use for which this may seem fit.

CHAPTER 5

CONCLUSION

CONCLUSION

We were able to create a system which detected a disaster such as fire brokage in the mall and bridge breakage. In this system Raspberry Pi became the informer and with a python script running in the background,whenever the circuit for any alarming system got modified- as per the problem caused- the software bots-using the API keys and tokens sent the message through the network connection to which Pi was connected, regarding the mishappening to the concerned authorities, broadcasting it openly on a self made twitter handle, displaying it, along with the image of any destruction caused on telegram groups, and sending it as an alarming email to all those concerned.

FUTURE SCOPE

This project was implemented successfully and it has got immense scope for further development, for which APIs of various social networks could also be incorporated , example being that's of Facebook, instant messaging services, provided they have their APIs well maintained and reliable. Incorporation of real time coordinates using GPS, displayed through Google Maps and other services can also lead to. more informative and precise awareness of the status-quo of any situation thereby created.

APPLICATIONS AND CONTRIBUTIONS

- Used by fire department for getting awared about any fire brokage that may occur in their controlled area. From top to bottom in the hierarchy everyone would be informed about it.

- Used by bridge construction department for getting awared about any bridge breakage that may occur in their controlled area. From top to bottom in the hierarchy everyone would be informed about it.

- Also the general public will also get the information about these mishappenings via twitter.

- We devoted out time and dedication for the completion of the project so that people around gets informed and our project becomes useful to everybody.

REFERENCES

[1] Python Twitter API (n.d.) GitHub, Inc. [US]. [Online] Available: https://github.com/sixohsix/twitter Accessed Feb 17, 2017

[2] L. Atzori, A. Iera, and G. Morabito, "SIoT: Giving a Social Structure to the Internet of Things," IEEE Commun. Letters, vol. 15, no. 11, 2011, pp. 1193–95.

[3] K. M. Alam, M. Saini, and A. EI Saddik, "Toward Social Internet of Vehicles: Concept, Architecture and Applications," IEEE Access, vol. 3, 2015, pp. 343–57.

[4] Publish Temperature Sensor Readings To Twitter Raspberry Pi (n.d.)Renewable Energy. [Online] Available:http://www.reuk.co.uk/wordpress/raspberry-pi/publish-temperature-sensor-readings-to-twitter-raspberry-pi/ Accessed March 3,2017

[5] G. J. Han et al., "A Proposed Security Scheme against DoS Attacks in Cluster-Based Wireless Sensor Networks," Security and Commun. Networks, vol. 7, no. 12, 2014, pp. 2542–54.

[6] H. Zhou et al., "ConSub: Incentive-Based Content Subscribing in Selfish Opportunistic Mobile Networks," IEEE JSAC, vol. 31, no. 9, 2013, pp. 669–79.

[7] Kun Wang, Xin Qi, Lei Shu, Der-Jiunn Deng, anD JoeL J. P. C. roDrigueS, "Toward Trustworthy CrowdSourcing In The Social Internet of Things", IEEE Wireless Communications ,October 2016

[8] Awais Ahmad†, Student Member, IEEE, M. Mazhar Rathore†, Student Member, IEEE, Anand Paul†*, Senior Member, IEEE Suengmin Rho‡, Member, IEEE †School of Computer Science and Engineering, Kyungpook National University, Daegu, Korea ‡Department of Multimedia, Sungkyul University, Anyang, Korea, "Defining Human Behaviors using Big Data Analytics in Social Internet of Things", IEEE 2016

[9] Luigi Atzori a, Antonio Iera b, Giacomo Morabito c,⇑, Michele Nitti, "The Social Internet of Things (SIoT) – When social networks meet the Internet of Things: Concept, architecture and network characterization ",IEEE August 2012

[10] Luigi Atzori, University of Cagliari Antonio Iera, University of Reggio Calabria Giacomo Morabito, University of Catania," From "Smart Objects" to "Social Objects": The Next Evolutionary Step of the Internet of Things", IEEE Communications Magazine,January 2014

[11] Vivek Kumar Sehgal ,Soumitra Mehrotra, Harshit Marwah," Car Security Using Internet of Things" ,IEEE 2016

[12] K. Wang and M. Wu, "Cooperative Communications Based on Trust Model for Mobile Ad Hoc Networks," IET Info. Security, vol. 4, no. 2, 2010, pp. 68–79.

[13] K. Wang and H. Guo, "An Improved Routing Algorithm Based on Social Link Awareness in Delay Tolerant Networks," Wireless Pers. Commun., vol. 75, no. 1, 2014, pp. 397–414.

[14] T. Spyropoulos, K. Psounis, and C. S. Raghavendra, "Efficient Routng in Intermittently Connected Mobile Networks: The Multiple-Copy Case," IEEE Trans. Networking, vol. 16, no. 1, 2008, pp. 77–90.

[15] B. Kantarci and H.T.Mouftah, “Reputation-Based Sensing-As-A-Service for Crowd Management Over the Cloud,” IEEE ICC, 2014, pp. 3614–19.

[16] Mohsenian-Rad, Amir-Hamed, et al. "Autonomous demand-side management based on game-theoretic energyconsumption scheduling for the future smart grid." Smart Grid, IEEE Transactions on 1.3 (2010): 320331. J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68–73.

[17] Bae, Hyoungchel, et al. "User-friendly demand side management for smart grid networks." Information Networking (ICOIN), 2014 International Conference on. IEEE, 2014.

[18] Rudberg, Martin, Martin Waldemarsson, and Helene Lidestam. "Strategic perspectives on energy management: A case study in the process industry." Applied Energy 104 (2013): 487-496.

[19] Atzori, Luigi, et al. "The social internet of things (siot)–when social networks meet the internet of things: Concept, architecture and network characterization." Computer Networks 56.16 (2012): 3594-3608.

[20] A.J. Jara, Y. Bocchi, and D. Genoud, “Social Internet of Things: The Potential of the Internet of Things for Defining Human Behaviours,” Proc. 2014 IEEE Int’l. Conf. Intelligent Networking and Collaborative Systems, 2014.

[21] L. Atzori et al., “The Social Internet of Things (SIoT) when Social Networks Meet the Internet of Things: Concept, Architecture and Network Characterization,” Computer Networks, vol. 56, no. 16, 2012, pp. 3594–3608.

[22] A. Ahmad et al., “Smart Cyber Society: Integration of Capillary Devices with High Usability Based on Cyberphysical System,” Future Generation Computer Systems, 2015.

[23] R. Pepper and J. Garrity, “The Internet of Everything: How the Network Unleashes the Benefits of Big Data,” Global Information Technology Report 2014, Cisco Systems, 2014; http://blogs.cisco.com/wp-content/uploads/ GITR-2014-Cisco-Chapter .pdf.

[24] R. Ranjan, “Streaming Big Data Processing in Datacenter Clouds,” IEEE Cloud Computing, vol. 1, no. 1, 2014, pp. 78–83.

[25] S. Marti, P. Ganesan, and H. Garcia-Molina, “SPROUT: P2P Routing with Social Networks,” Current Trends in Database Technology-EDBT 2004 Workshops, Springer, 2005, pp. 425–35.