WOMEN'S SAFETY DEVICE

Submitted in partial fulfillment of the
requirements of the degree of

BACHELOR OF ENGINEERING

In

COMPUTER ENGINEERING

By

SHANE PARMAR	61
MOHIT RAO	76
CLEETUS RODRIGUES	77
ANTO FERNANDO	99

Supervisor:

Mr. SAURABH PATIL

(Asst. Prof., Computer Engineering Department, XIE)

(2018-2019)

CERTIFICATE

This is to certify that the project entitled "**WOMEN'S SAFETY DEVICE**" is a bonafide work of

SHANE PARMAR	61
MOHIT RAO	76
CLEETUS RODRIGUES	77
ANTO FERNANDO	99

Submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelor of Engineering"** in **"Computer Engineering"**.

_____

Supervisor/Guide
(Mr. Saurabh Patil)

_____ _____

(Prof. Sushama Khanvilkar)
Head of Department

(Dr. Y.D.Venkatesh)
Principal

Project Report Approval for B.E.

This project report entitled "**WOMEN'S SAFETY DEVICE"** by

SHANE PARMAR	61
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is approved for the degree of **Bachelor of Engineering** in **Computer Engineering** by the **University of Mumbai** during the academic year 2017-2018**.**

Examiner

1._____

2._____

Date:

Place:

Declaration

We declare that this written submission represents our ideas in other's 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 penalty 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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SHANE PARMAR(61)

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MOHIT RAO (76)

_____

CLEETUS RODRIGUES (77)

_____

ANTO FERNANDO(99)

Abstract

Rising crime against women has made women's safety an issue that needs immediate technological solutions to be implemented. We propose a gps based womens safety system with features designed in keeping various untoward emergencies women must face in mind. This device consists of a system that ensures immediate alerts in case a woman is harassed or she thinks she is in trouble. This system can be turned on by a woman in case she even thinks she would be in trouble. It is useful because once an incident occurs with a woman she may or may not get the chance to press the emergency button. In a button press alerting system, in case a woman is hit on the head from behind, she may never get the chance to press panic button and no one will know she is in trouble. Our system solves this problem. This device is to be turned on in advance by a woman in case she is walking on a lonely road or some dark alley or any remote area. Only the woman authenticated to the devices can start the system by fingerprint scan. Once started the devices requires the woman to constantly scan her finger on the system every 1 minute, else the system now sends her location to the authorized personnel number through SMS message as a security measure and also to the authorities. In this case even if someone hits the woman or the woman falls down and get unconscious, she does not need to do anything, the system does not get her finger scan in 1 minute and it automatically starts the dual security feature. This device will prove to be very useful in saving lives as well as preventing atrocities against women.

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List of Abbreviations

IFTTT	IF-This-Then-That
IoT	Internet of Things
GPS	Global Positioning System

Chapter 1

Introduction

India which sees itself as a promising super power and an economic hub can achieve its goal if and only if a large numbers of women participate in the development process. The status of women in India has gone through many great changes over the past few millennia. But also in today's world, security is a major issue for women.

In modern India, women continue to face social challenges and are often victims of abuse and violent crimes, harassment by uploading offensive photograph taken by hidden cameras etc. According to a global poll conducted by Thomson Reuters, India is the 4th dangerous country in the world for women, and the worst country for women among the G20 countries. Women are not as physically fit as men, in an emergency situation a helping hand would be assistance for them.
We are all aware of importance of women safety, but we must analyse that they should be properly protected.

1.1 Problem definition

The purpose of our project is to provide safety to the women's in dangerous zone. This project presents an analysis review on the principal need of intelligence security system with technology requirement and challenges to build the system. Thus with such system we can make womens more secure and make the world a better place. In this project we are providing facility to secure the women's by providing fingerprint sense GSM and GPS module and a mini Camera to take pictures at the time when the women feels insecure.

As the women feel insecure at that time she can press the fingerprint sensor, this will activate the GPS, GSM and the camera. GPS will calculate the latitude and longitude coordinates of that area. As in the modern world most of us have android mobile phones, we will make use of GSM which is inbuilt in an android mobile phone to get the coordinates. GSM module will send SMS which contains the latitude and longitude coordinates to numbers such as victims family, friends, police or neighbours which are already stored in microcontrollers memory. Then the victim should make sure that she senses her finger at least once in a minute. If she fails to do so then the Microcontroller will understand that the victim is under attack and will alert the police and the family members by making calls. We will make use of IFTTT for sending sms and making calls. The IFTTT makes use of applets which will automatically works whenever the IF condition is triggered. The camera will start taking pictures as the micro-controller is activated. These small things can ensure that the women is safer than she was before. Thus we can provide a safety for women using all these technology.

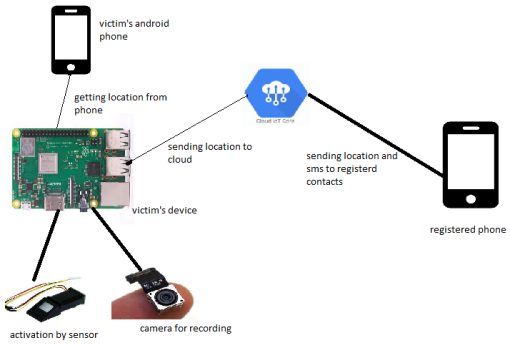


Fig. 1.1.1 Architecture Diagram

1.2 Aim and Objectives:

1) To improve societal conditions for women by reducing high crime rates and general environment of danger for women by making use of technology. A positive change can be brought about in our society if women feel empowered against hooligans and anti-societal elements that indulge in reprehensible behaviour such as harassment, stalking and molestation. We aim to foster a sense of safety among women by harnessing the capabilities of technology.

2) To improve response time for local authorities, by providing a simplified but effective emergency alerting and communication alternative to existing channels of notifying the authorities for help, thus ensuring swifter and immediate response by the authorities.

3) To implement a practical system using Internet-of-Things(IoT) that ensures timely reporting of crimes against women such as harassment, stalking, molestation etc that otherwise go unreported.

4) To understand and employ real world applications of concepts under Internet-of-Things (IoT) and make use of remote data accessing using cloud computing and real-time

1.3 Scope of Project

1) Children's safety: In addition to improving the conditions in terms of women's safety in India, this project can also be used for parents to detect their children's location. When childrens are out on a picnic or some water park and if they get lost or kidnapped they can use this same mechanism to prevent crime from happening.

2) Banking safe: In banks, this project will help the manager and the staffs to do an emergency call to the police when some robbery takes place.

3) This project can be used by common man in day to day life whenever he witnesses an occurrence of a crime or anti-social behavior by individuals or gangs/mobs of people. Thus people can act as active reporters of the situation and alert authorities instead of being passive eyewitnesses.

4) This project can be used in major institutions like railways whenever a bridge has collapsed or any real time death incident or major injuries to call an ambulance and police.

5) This project can be used by the members of the society whenever they have witnessed a crime in their neighborhood to call the police.

1.4 Existing System

A. VithU app

This is an emergency app initiated by a popular Indian crime television series “Gumrah” aired on Channel [V]. The app only works for Android systems. VithU, is an emergency App that, at the click of the power button of your Smartphone 2 times consecutively begins sending out alert messages every 2 minutes to your contacts that you feed into the app as the designated receivers or guardians. The message says "I am in danger. I need help. Please follow my location." Real-time location tracking is possible with the app. VithU, however, has been criticised for its triggering mechanism, with user reviews indicating that the double click method is not reliable and doesn’t always work. The two clicks of the power button must be properly done, and partial or incomplete clicks are not read as valid. Furthermore, relying on a hardware button so commonly used in phones increases the chances of the message being sent out wrongly or unnecessarily

B. Fight back

FightBack app is a very basic app similar to ones listed above. However, one unique feature we like about the app is the Facebook status update. Apart from providing SMS and Email options to alert the other person during distress, this app also updates your Facebook status. Fightback has come under fire for being battery intensive, it’s cumbersome installation, the long time to send out SMS alerts and its buggy interface

C. SmartShehar Woman Safety Shield Protection

The app allows you to take a picture. Hitting the emergency button results in the picture along with the location going to a pre-decided list of emergency contacts. The woman losing the phone before sending is not a problem, as the app will automatically send the information within a few seconds. The “Walk With Me“ feature will allow those on her list to track your movements in real time. But it’s problems include not having an accessible privacy policy, no mention how the data collected through the app is stored, seeking unnecessary permissions, and do not allow users to opt out of particular uses of data collection because essentially, the user has no control over what happens with the data collected via the app.

D. My Safetipin

This safety app provides users with features like GPS tracking, directions to safe locations and pins showing safe and unsafe areas on the map. Apart from the basic SOS feature of contacting the user's friends and family in emergency situations and letting them track the users, the app has a number of other features. Safetipin is also available in Hindi, Bahasa and Spanish, besides English. The app crowdsources its location sourcing to determine 'good' or 'bad' neighborhoods, but that can also prove to be problematic as leaving it to the public to chart out bad neighborhoods is a vague and unreliable process.

Chapter 2

Review of literature

A Safety Device for Women's Security Using GSM/GPS

The paper [1] proposes wireless key GSM and GPS module with controller. As the women feels insecure at that time she can press the wireless key then the GPS and GSM modules are activated .GPS will calculate the latitude and longitude coordinates of that area. GSM module will send SMS which contains the latitude and longitude coordinates to the numbers such as family, friends, police station and neighbours which are already stored in microcontrollers memory. Also GSM module will make call to these numbers.

Emergency Alert for women's safety with location tracking.

The Paper [2] proposes ATmega328 with GPS and GSM modems. The system can be interconnected with the alarm system and alert the neighbors. The detection and messaging system is composed of a GPS receiver, Microcontroller and a GSM Modem. GPS Receiver gets the location information from satellites in the form of latitude and longitude. The Microcontroller processes this information and this processed information is sent to the user using GSM modem. A GSM modem is interfaced to the MCU. The GSM modem sends an SMS to the predefined mobile number. When a woman is in danger and in need of self-defense then she can press the switch which is allotted to her. By pressing the switch, the entire system will be activated then immediately a SMS will be sent to concern person with location using GSM and GPS.

All in one Intelligent Safety System for Women Security.

The paper [3] proposes system can be implemented as an android app application or using Arduino based board. It uses many modules such as database module, SOS keypress module, voice recognization module, GPS module, GSM module, Fake Call tool module, Audio and Video module to achieve many function like to view location in Google map, alert message with location, audio and video recording, speaker ON for auto receiving call, fake call ringtone with hand up option, complaints register on 100, generate electric shock for self defense and screaming alarm siren. The proposed system provides all required functionality and there is no need to buy and install different apps that possess different functionality. Hence the cost gets minimized as well as the memory requirement by the system is less compared to having many apps.

An Intelligent Safety System for Individual's Security

The paper [4] propose an android application which activates the vibrate sensor when the opens the application. Then whenever the victim touches the screen of the phone the GPS and GSM module of the phone gets active and send the latitude and longitude coordinates to the application. This application precedes these values to the registered numbers provided by the victim in the database. This ensures the safety of women.

Chapter3

Description

In this project we are providing facility to secure the women's by providing fingerprint sense GSM and GPS module and a mini Camera to take pictures at the time when the women feels insecure. As the women feel insecure at that time she can press the fingerprint sensor, this will activate the device.

The woman's android phone provides GPS and GSM modules for use to the device, which are used to obtain her coordinates and thus determine her position. Once the system is activated, the woman must keep scanning her finger within a predetermined amount of time. Failure to do so triggers the failsafe mechanism, sending current real time location as well as a generated emergency message to her selected contacts and the authorities. The camera can capture images of her surrounding or of the culprits harassing her and these images are sent to the police as evidence.

3.1 Analysis:

A) For the first print scan and registrations of user and contact details

When the prospective user scans her prints for the very first time, the print is read and stored in the pi for registering and authenticating the user. Python fingerprint library is used to read and scan the print. Since the pi can store upto 1000 prints, the user's prints in different orientations and positions is stored so they can be detected in any situation. The user and contact then upload contact info onto the maker channel and Blynk is installed on the user end. For the first run, the print is merely scanned again and if the pi recognizes it as correct, location tracking script is run enabling the contact to track the pi.

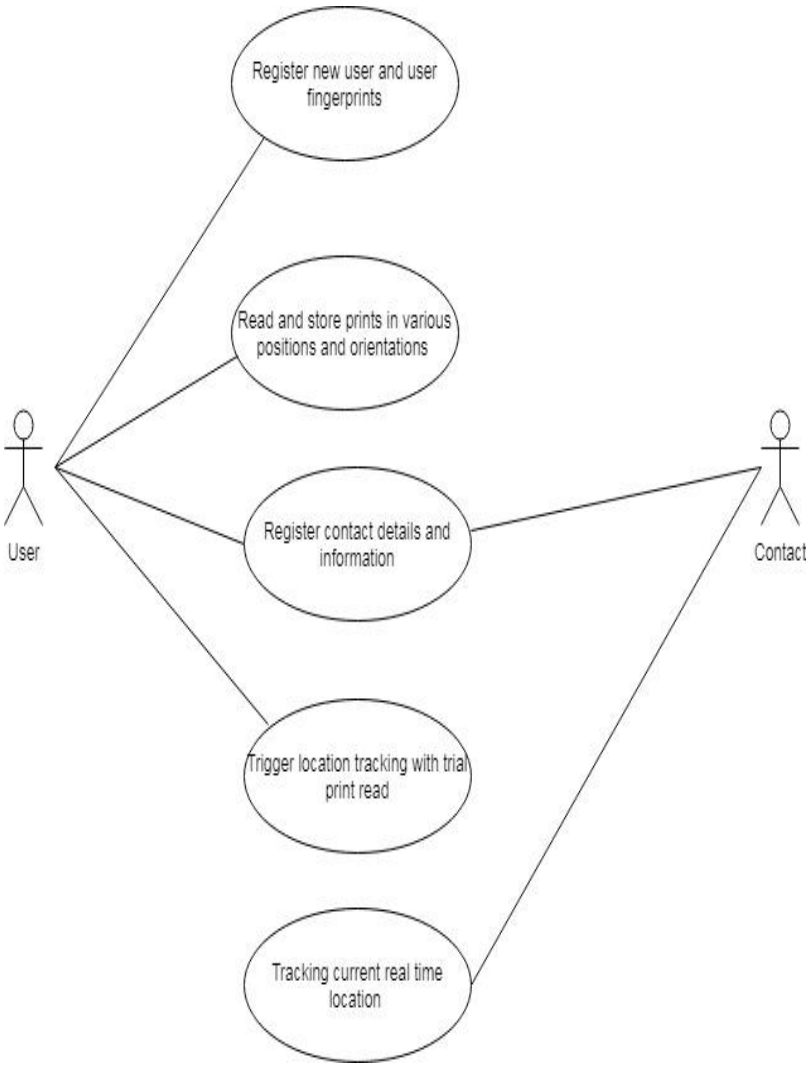
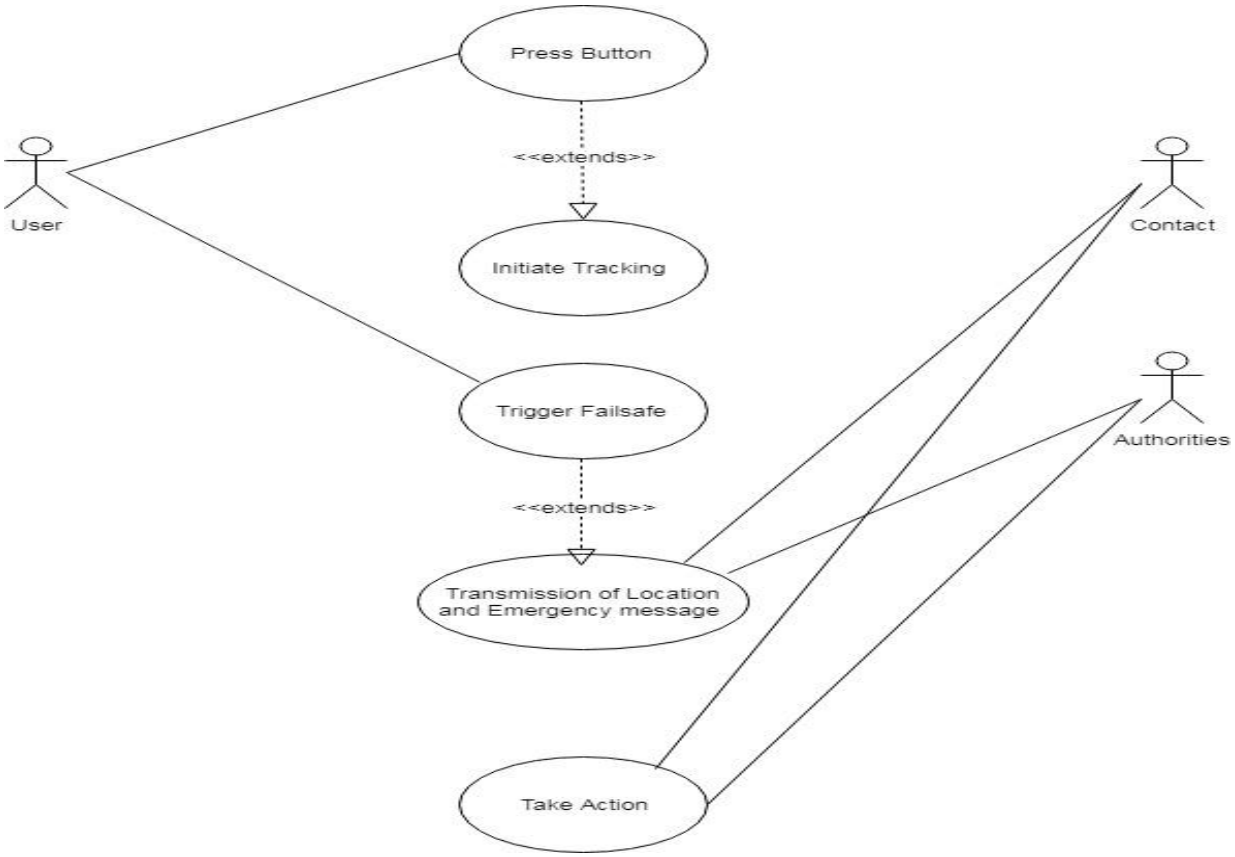


Fig 3.1.1 Use Case Diagram

B) Working of the device

When the user feels unsafe, she activates the device and scans her fingerprint. The mechanism is this initiated and the location of the pi is tracked. The user triggers the failsafe mechanism by not scanning her print again after the allotted time, thus sending her current location and an emergency message to the contacts and authorities. The use cases in this scenario between the actors (user, contacts and the authorities) would be

- Pressing of the button
- Initiation of tracking
- Trigger Failsafe
- Transmission of message and location
- Action taken on receiving the message



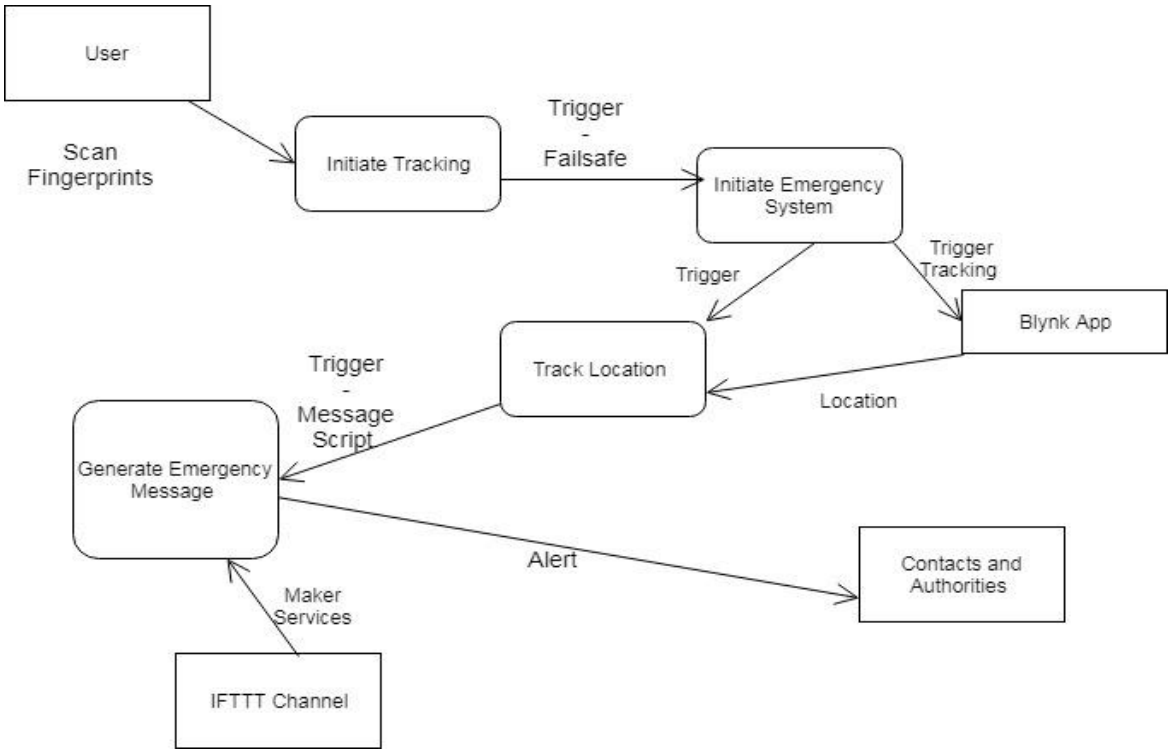
3.1.2 Data FlowDiagram:

3.1.2(a) 0-Level DFD :

Fig 3.1.2 (a) Level-0 DFD

This is the **level 0** of **Data Flow Diagram FIGURE 3.1.2 (a) (DFD).** This signifies the very basic working of the system conveying information from user to her contacts.

3.1.2(b) 1-Level DFD :



3.1.2 (b) Level-1 DFD

This diagram gives more detailed information above the data flow between user and the system. The IFTTT channel generates and sends the message while the Blynk web server stores and updates the real time location coordinates.

3.1.3 Feasibility Study

Feasibility study is made to see if the project on completion will serve the purpose of the organization for the amount of work, effort and the time that spend on it. Feasibility study lets the developer foresee the future of the project and the usefulness. A feasibility study of a system proposal is according to its workability, which is the impact on the organization, ability to meet their user needs and effective use of resources. Thus when a new application is proposed it normally goes through a feasibility study before it is approved for development. The document provide the feasibility of the project that is being designed and lists various areas that were considered very carefully during the feasibility study of this project such as Technical, Economic and Operational feasibilities.

1) Technical Feasibility

The system must be evaluated from the technical point of view first. The assessment of this feasibility must be based on an outline design of the system requirement in the terms of input, output, programs and procedures. Having identified an outline system, the investigation must go on to suggest the type of equipment, required method developing the system, of running the system once it has been designed.

- Technical issues raised during the investigation are:
- Does the existing technology sufficient for the suggested one?
- Can the system expand if developed?

The project should be developed such that the necessary functions and performance are achieved within the constraints. Wifi is given from the android phone to the Pi, which is powered by a 5V battery. The phone's coordinates are being sent via the Pi to the server. So there are minimal constraints involved with this project. The system has been developed using Python the project is technically feasible for development.

2) Economic Feasibility

The developing system must be justified by cost and benefit. Criteria to ensure that effort is concentrated on project, which will give best, return at the earliest. One of the factors, which affect the development of a new system, is the cost it would require.

The following are some of the important financial questions asked during preliminary investigation:

- The costs conduct a full system investigation.
- The cost of the hardware and software.
- The benefits in the form of reduced costs or fewer costly errors.

Since the system is developed as part of project work, there is no manual cost to spend for the proposed system. Also all the resources are already available, it give an indication of the system is economically possible for development.

3) Behavioural Feasibility

This includes the following questions:

- Is there sufficient support for the users?
- Will the proposed system cause harm?

The project would be beneficial because it satisfies the objectives when developed and installed. All behavioral aspects are considered carefully and conclude that the project is behaviorally feasible.

3.2 Design:

3.2.1BlockDiagram:

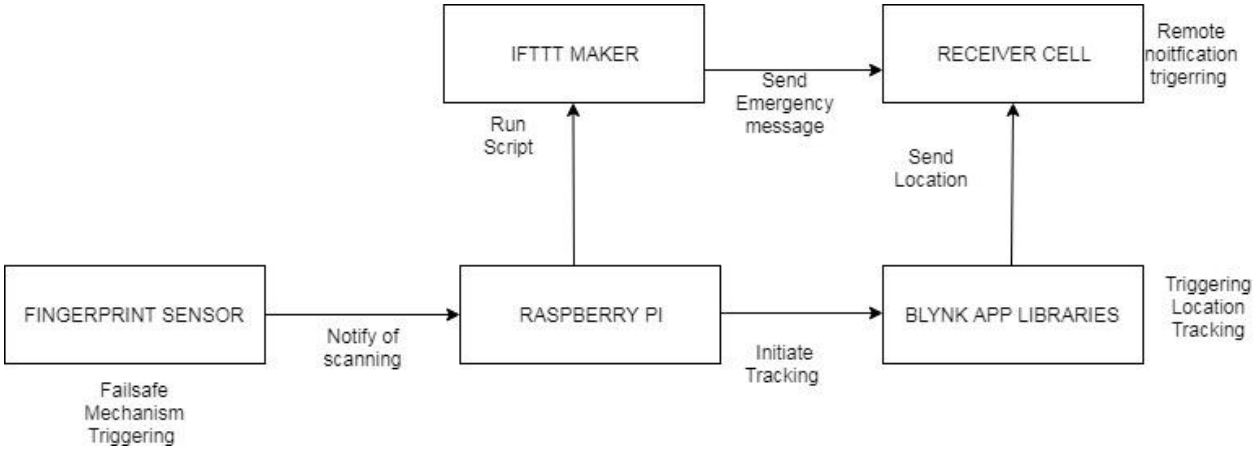


Fig 3.1.3. Block Diagram

This shows the triggering mechanism of the device in action. First scan initiates the mechanism, thereafter the user must scan her prints after determined time to not trigger failsafe. If she fails to do so, the generated message will be sent by IFTTT maker channel, and current location will be sent from the Blynk web server to the app on receiver side.

3.2.2 Flowchart

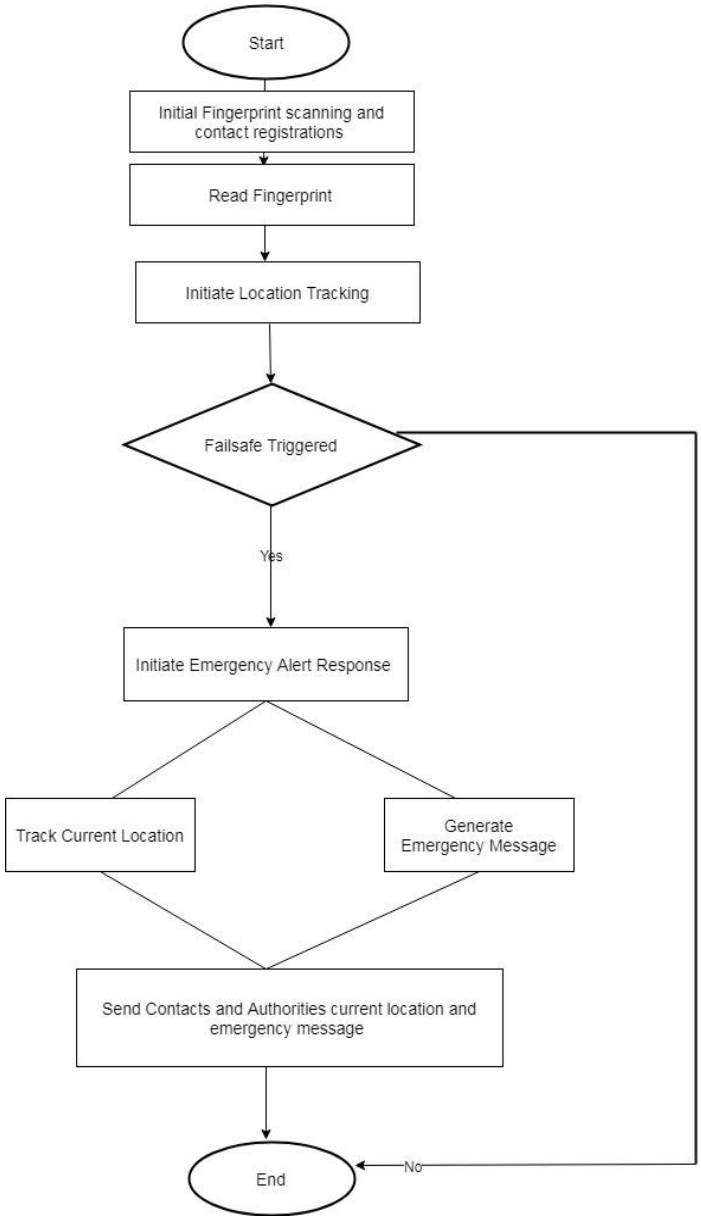


Fig 3.1.4 Flowchart

The above figure is the **flowchart** of the proposed system. This process begins after the first scan by the user. First scan initiates the mechanism, thereafter the user must scan her prints after determined time to not trigger failsafe. If she fails to do so, the generated message will be sent by IFTTT maker channel, and current location will be sent from the Blynk web server to the app on receiver side.

3.3 Implementation Methodology:

3.3.1 Activating the system

In circumstances where the woman feels threatened, she can switch on the device with the push of a pop-button. To initiate the location tracking mechanism, she must scan her print once. Since multiple orientations and positions the finger can be scanned in have been stored, any position she scans her finger in will be a valid input to run the tracking script programmed into the device. Once she has scanned her finger, she must repeat the process after an allotted time (preferably 1 minute or less). Failure to scan the print again is taken as an indication that the woman is in danger, triggering the failsafe.

3.3.2 Software implementation for Location Tracking

Once the print is read, the pi will run a Python script for location tracking. Now, the pi is being tracked, and it's real-time location updated in the cloud server we are using (for the purpose of this project, we're relying on Blynk app). Blynk will track and store the location of the device and thus the user is being tracked in real time. The open-source Blynk server forwards information between the Blynk mobile application and Raspberry Pi, thus enabling real-time tracking of the device's location using the Blynk app.

3.3.3 Sending emergency message using IFTTT Maker channel services

The failsafe mechanism is the generation and transmission of the emergency alert message from the user to select contacts and the authorities (contact info of relevant authorities eg Women's Cell of the Mumbai Police and Railway authorities will be preprogrammed). This failsafe is triggered when the user does not have her print scanned after allotted time.
We have used IFTTT to create chains of applets that will execute successively to send an emergency sms to the selected contacts and authorities if the woman is in danger. IFTTT is a web service and phone app that allows you to customize actions to events. You can choose from a series of pre-built triggers, then choose an action to respond to that trigger.

3.3.4 Livestreaming from the user's current location

Visual referencing and evidence of the user's surroundings can be very useful in determining not only where the woman is but what problems she might be suffering currently and how she can be helped. Real-time streaming from the user can be very beneficial in such a scenario. A 5 Mp Raspberry Pi 3 B Picam has been attached to the device enabling live video capture. The python script enabling real-time video streaming will be triggered once the user fails to scan her finger after allotted time period. For the purpose of the project, one can access the video streaming through any device that has a browser and is connected to the same network as the Pi. During fully functional scaling, a public server will be set up thus enabling streaming to authorized contacts as well as authorities.

3.4 Details of Hardware and Software:

3.4.1 Hardware Details

3.4.1.1 Raspberry Pi

The Raspberry Pi is a series of credit card-sized single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote the teaching of basic computer science in schools and developing countries. Raspberry Pi is a major component of our project, acting as the core of the device. Several generations of Raspberry Pi's have been released. The first generation (retrospectively known as the Raspberry Pi 1) was released in February 2012 in basic Model A and a higher specification Model B. Improved A+ and B+ models were released a year later. The Raspberry Pi 2 was released in February 2015 and Raspberry Pi 3 in February 2016. These boards are priced between US$20 and 35. A cut down "compute" model was released in April 2014, and a Raspberry Pi Zero with smaller size and limited input/output (I/O), general-purpose input/output (GPIO), and abilities released in November 2015 for US$5.

For the purpose of this project we are using Raspberry Pi 3 B +. The characteristics that make it appropriate for our project are -

- Broadcom BCM2837B0, Cortex-A53 (ARMv8) 64-bit SoC @ 1.4GHz
- 2.4GHz and 5GHz IEEE 802.11.b/g/n/ac wireless LAN, Bluetooth 4.2, BLE
- Gigabit Ethernet over USB 2.0 (maximum throughput 300 Mbps)
- Extended 40-pin GPIO header
- CSI camera port for connecting a Raspberry Pi camera
- DSI display port for connecting a Raspberry Pi touchscreen display
- 4-pole stereo output and composite video port
- Micro SD port for loading your operating system and storing data
- 5V/2.5A DC power input

3.4.1.2 Fingerprint Sensor

Raspberry Pi has 2 pins that work with 3.3V. A USB UART converter is hence frequently needed to make the sensor work with the Pi. For a typical UART based Fingerprint sensor module -

Pin Nmuber	Name	Type	Function Description
1	Vtouch	In	Touch sensor power input(color: blue)
2	Sout	Out	Touch sensor output(color: yellow)
3	Vin	In	Power input(color: red)
4	TD	in	Data output. TTL logical level (color: green)
5	RD	out	Data input. TTL logical level (color: white)
6	GND	—	Signal ground. Connected to power ground (color: black)

3.4.1.3 Raspberry Pi Camera:

The picam has a resolution of 5 MP, with Camera Serial Interface (CSI)as its Interface Type. Image dimensions therein are 25x23x8 (LxWxH) mm. It supports Video Formats in 1080p @ 30fps, 720p @ 60fps and 640x480p 60/90. It is fully compatible with Raspberry Pi 3 Model B

3.4.2 Software Details

3.4.2.1 Blynk App

Blynk is a Platform with iOS and Android apps to control Arduino, Raspberry Pi etc over the Internet. It's a digital dashboard where you can build a graphic interface for your project by simply dragging and dropping widgets. Blynk is not tied to some specific board or shield. Instead, it's supporting hardware of your choice, whether your Arduino or Raspberry Pi is linked to the Internet over Wifi, Ethernet or a new ESP8266 chip. The open-source Blynk server forwards information between the Blynk mobile application and Raspberry Pi, thus enabling real-time tracking of the device's location using the Blynk app.

3.4.2.2 IFTTT Maker Channel

If This Then That, also known as IFTTT, is a free web-based service to create chains of simple conditional statements, called applets. An applet is triggered by changes that occur within other web services such as Gmail, Facebook , Telegram, Instagram, or Pinterest. For example, an applet may send an e-mail message if the user tweets using a hashtag, or copy a photo on Facebook to a user's archive if someone tags a user in a photo.

Services (formerly known as channels) are the basic building blocks of IFTTT. They mainly describe a series of data from a certain web service such as YouTube or eBay. Services can also describe actions controlled with certain APIs, like SMS. Sometimes, they can represent information in terms of weather or stocks. Each service has a particular set of triggers and actions. Triggers are the "this" part of an applet. They are the items that trigger the action. For example, from an RSS feed, you can receive a notification based on a keyword or phrase. Actions are the "that" part of an applet. They are the output that results from the input of the trigger. Applets (formerly known as recipes) are the predicates made from Triggers and Actions. For example, if you like a picture on Instagram (trigger), an IFTTT app can send the photo to your Dropbox account (action). Ingredients are basic data available from a trigger—from the email trigger, for example; subject, body, attachment, received date, and sender's address.

3.4.2.3 Raspbian Operating System:

The Raspberry Pi used in this project runs on Raspbian Operating System. Raspbian is a Debian-based computer operating system for Raspberry Pi, developed by a small team of developers. It is not affiliated with the Raspberry Pi Foundation, but the foundation provides a Raspbian image which is listed as an officially supported operating system.Raspbian is based on Linux operating system. The one who wants to operate Raspbian must have knowledge of Linux operating system.

Chapter 4

Implementation and Results

4.1 Implementation

4.1.1 Device Design

We propose using a Raspberry pi-3 B+ for hardware as the device at the core of the system. The Pi will be powered using a portable battery to ensure mobility. A fingerprint scanner attached will act as the triggering button for the system. The scanner serves the dual purpose of a trigger button as well as ensuring unique user identification. During the first run, the scanner will be used to read and store inputs of the scans of the user's fingerprint in various positions.

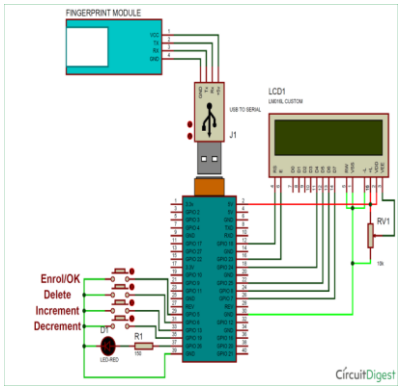
This ensures that the user can initiate the tracking mechanism by having her fingerprint read in any possible position or orientation, as she may not have the opportunity to have a complete and perfect scan done due to circumstances. Hence partial or incomplete scans will also be read and stored.

The main script that runs both the initial activation as well as failsafe mechanism is:

```
#!/usr/bin/env python
# -*- coding: utf-8 -*-

"""
PyFingerprint
Copyright (C) 2015 Bastian Raschke <bastian.raschke@posteo.de>
All rights reserved.

"""

import hashlib
from pyfingerprint.pyfingerprint import PyFingerprint
import time
import threading


def fingerprintdemo():
	## Search for a finger
	##
	## Tries to initialize the sensor
	try:
		f = PyFingerprint('/dev/ttyUSB0', 57600, 0xFFFFFFFF, 0x00000000)

		if ( f.verifyPassword() == False ):
			raise ValueError('The given fingerprint sensor password is wrong!')
	except Exception as e:
		print('The fingerprint sensor could not be initialized!')
		print('Exception message: ' + str(e))
		exit(1)
```

```
## Gets some sensor information
print('Currently used templates: ' + str(f.getTemplateCount()) +'/'+ str(f.getStorageCapacity()))

## Tries to search the finger and calculate hash
try:
	print('Waiting for finger...')

	## Wait that finger is read
	while ( f.readImage() == False ):
		pass

	## Converts read image to characteristics and stores it in charbuffer 1
	f.convertImage(0x01)

	## Searchs template
	result = f.searchTemplate()

	positionNumber = result[0]
	accuracyScore = result[1]
	global repeataccess
	if ( positionNumber == -1 ):
		print('No match found!')
		exit(0)
		repeataccess = 0
	else:
		print('Found template at position #' + str(positionNumber))
		print('The accuracy score is: ' + str(accuracyScore))
		repeataccess = 1


	## Loads the found template to charbuffer 1
	f.loadTemplate(positionNumber, 0x01)

	## Downloads the characteristics of template loaded in charbuffer 1
	characterics = str(f.downloadCharacteristics(0x01)).encode('utf-8')

	## Hashes characteristics of template
	print('SHA-2 hash of template: ' + hashlib.sha256(characterics).hexdigest())
```

```
        except Exception as e:
                print('Operation failed!')
                print('Exception message: ' + str(e))
                exit(1)


def every(delay, task):
  next_time = time.time() + delay
  while True:
    time.sleep(max(0, next_time - time.time()))
    try:
                task()
    except Exception:
      traceback.print_exc()
      # in production code you might want to have this instead of course:
      # logger.exception("Problem while executing repetitive task.")
    # skip tasks if we are behind schedule:
    next_time += (time.time() - next_time) // delay * delay + delay



if __name__ == '__main__':
        fingerprintdemo()
        if (repeataccess == 1):
                threading.Thread(target=lambda: every(10, fingerprintdemo)).start()
        else:
                threading.Thread(target=lambda: every(10, fingerprintdemo)).stop()
```



4.1.2 Location tracking

Once the print is read, the pi will run a Python script for location tracking. Now, the pi is being tracked, and its real-time location updated in the cloud server we are using (for the purpose of this project, we're relying on Blynk app). Blynk will track and store the location of the device and thus the user is being tracked in real time. The open-source Blynk server forwards information between the Blynk mobile application and Raspberry Pi, thus enabling real-time tracking of the device's location using the Blynk app. Current coordinates of the user are sent via her phone to the pi, with Blynk app running on user phones and the script to receive the coordinates running when the first print is scanned. This live location will be sent to the user's registered contacts who can monitor her movements continuously. If she fails to scan her print again after allotted time the last know location is immediately sent to the authorities along with the generated emergency message.

Code for sending coordinates to the Blynk Cloud:

```
import BlynkLib
import time
from time import sleep
time.sleep(3)
BLYNK_AUTH = 'ff59465d4bc74d80b68dbd1810dcc38d'
blynk = BlynkLib.Blynk(BLYNK_AUTH)
lat=0


@blynk.VIRTUAL_READ(10)
def my_read_handler():
        f0= open("sample.txt", "r+")
        for i in f0:
                global lat
                lat = i[0:10]
                print(lat)

        blynk.virtual_write(10,lat)
        f0.close()

@blynk.VIRTUAL_READ(11)
def my_read_handler():
        f= open("sample.txt", "r+")
        for i in f:
                global lang
                lang = i[10:20]
                print(lang)
        blynk.virtual_write(11,lang)
        f.close()

blynk.run()
```

Code to receive coordinates from Blynk cloud:

```
import BlynkLib
import time
import os
from time import sleep
valuelatlong=""

BLYNK_AUTH = 'c30255f26f8446308f8b114723fd1e13'
# Initialize Blynk
blynk = BlynkLib.Blynk(BLYNK_AUTH)
# Register Virtual Pins
i=0
j=0
@blynk.VIRTUAL_WRITE(1)
def my_write_handler(param):
        global i
        global j
        print(param)
        if (i<=1):
                src=open("sample.txt","r")
                fline=param
                oline=src.readlines()
                #Here, we prepend the string we want to on first line
                oline.insert(0,fline)
                src.close()
                #We again open the file in WRITE mode
                src=open("sample.txt","w")
                src.writelines(oline)
                i=i+1
                print("insideif")
                print(i)
                print(j)
                src.close()

        j=j+1
        if (j==4):
```

```
j=0
                i=0

        print(param)
        #aluelatlong = param
        #ime.sleep(5)
        f=open("sample.txt","a")
        src=open("sample.txt","r")
        fline=param
        oline=src.readlines()
        #Here, we prepend the string we want to on first line
        oline.insert(0,fline)
        #f.write(param)

        f0= open("sample.txt", "r+")
        for i in f0:
                lat = i[0:10]
                #lang = i[10:20]
                print(lat)
                #print(lang)
        f.close()
        src.close()'"

        #os.system('sudo rm -rf sample.txt')


# Start Blynk (this call should never return)
blynk.run()
```

4.1.3 Sending emergency message using IFTTT Maker channel services

Three applets were created and daisy chained such that they would run consecutively, actions of one triggering the other, the end result of which would be the contact receiving an emergency sms alerting them that user was in danger –

1) If [Webhook] then [Email] - The first applet had a webhook service from the Maker channel as it's triggering event i.e 'this' action. The webhook is an HTTP callback i.e a post that would occur when an 'event' occured, thus acting as an event notification. The 'Event' is the running of a simple python script for sending web requests. The simplest way to access your ifttt recipe from Python
is the Requests library. This is built specifically to conduct web requests. To install the library we type in the terminal :

   a) sudo pip install requests.
   b) sudo apt-get install python-dev libffi-dev libssl-dev
   c) sudo pip install --upgrade ndg-httpsclient

   We then write a python code to send an Email. The action taking place subsequently i.e 'that' action will be sending of an Email to the linked Email account i.e the project account.

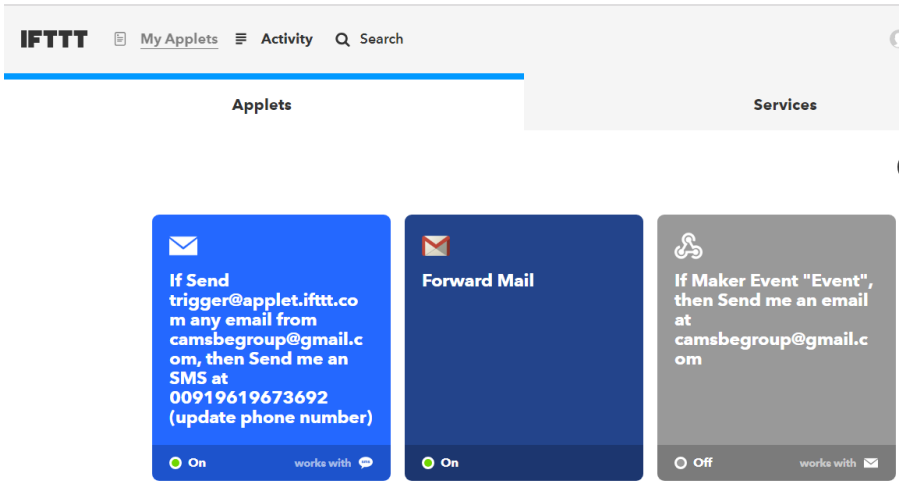
2) Forward Mail applet - the Email being received is from the 'action' account of IFTTT. An Email can also act as a trigger if it's being sent to the IFTTT - to their 'trigger' account (respective mail IDs being action@ifttt.com and trigger.receive@ifttt.com). An applet was created that would immediately forward all mail received from the action account back to the receive account, thus any mail being sent as the result of an action itself would act as a trigger for the next applet, both mails belonging to IFTTT.

3) If [Email] then [SMS] - The mail that had originated as an action is now itself a trigger. 'This' event is the mail being sent to IFTTT, 'that' action is an SMS with predetermined content eg 'I"m in Danger/I need help" being sent to selected contact.

Code to activate Webhooks Service and trigger the IFTTT applet:

```
import requests

def email_alert(first, second, third):
    report = {}
    report["value1"] = first
    report["value2"] = second
    report["value3"] = third
    requests.post("https://maker.ifttt.com/trigger/Event/with/key/b6TjEPKXFsWuTE050AL2lZ",
data=report)

email_alert(a, b, c)
```

The daisy-chained applets on IFTTT are:



4.1.4 Livestreaming from user location

For the purpose of this project we are implementing live tracking enabled when both user and receiver are in the same network. In future work an open server will be used for the purpose.

Code used for live streaming:

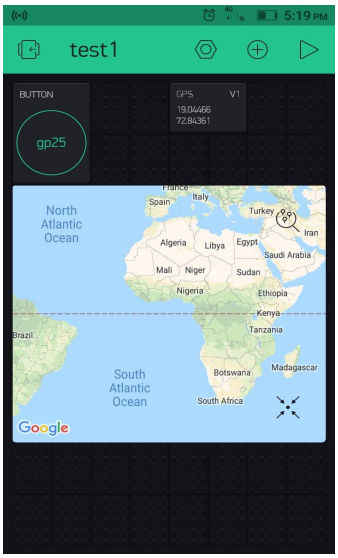
```
import io
import picamera
import logging
import socketserver
from threading import Condition
from http import server
```

```
PAGE="""\
<html>
<head>
<title>Raspberry Pi - Surveillance Camera</title>
</head>
<body>
<center><h1>Raspberry Pi - Surveillance Camera</h1></center>
<center><img src="stream.mjpg" width="640" height="480"></center>
</body>
</html>
"""

class StreamingOutput(object):
    def __init__(self):
        self.frame = None
        self.buffer = io.BytesIO()
        self.condition = Condition()
    def write(self, buf):
        if buf.startswith(b'\xff\xd8'):
            # New frame, copy the existing buffer's content and notify all
            # clients it's available
            self.buffer.truncate()
            with self.condition:
                self.frame = self.buffer.getvalue()
                self.condition.notify_all()
            self.buffer.seek(0)
        return self.buffer.write(buf)
class StreamingHandler(server.BaseHTTPRequestHandler):
    def do_GET(self):
        if self.path == '/':
            self.send_response(301)
            self.send_header('Location', '/index.html')
            self.end_headers()
        elif self.path == '/index.html':
            content = PAGE.encode('utf-8')
            self.send_response(200)
            self.send_header('Content-Type', 'text/html')
            self.send_header('Content-Length', len(content))
            self.end_headers()
            self.wfile.write(content)
```

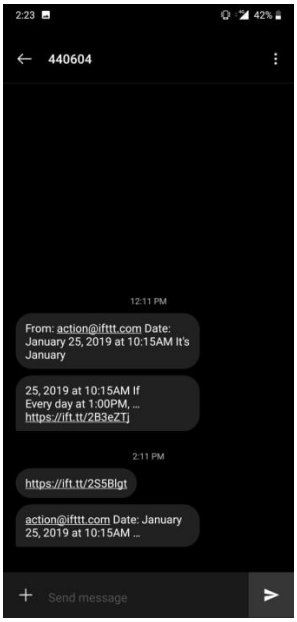
```
        elif self.path == '/stream.mjpg':
            self.send_response(200)
            self.send_header('Age', 0)
            self.send_header('Cache-Control', 'no-cache, private')
            self.send_header('Pragma', 'no-cache')
            self.send_header('Content-Type', 'multipart/x-mixed-replace; boundary=FRAME')
            self.end_headers()
            try:
                while True:
                    with output.condition:
                        output.condition.wait()
                        frame = output.frame
                    self.wfile.write(b'--FRAME\r\n')
                    self.send_header('Content-Type', 'image/jpeg')
                    self.send_header('Content-Length', len(frame))
                    self.end_headers()
                    self.wfile.write(frame)
                    self.wfile.write(b'\r\n')
            except Exception as e:
                logging.warning(
                    'Removed streaming client %s: %s',
                    self.client_address, str(e))
        else:
            self.send_error(404)
            self.end_headers()

class StreamingServer(socketserver.ThreadingMixIn, server.HTTPServer):
    allow_reuse_address = True
    daemon_threads = True
with picamera.PiCamera(resolution='640x480', framerate=24) as camera:
    output = StreamingOutput()
    #Uncomment the next line to change your Pi's Camera rotation (in degrees)
    #camera.rotation = 90
    camera.start_recording(output, format='mjpeg')
    try:
        address = ('', 8000)
        server = StreamingServer(address, StreamingHandler)
        server.serve_forever()
finally:
        camera.stop_recording()
```

4.2 Results

When the user scans her fingerprint for the first time, her current location is sent to her registered contact. Failure to scan her print after allotted time results in exact current location being sent to her contacts and the authorities.



An emergency SMS message is sent to her registered contacts as well as the authorities notifying them that the woman is in danger when she fails to scan her print after allotted time.



Chapter 5

Testing

Test ID	Test Scenario	Test Steps	Expected Result	Achieved Result	Pass/Fail
TC01	Checking whether location coordinates are being sent from user's Blynk app to the Pi and from Pi to the receiver's phone via Blynk cloud	1.Setting up the Blynk app on the user's phone to send coordinate to the Pi 2.Loading the script on the Pi to receive the coordinates from the user's phone 3.Loading the script on user end to send the coordinates to the receiver via Blynk cloud	Current location of the user must be tracked in real time on receiver's end	Same as Expected	Pass

TC02	Checking if generation and sending of emergency message happens properly	1.Setting up IFTTT account to create applet to send message when script is run 2.Composing message and registering contacts it is to be sent to 3.Loading script on Pi	Message with composed body is sent to registered number immediately after script is run	As Expected	Pass
TC03	Checking if live streaming is successful from user end	1.Setting up operable picam 2.Loading picam script for Raspberry Pi	Livestreaming enabled from user end	As expected	Pass
TC04	Checking if initial activation occurs after user scans her finger for the first time	1.Setting up the fingerprint sensor to recognize and read user's fingerprint 2. Integrating the scripts for location tracking and message sending with the activation script 3. Loading the activation script on the Pi	User's current location is sent along with a message notifying that she feels unsafe to her registered contacts	As expected	Pass
TC05	Checking if the failsafe mechanism is activated if the user does not scan	1.Setting up the fingerprint sensor 2. Integrating the script for location	Location of the last scan along with live tracking,	As expected	Pass

	her print after allotted time	tracking, message sending and live tracking with the failsafe script 3.Integrating the failsafe script with the activation script 4. Loading the script on the Pi	emergency message notifying the authorities that she is in danger and live streaming of her environment activated if she fails to scan her print.		

Chapter 6

Conclusion and Future Work

6.1 Conclusion

The proposed system reduces the risk of failure in a situation of emergency. It also helps in giving the live location of the victim to the registered contacts and the police. So that immediate action would be taken over the arised situation. Our main motive to tackle the social issue of women's safety using technological innovation devised. An effective way to tackle the social issue of women's safety using technological innovation can be devised, as shown through this project. This project thus addresses a major fault in our law and order apparatus, by making efficient use of IoT. Further applications of IoT can address societal issues and bring about improvements in our daily lives.

6.2 Future Work

1) An open server for cloud computing and sending and receiving user coordinates as well as to enable live streaming
2) A full-fledged SMS gateway to ensure unlimited message generation and transmission

References

[1] Abhijeet Paradkar, " All in one safety System for Women" , International Journal for Computer Application

[2] Prof. Kiran Mensinkai, "An Intelligent Safety System for Individual's Safety" , International Conference for Data Analytics and Soft Computing

[3] M. Shrilekha, "Emergency Alert for Women's Safety with Location Tracking", Pace Institute of Engineering

[4] Ashwini P. Thaware "A Safety System for Women", International Journal for Recent and Innovative tren

PUBLISHED WORKS

WOMEN'S SAFETY DEVICE

Saurabh Patil[1], Anto Fernando[2], Cleetus Rodrigues[2],Mohit Rao[2], Shane Parmar[2]

[1] *Professor,* [2]*Students*

[1]saurabh.terna@gmail.com

[2]antovin1996@gmail.com

[2]rodriguescleetus@gmail.com

[2]thisismohitrao@gmail.com

[2]parmarshane23@gmail.com

***Abstract*—Rising crime against women has made women's safety an issue that needs immediate technological solutions to be implemented. We propose a GPS based women's safety system with features designed in keeping various untoward emergencies women must face in mind. This device consists of a system that ensures immediate alerts in case a woman is harassed or she thinks she is in trouble. This system can be turned on by a woman in case she even thinks she would be in trouble. It is useful because once an incident occurs with a woman she may or may not get the chance to press the emergency button. In a button press alerting system, in case a woman is hit on the head from behind, she may never get the chance to press panic button and no one will know she is in trouble. Our system solves this problem. This device is to be turned on in advance by a woman in case she is walking on a lonely road or some dark alley or any remote area. Only the woman authenticated to the devices can start the system by fingerprint scan. Once started the devices requires the woman to constantly scan her finger on the system every 1 minute, else the system now sends her location to the authorized personnel number through SMS message as a security measure and also sounds a buzzer continuously so that nearby people may realize the situation. In this case even if someone hits the woman or the woman falls down and get unconscious, she does not need to do anything, the system does not get her finger scan in 1 minute and it automatically starts the dual security feature. This device will prove to be very useful in saving lives as well as preventing atrocities against women.**

***Keywords*— Internet-of-Things, Raspberry pie 3b plus, multi-module interfacing, cloud computing**

I. INTRODUCTION

A. Description

India which sees itself as a promising super power and an economic hub can achieve its goal if and only if a large number of women participate in the development process. The status of women in India has gone through many great changes over the past few millennia. But also, in today's world, security is a major issue for women. In modern India, women continue to face social challenges and are often victims of abuse and violent crimes, harassment by uploading offensive photograph taken by hidden cameras etc. According to a global poll conducted by Thomson Reuters, India is the 4th dangerous country in the world for women, and the worst country for women among the G20 countries. Women are not as physically fit as men, in an emergency situation a helping hand would be assistance for them.

The purpose of our project is to provide safety to the women's in dangerous zone. This project presents an analysis review on the principal need of intelligence security system with technology requirement and challenges to build the system. Thus, with such system we can make women more secure and make the world a better place. In this project we are providing facility to secure the women's by providing fingerprint sense GSM and GPS module and a mini Camera to take pictures at the time when the women feel insecure.

As the woman feels insecure at that time she can press the fingerprint sensor, this will activate the GPS, GSM and the camera. GPS will calculate the latitude and longitude coordinates of that area. As in the modern world most of us have android mobile phones, we will make use of GSM which is inbuilt in an android mobile phone to get the coordinates. GSM module will send SMS which contains the latitude and longitude coordinates to numbers such as victim's family, friends, police or neighbor's which are already stored in microcontrollers memory. Then the victim should make sure that she senses her finger at least once in a minute. If she fails to do so then the Microcontroller will understand that the

victim is under attack and will alert the police and the family members by making calls. We will make use of IFTTT for sending SMS and making calls. The IFTTT makes use of applets which will automatically works whenever the IF condition is triggered. The camera will start taking pictures as the micro-controller is activated. These small things can ensure that the women are safer than she was before. Thus, we can provide a safety for women using all these technologies

B. Aim and Objectives

1) To improve societal conditions for women by reducing high crime rates and general environment of danger for women by making use of technology. A positive change can be brought about in our society if women feel empowered against hooligans and anti-societal elements that indulge in reprehensible behavior such as harassment, stalking and molestation. We aim to foster a sense of safety among women by harnessing the capabilities of technology.

2) To improve response time for local authorities, by providing a simplified but effective emergency alerting and communication alternative to existing channels of notifying the authorities for help, thus ensuring swifter and immediate response by the authorities.

3) To implement a practical system using Internet-of-Things (IoT) that ensures timely reporting of crimes against women such as harassment, stalking, molestation etc. that otherwise go unreported.

4) To understand and employ real world applications of concepts under Internet-of-Things (IoT) and make use of remote data accessing using cloud computing and real-time

II. LITERATURE SURVEY

A Safety Device for Women's Security Using GSM/GPS by Abhijeet Paradkar [1] proposes wireless key GSM and GPS module with controller. As the women feels insecure at that time, she can press the wireless key then the GPS and GSM modules are activated. GPS will calculate the latitude and longitude coordinates of that area. GSM module will send SMS which contains the latitude and longitude coordinates to the numbers such as family, friends, police station and neighbors which are already stored in microcontrollers memory. Also, GSM module will make call to these numbers.

Emergency Alert for women's safety with location tracking by Prof. Kiran Mensinkai [2] proposes ATmega328 with GPS and GSM modems. The system can be interconnected with the alarm system and alert the neighbors. The detection and messaging system are composed of a GPS receiver, Microcontroller and a GSM Modem. GPS Receiver gets the location information from satellites in the form of latitude and longitude. The Microcontroller processes this information and this processed information is sent to the user using GSM modem. A GSM modem is interfaced to the MCU. The GSM modem sends an SMS to the predefined mobile number. When a woman is in danger and in need of self-defense then she can press the switch which is allotted to her. By pressing the switch, the entire system will be activated then immediately a SMS will be sent to concern person with location using GSM and GPS.

All in one Intelligent Safety System for Women Security [3] proposes system can be implemented as an android app application or using Arduino based board. It uses many modules such as database module, SOS keypress module, voice recognition module, GPS module, GSM module, Fake Call tool module, Audio and Video module to achieve many function like to view location in Google map, alert message with location, audio and video recording, speaker ON for auto receiving call, fake call ringtone with hand up option, complaints register on 100, generate electric shock for self-defense and screaming alarm siren. The proposed system provides all required functionality and there is no need to buy and install different apps that possess different functionality. Hence the cost gets minimized as well as the memory requirement by the system is less compared to having many apps.

Ashwini P Thaware's An Intelligent Safety System for Individual's Security [4] propose an android application which activates the vibrate sensor when the opens the application. Then whenever the victim touches the screen of the phone the GPS and GSM module of the phone gets active and send the latitude and longitude coordinates to the application. This application precedes these values to the registered numbers provided by the victim in the database. This ensures the safety of women.

III. DEVICE DESIGN

A. Selection of Components

The components used for the design have been chosen after mindful consideration and study. Components are chosen for carrying out the work by keeping the following reasons in mind:

1) Raspberry Pi 3B +: The Raspberry Pi is a series of credit card-sized single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote the teaching of basic computer science in schools and developing countries. Raspberry Pi is a major component of our project, acting as the core of the device. For the purpose of this project we are using Raspberry Pi 3 B +. The characteristics that make it appropriate for our project are -

- Broadcom BCM2837B0, Cortex-A53 (ARMv8) 64-bit SoC @ 1.4GHz
- 2.4GHz and 5GHz IEEE 802.11.b/g/n/ac wireless LAN, Bluetooth 4.2, BLE
- Gigabit Ethernet over USB 2.0 (maximum throughput 300 Mbps)
- Extended 40-pin GPIO header
- CSI camera port for connecting a Raspberry Pi camera
- DSI display port for connecting a Raspberry Pi touchscreen display
- 4-pole stereo output and composite video port
- Micro SD port for loading your operating system and storing data
- 5V/2.5A DC power input

2) Fingerprint Sensor R307: The R307 module ensures that we not only have a triggering button for our project but also a mechanism to ensure user authentication to ensure only the woman in need can activate the system. Raspberry Pi has 2 pins that work with 3.3V. A USB UART converter is hence frequently needed to make the sensor work with the Pi. For a typical UART based Fingerprint sensor module –

Pin Nmuber	Name	Type	Function Description
1	Vtouch	In	Touch sensor power input(color: blue)
2	Sout	Out	Touch sensor output(color: yellow)
3	Vin	In	Power input(color: red)
4	TD	in	Data output. TTL logical level (color: green)
5	RD	out	Data input. TTL logical level (color: white)
6	GND	—	Signal ground. Connected to power ground

Fig 1. Properties of R307 Module

3)Blynk App and servers: Blynk is a Platform with iOS and Android apps to control Arduino, Raspberry Pi etc. over the Internet. It's a digital dashboard where you can build a graphic interface for your project by simply dragging and dropping widgets. Blynk is not tied to some specific board or shield. Instead, it's supporting hardware of your choice, whether your Arduino or Raspberry Pi is linked to the Internet over Wi-Fi, Ethernet or a new ESP8266 chip. The open-source Blynk server forwards information between the Blynk mobile application and Raspberry Pi, thus enabling real-time tracking of the device's location using the Blynk app.

4)IFTTT Maker Channel: If This Then That, also known as IFTTT, is a free web-based service to create chains of simple conditional statements, called applets. An applet is triggered by changes that occur within other web services such as Gmail, Facebook, Telegram, Instagram, or Pinterest. Services (formerly known as channels) are the basic building blocks of IFTTT. Each service has a particular set of triggers and actions. Triggers are the "this" part of an applet. They are the items that trigger the action. Actions are the "that" part of an applet. They are the output that results from the input of the trigger. Applets (formerly known as recipes) are the predicates made from Triggers and Actions. Ingredients are basic data available from a trigger—from the email trigger, for example; subject, body, attachment, received date, and sender's address.

5) Raspbian Operating System: The Raspberry Pi used in this project runs on Raspbian Operating System. Raspbian is a Debian-based computer operating system for Raspberry Pi, developed by a small team of developers. It is not affiliated with the Raspberry Pi Foundation, but the foundation provides a Raspbian image which is listed as an officially supported operating system. Raspbian is based on Linux operating system. The one who wants to operate Raspbian must have knowledge of Linux operating system.

6) Raspberry Pi Camera: The picam has a resolution of 5 MP, with Camera Serial Interface (CSI)as its Interface Type. Image dimensions therein are 25x23x8 (LxWxH) mm. It supports Video Formats in 1080p @ 30fps, 720p @ 60fps and 640x480p 60/90. It is fully compatible with Raspberry Pi 3 Model B

B. Working of the Device

We propose using a Raspberry pi-3 B+ for hardware as the device at the core of the system. The Pi will be powered using a portable battery to ensure mobility. A fingerprint scanner attached will act as the triggering button for the system. The scanner serves the dual purpose of a trigger button as well as ensuring unique user identification. During the first run, the scanner will be used to read and store inputs of the scans of the user's fingerprint in various positions. This ensures that the user can initiate the tracking mechanism by having her fingerprint read in any possible position or orientation, as she may not have the opportunity to have a complete and perfect scan done due to circumstances. Hence, partial or incomplete scans will also be read and stored.

In circumstances where the woman feels threatened, she can switch on the device with the push of a pop-button. To initiate the location tracking mechanism, she must scan her print once. Since, multiple orientations and positions the finger can be scanned in have been stored, any position she scans her finger in will be a valid input to run the tracking script programmed into the device. Once she has scanned her finger, she must repeat the process after an allotted time (preferably 1 minute or less). Failure to scan the print again is taken as an indication that the woman is in danger, triggering the failsafe. Livestreaming of the users whereabouts will also be initiated to give visual clues and evidence to the authorities.

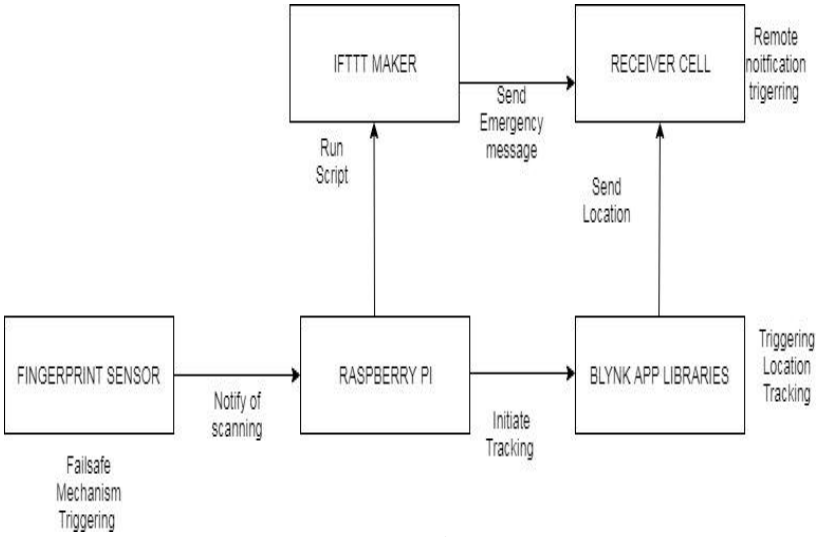


Fig 2. Block Diagram of device working

IV. IMPLEMENTATION METHODOLOGY

A. *Activating the system*

When the user feels unsafe, she activates the device and scans her fingerprint. The mechanism is this initiated and the location of the pi is tracked. The user triggers the failsafe mechanism by not scanning her print again after the allotted time, thus sending her current location and an emergency message to the contacts and authorities. First scan initiates the mechanism, thereafter the user must scan her prints after determined time to not trigger failsafe. If she fails to do so, the generated message will be sent by IFTTT maker channel, and current location will be sent from the Blynk web server to the app on receiver side.

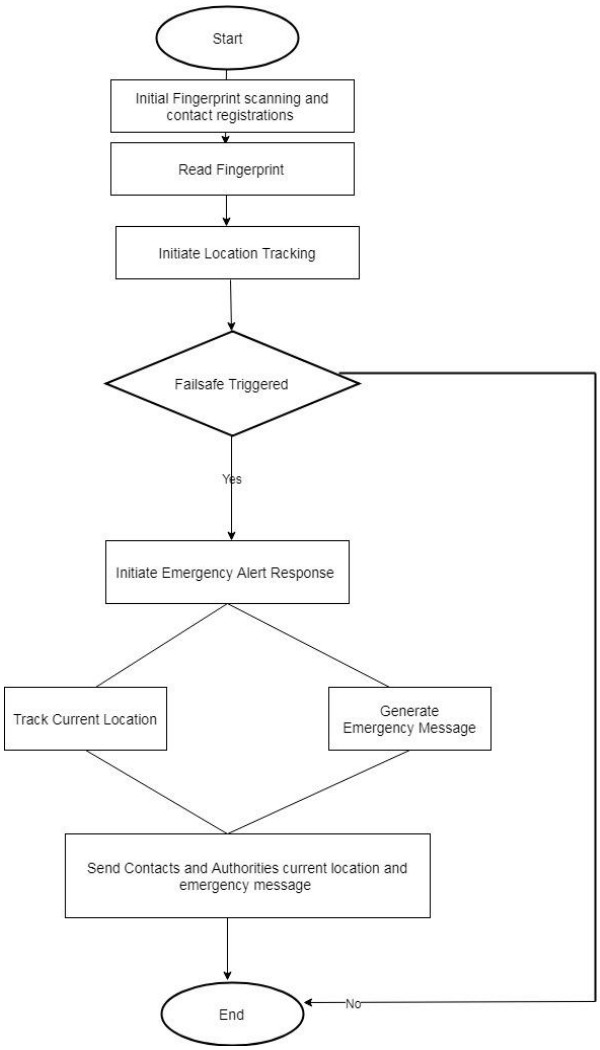


Fig 3. Flowchart of the working of the system

B. *Software Implementation for Location tracking*

Once the print is read, the pi will run a Python script for location tracking. Now, the pi is being tracked, and its real-time location updated in the cloud server we are using (for the purpose of this project, we're relying on Blynk app). Blynk will track and store the location of the device and thus the user is being tracked in real time. The open-source Blynk server forwards information between the Blynk mobile application and Raspberry Pi, thus enabling real-time tracking of the device's location using the Blynk app. Current coordinates of the user are sent via her phone to the pi, with Blynk app running on user phones and the script to receive the coordinates running when the first print is scanned. This live location will be sent to the user's registered contacts who can monitor her movements continuously. If she fails to scan her print again after allotted time the last know location is immediately sent to the authorities along with the generated emergency message.

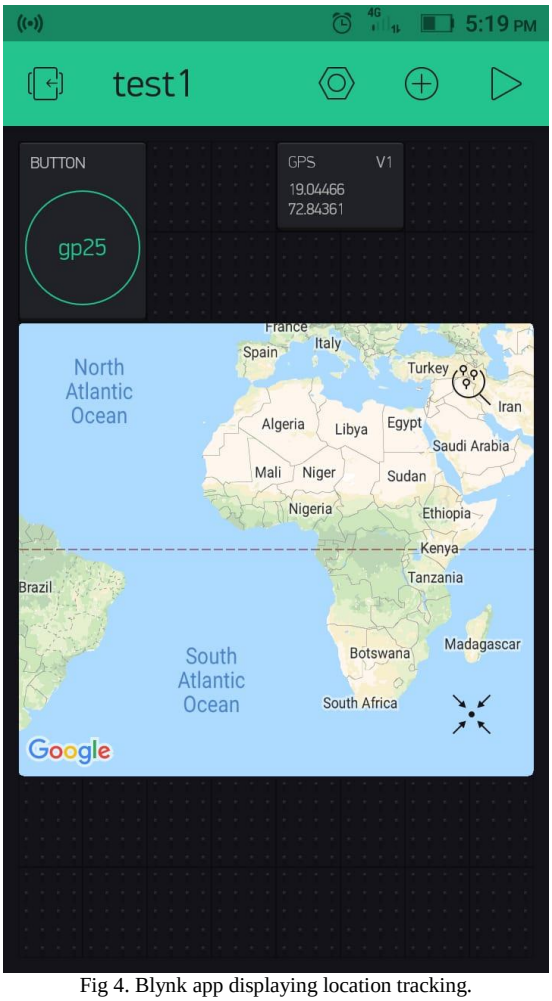


Fig 4. Blynk app displaying location tracking.

C. Sending emergency message using IFTTT Maker channel services

The failsafe mechanism is the generation and transmission of the emergency alert message from the user to select contacts and the authorities (contact info of relevant authorities e.g. Women's Cell of the Mumbai Police and Railway authorities will be preprogrammed). This failsafe is triggered when the user does not have her print scanned after allotted time. We have used IFTTT to create chains of applets that will execute successively to send an emergency SMS to the selected contacts and authorities if the woman is in danger. Three applets were created and daisy chained such that they would run consecutively, actions of one triggering the other, the end result of which would be the contact receiving an emergency SMS alerting them that user was in danger –

1) If [Webhook] then [Email] - The first applet had a webhook service from the Maker channel as its triggering event i.e. 'this' action. The webhook is an HTTP callback i.e. a post action that would occur when an 'event' occurred, thus acting as an event notification. The 'Event' is the running of a simple python script for sending web requests We then write a python code to send an Email. The action taking place subsequently i.e. 'that' action will be sending of an Email to the linked Email account i.e. the project account.

2) Forward Mail applet - the Email being received is from the 'action' account of IFTTT. An Email can also act as a trigger if it's being sent to the IFTTT - to their 'trigger' account (respective mail IDs being action@ifttt.com and trigger.receive@ifttt.com). An applet was created that would immediately forward all mail received from the action account back to
the receive account, thus any mail being sent as the result of an action itself would act as a trigger for the next applet, both mails belonging to IFTTT.

3) If [Email] then [SMS] - The mail that had originated as an action is now itself a trigger. 'This' event is the mail being sent to IFTTT, 'that' action is an SMS with predetermined content e.g. "I am in Danger/I need help" being sent to selected contact.

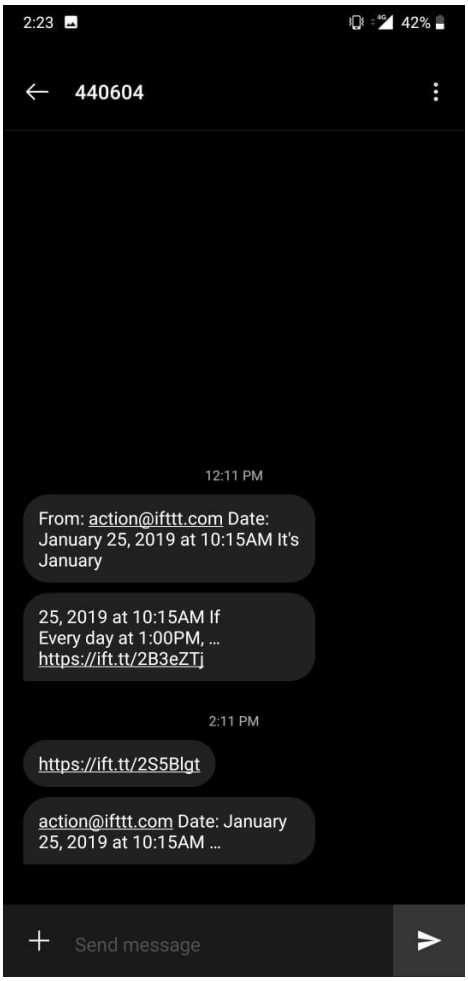


Fig 5. SMS received instantly after failsafe mechanism is triggered.

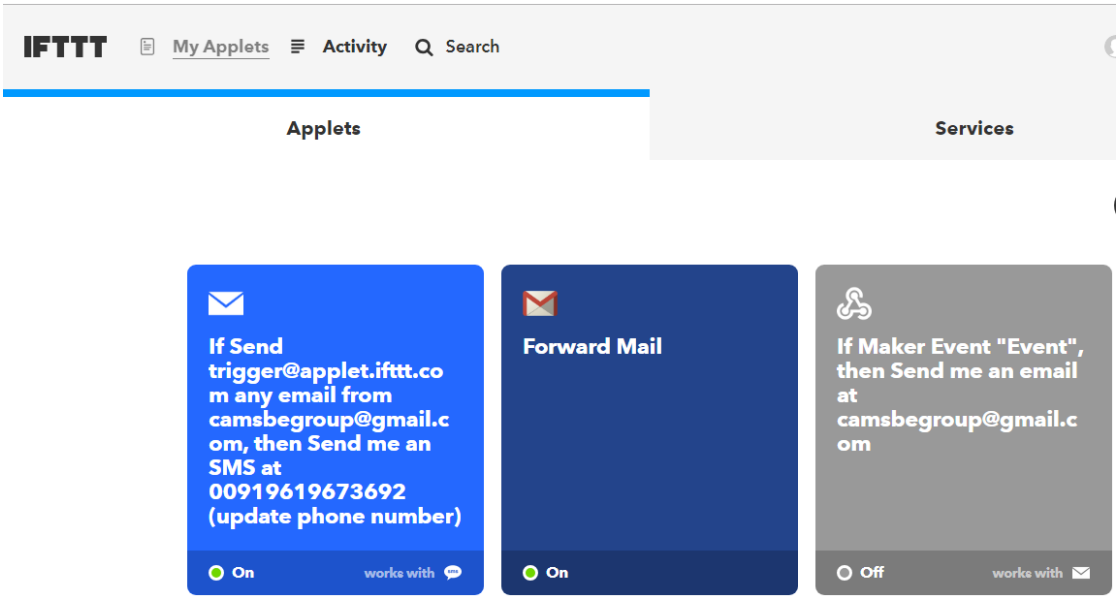


Fig 5. IFTTT Applet daisy-chaining enabling sending the emergency message.

D. Livestreaming from the user's current location

Visual referencing and evidence of the user's surroundings can be very useful in determining not only where the woman is but what problems she might be suffering currently and how she can be helped.

Real-time streaming from the user can be very beneficial in such a scenario. A 5 Mp Raspberry Pi 3 B Picam has been attached to the device enabling live video capture. The python script enabling real-time video streaming will be triggered once the user fails to scan her finger after allotted time period. For the purpose of the project, one can access the video streaming through any device that has a browser and is connected to the same network as the Pi. During fully functional scaling, a public server will be set up thus enabling streaming to authorized contacts as well as authorities.

V. Conclusion

The proposed system reduces the risk of failure in a situation of emergency. It also helps in giving the live location of the victim to the registered contacts and the police. So that immediate action would be taken over the arised situation. Our main motive to tackle the social issue of women's safety using technological innovation devised. An effective way to tackle the social issue of women's safety using technological innovation can be devised, as shown through this project. This project thus addresses a major fault in our law and order apparatus, by making efficient use of IoT. Further applications of IoT can address societal issues and bring about improvements in our daily life.

Limitations and Future Scope:

The device hinges on a number of factors that might be considered it's drawback in terms of full scaling. It depends on availability of Wi-Fi connection for the woman user as well as the assumption that her registered contacts will have functional internet connection at the time. Thus the device is majorly restricted to urban centres for now. However with rise of Internet connectivity across the nation this might not be a problem in the foreseeable future.

Future scope:

1) Children's safety: In addition to improving the conditions in terms of women's safety in India, this project can also be used for parents to detect their children's location. When children are out on a picnic or some water park and if they get lost or kidnapped, they can use this same mechanism to prevent crime from happening.

2) Banking safe: In banks, this project will help the manager and the staffs to do an emergency call to the police when some robbery takes place.

3) This project can be used by common man in day to day life whenever he witnesses an occurrence of a crime or anti-social behavior by individuals or gangs/mobs of people. Thus, people can act as active reporters of the situation and alert authorities instead of being passive eyewitnesses.

4) This project can be used in major institutions like railways whenever a bridge has collapsed or any real time death incident or major injuries to call ambulance and police.

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SHANE PARMAR (61)

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MOHIT RAO (76)

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CLEETUS RODRIGUES(77)

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ANTO FERNANDO (99)