

# ABSTRACT

Noise Pollution is unwanted sound, it needs to be controlled to make the workplace comfortable. Different people react differently to the same type of noise. A noise level up to 90 dB does not have any appreciable effect. Exposure in excess of 115 dB is not permitted with unprotected ears as it runs the risk of hearing impairment. According to the law, after 10:00 pm there should not be sound exceeds more than 110db. In many areas people never obey this law and create noise on the various occasions and festivals.

So to overcome this, Noise Monitoring System can be used which is based on IoT. The aim of this system is to monitor the sound level in a particular area where it is installed, so the cops/Pollution Control Board (PCB) get ease to take sudden action on it at that place. This system will use Raspberry Pi as a core component along with a camera and various sensors associated with it for this purpose. This system will monitor the db level of noise and send the data to the cops/PCB along with the location using GPS module.

# ACKNOWLEDGEMENT

The acknowledgement is nothing but a small token of gratitude towards the people who has helped along the way. We take the opportunity of submitting this dissertation report to express our deep regards towards the ones who offered their invaluable guidance in hour of need.

Prominent among then our project guide, **Ms. KIMAYA SHELAR** who helped us as well as guided us right from the selection of this project to successful completion of this project report. We also like to thank other staff members of **B.Sc-IT** department for their guidance and help during our project development. We are deeply thankful to our Principal, **Dr. ROHINI KELKAR** for her support and the interest she shown behind our project.

# DECLARATION

I hereby declare that the project entitled, **“NOISE POLLUTION MONITORING SYSTEM”** done at Vidyalankar School of Information Technology, has not been in any case duplicated to submit to any other universities for the award of any degree. To the best of my knowledge other than me, no one has submitted to any other universities.

The project is done in partial fulfillment of the requirements for the award of degree of **BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)** to be submitted as final semester project as part of a curriculum.

**Name and Signature of the Student**

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# **CHAPTER I**

## **INTRODUCTION**

## 1.1 BACKGROUND

Noise Pollution is unwanted sound. It needs to be controlled to make the workplace comfortable. Different people react differently to the same type of noise. A noise level up to 90 dB does not have any appreciable effect. Exposure in excess of 115 dB is not permitted with unprotected ears as it runs the risk of hearing impairment. According to the law, after 10:00 pm there should not be sound exceeds more than 110db. In many areas people never obey this law and create noise on the various occasions and festivals.

So, to overcome this, Noise Monitoring System can be used which is based on IOT. The aim of this system is to monitor the sound level in a particular area where it is installed, so the cops/Pollution Control Board (PCB) gets ease to take sudden action on it at that place. This system will use Raspberry Pi as a core component along with a camera and various sensors associated with it for this purpose. This system will monitor the db level of noise and send the data to the cops/PCB along with the location using GPS module.

## **1.2 OBJECTIVES**

- Knowing the meaning of environment and pollution.
- To know the meaning of noise pollution for system.
- To know how to measure noise.
- To monitor the noise level in surrounding.
- Review the problems that arise due to noise pollution.
- Review the impact and step should be taken to reduce the noise pollution.
- To take the strict actions on the people who don't obey the law causing noise pollution.

## **1.3 APPLICABILITY (FEASIBILITY STUDY)**

It is used to prevent the unnecessary noise pollution, which is increasing day by day in human kind. Through sound Decibels we can measure the sound and have the restrictions on it, with ease by using this system.

This system will help the citizens by taking control over the noise where hospitals and old age homes are situated. In a further time it can use everywhere on the streets to strictly fulfill the Indian Law.



## **CHAPTER II**

# **SURVEY OF TECHNOLOGIES**

# **TECHNICAL FEASIBILITY**

## **Programming Language Python:**

According to the latest Programming Community Index, Python is one of the top 10 most popular programming languages of 2017. You can use Python for developing desktop GUI applications, also websites and web applications. Python can be used in various fields even IoT where you can create simple syntax and work on your device. Python is a simple programming language which can be easily used by anyone and everyone. Choosing Python over other programming languages gives you ease and faster working on it. It is the official language to be used with Raspberry Pi. Python is a very easy language to master and easy to use and deploy, so you do not need to spend too much of your time in learning the formatting standards or compiling processes. Python can be used in embedded systems; it is portable, and Expandable.

## **Raspbian OS:**

Raspbian is the free operating system based on the Debian optimized for the Raspberry Pi hardware. OS is the set of most basic programs and the utilities that make your Raspberry Pi run. It is more than a pure OS: it comes with over 35,000 packages; precompiled software bundled in a nice format for easy installation on your Raspberry Pi. Raspbian uses PIXEL, Pi improved windows Environment Lightweight as its main desktop environment as of the latest update. It is composed of a modified LXDE environment and the Open box stacking window manager with a new theme.

## **CHAPTER III**

# **REQUIREMENTS AND ANALYSIS**

### **3.1 PROBLEM DEFINITION**

Noise Pollution is unwanted sound; it needs to be controlled to make the workplace comfortable. A noise level up to 90 dB does not have any appreciable effect. Exposure in excess of 115 dB is not permitted with unprotected ears 0as it runs the risk of hearing impairment. So, to overcome this, Noise Monitoring System can be used which is based on IoT.

## 3.2 REQUIREMENTS SPECIFICATION

### **Functional Requirement:**

The requirement specification provides complete information about our system called “Noise Pollution Monitoring System”.

- User should be able to power On/Off the System.
- System should do maximum computation on its own.
- System should be able to capture image/video of surrounding from the installed surveillance camera.
- System should be able to receive data from the sound sensor.
- System should be able to drive the GPS module.

### **Non-functional requirement:**

Noise Monitoring System has the following Non-Functional Requirements:

- **Availability** – System should be available for all the time.
- **Usability** – The data receive from the system should be consistent.
- **Reliability** – System will reliable for long time without any manual changes.
- **Performance** – System will be performing as per expected from the user with minimal errors generated.

### 3.3 PLANNING AND SCHEDULING

In order to complete our project, it was necessary for us to learn various technologies. Few technologies were familiar to us but for some of them we had to start learning from scratch. So we allocated time for each technology accordingly

Sr. No	Technology		Allocated time for weeks
1	Raspberry Pi	<ul style="list-style-type: none"><li>• Auto Format</li><li>• Fix Encoding &amp; Reload</li><li>• Board Selection &amp; Management</li><li>• Port Menu</li><li>• Programmer Functions</li><li>• Burn Boot loader</li></ul>	4 weeks

Table 1

## Waterfall Model:

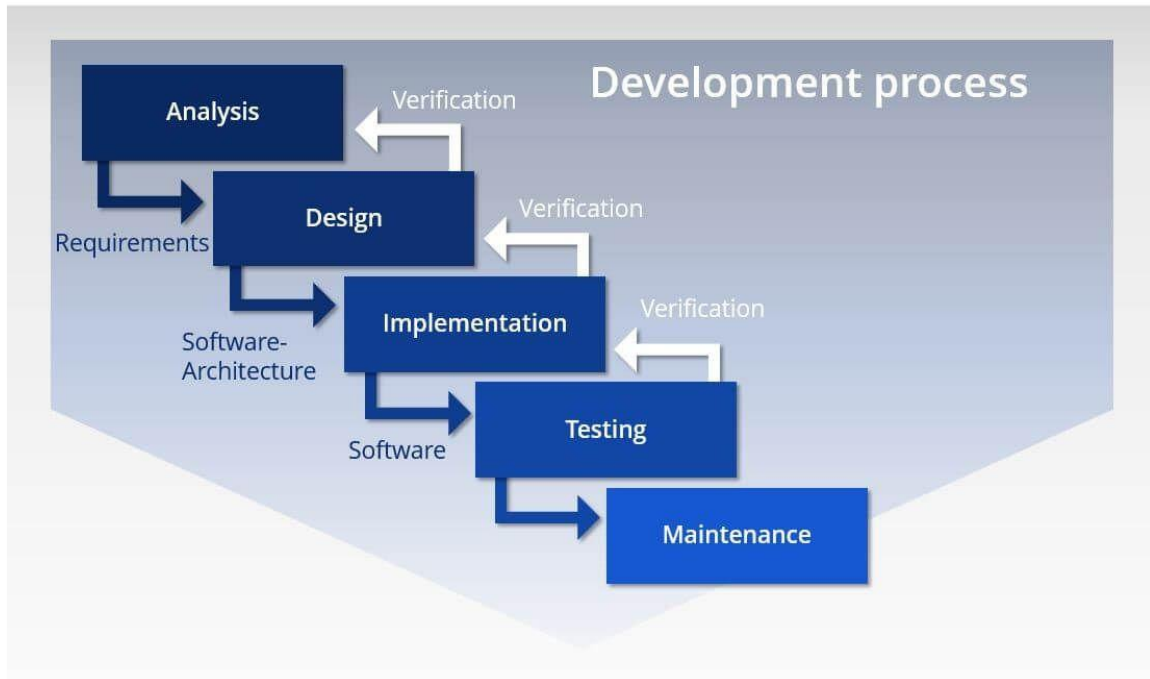


Figure 1

## Gantt chart:

Semester V														
	June		July				August			September			October	
Activities	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14
<b>Project Idea Finalization</b>														
<b>Requirements</b>														
Survey of data/ need (Literature Review)														
Feasibility and need validation														
Scope Freezing														
<b>Requirements Detailing</b>														
Use Case Diagrams														
<b>Design</b>														
Database Design/ Block Diagram (ER Diagram, Key Data Structures)														
Other UML Diagrams (Sequence, Activity, Flow Chart etc.)														
Hardware Design - [for embedded/ IoT projects]														
Evaluate Technology options														
<b>Prototype</b>														
Key Technical issue definition														
<b>Planning &amp; Review</b>														
Overall Project Plan														
Weekly Review/ Discussion with Guide														

Figure 2

## 3.4 SOFTWARE AND HARDWARE REQUIREMENTS

### SOFTWARE:

- **Python IDLE 3:**

Python is simple, easy to learn syntax efficient and provides readability and therefore reduces the cost of program maintenance. Developing python program requires less time compared to some of the other languages.

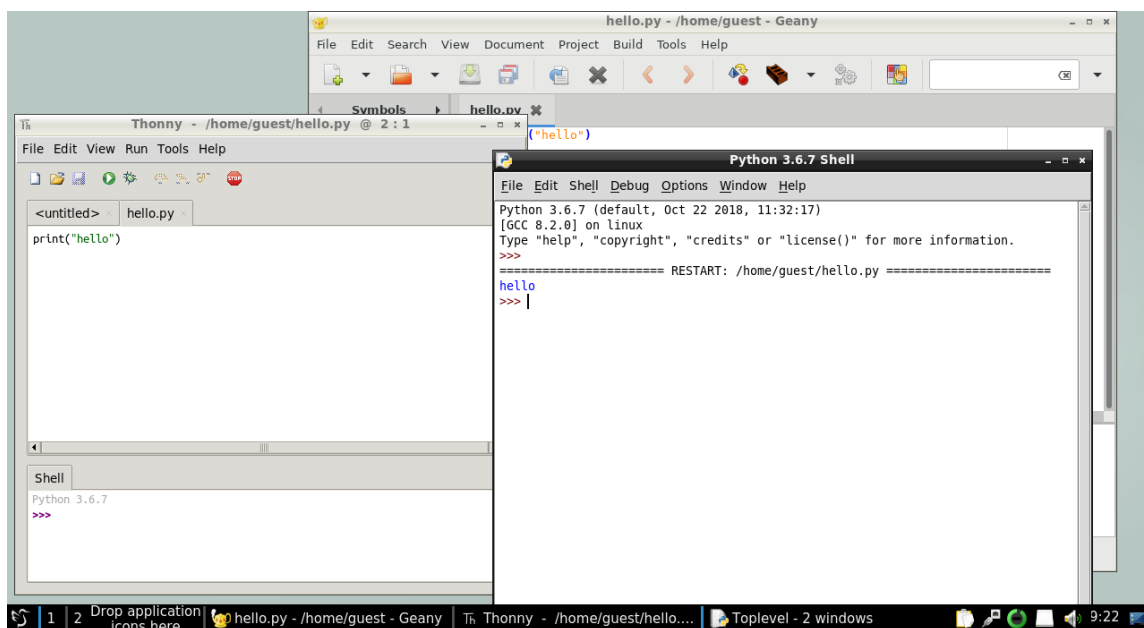


Figure 3

- **Operating System:**

Raspbian is the free operating system based on the Debian optimized for the Raspberry Pi hardware. OS is the set of most basic programs and the utilities that make your Raspberry Pi run.



## **HARDWARE:**

- **Raspberry Pi B Model 3 B+ :**

Hardware is the main heart of the project. A Raspberry Pi is a general-purpose computer, usually with a Linux operating system, and the ability to run multiple programs.



Figure 4

- **Male-Female Wires:**

These wires is nothing but simply wires that have connector pins at each end, allowing them to be used to connect two points to each other without soldering.



Figure 5

- **GPS Module:**

GPS receiver module gives output in standard NMEA string format, which contains different parameters separated by commas like longitude, latitude, altitude, time etc.



Figure 6

- **Sound Sensor:**

Sound Sensor can detect the sound intensity of the environment. The main component of the module is a simple microphone, which is based on the LM386 amplifier and an electrets microphone.

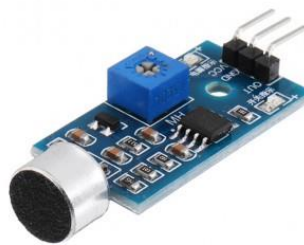


Figure 7

- **Camera:**

The sensor itself has a native resolution of 5MP and has a fixed focus lens onboard. The camera is capable to shoot images and video.



Figure 8

## **3.5 PRELIMINARY PRODUCT DESCRIPTION**

### **Raspberry Pi B Model 3 B+:**

Hardware is the main heart of the project. A Raspberry Pi is a general-purpose computer, usually with a Linux operating system, and the ability to run multiple programs.

### **Sound Sensor:**

Sound Sensor can detect the sound intensity of the environment. The main component of the module is a simple microphone, which is based on the LM386 amplifier and an electrets microphone.

### **GPS Module:**

GPS receiver module gives output in standard NMEA string format, which contains different parameters separated by commas like longitude, latitude, altitude, time etc.

# **CHAPTER IV**

# **SYSTEM DESIGN**

## 4.1 DIAGRAMS

### Block Diagram:

A block diagram is a visual representation of a system that uses simple, labeled blocks that represent single or multiple items, entities or concepts, connected by lines to show relationships between them.

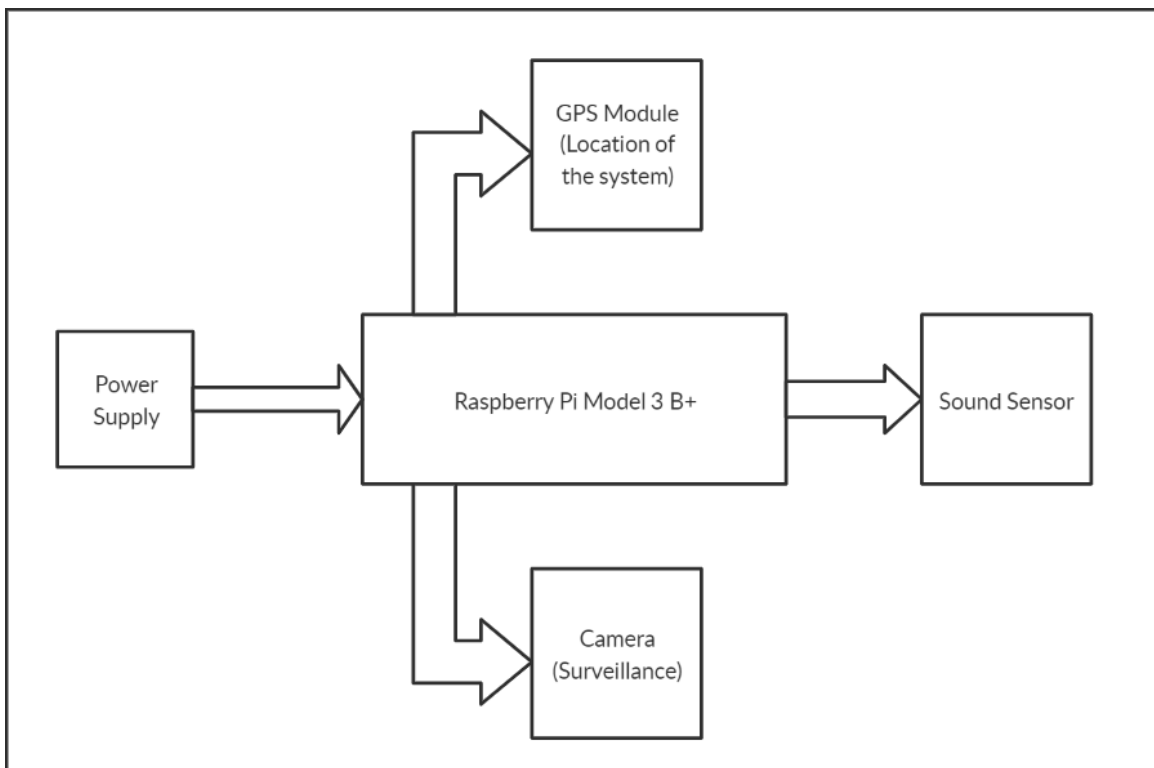


Figure 9

## Use Case Diagram:

Use case diagrams are usually referred to as behavior diagrams used to describe a set of actions (use cases) that some system or systems (subject) should or can perform in collaboration with one or more external users of the system (actors). Each use case should provide some observable and valuable result to the actors or other stakeholders of the system.

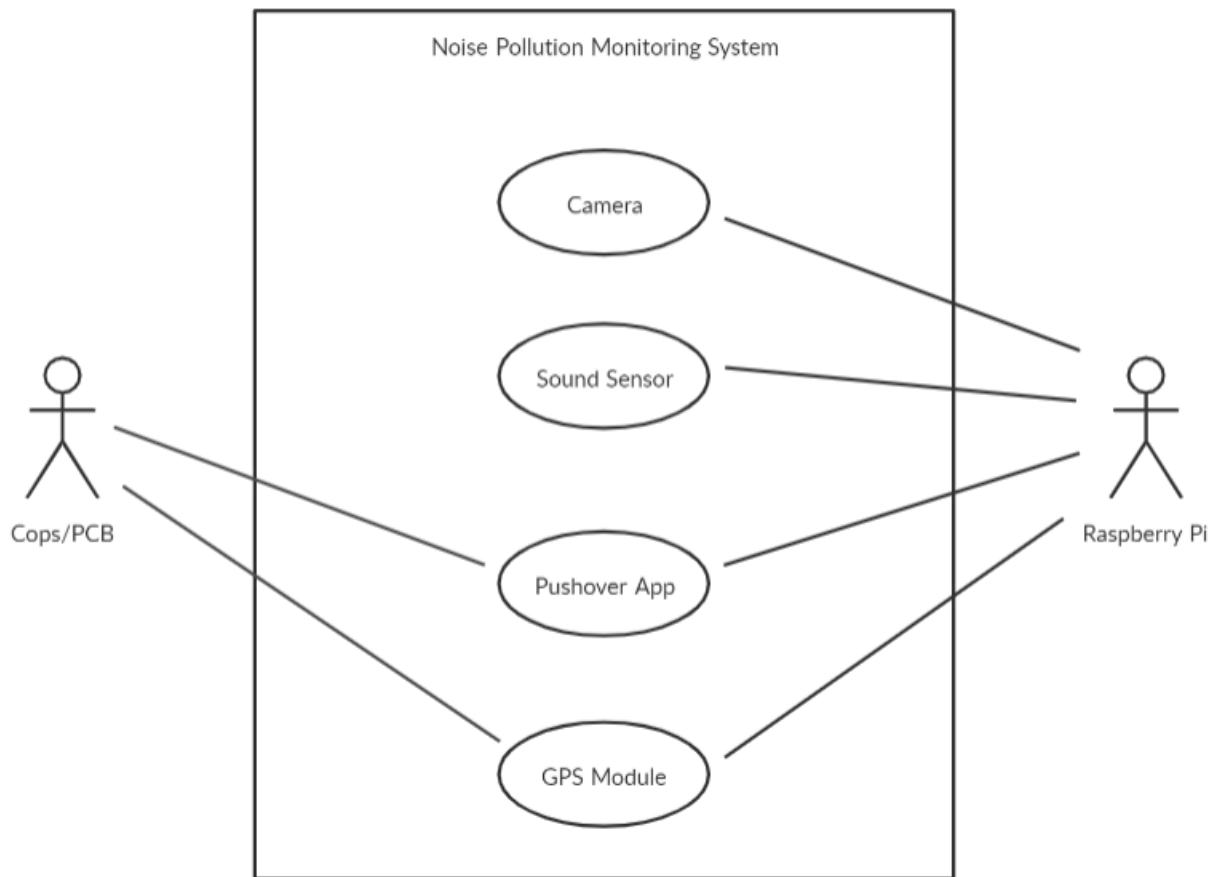
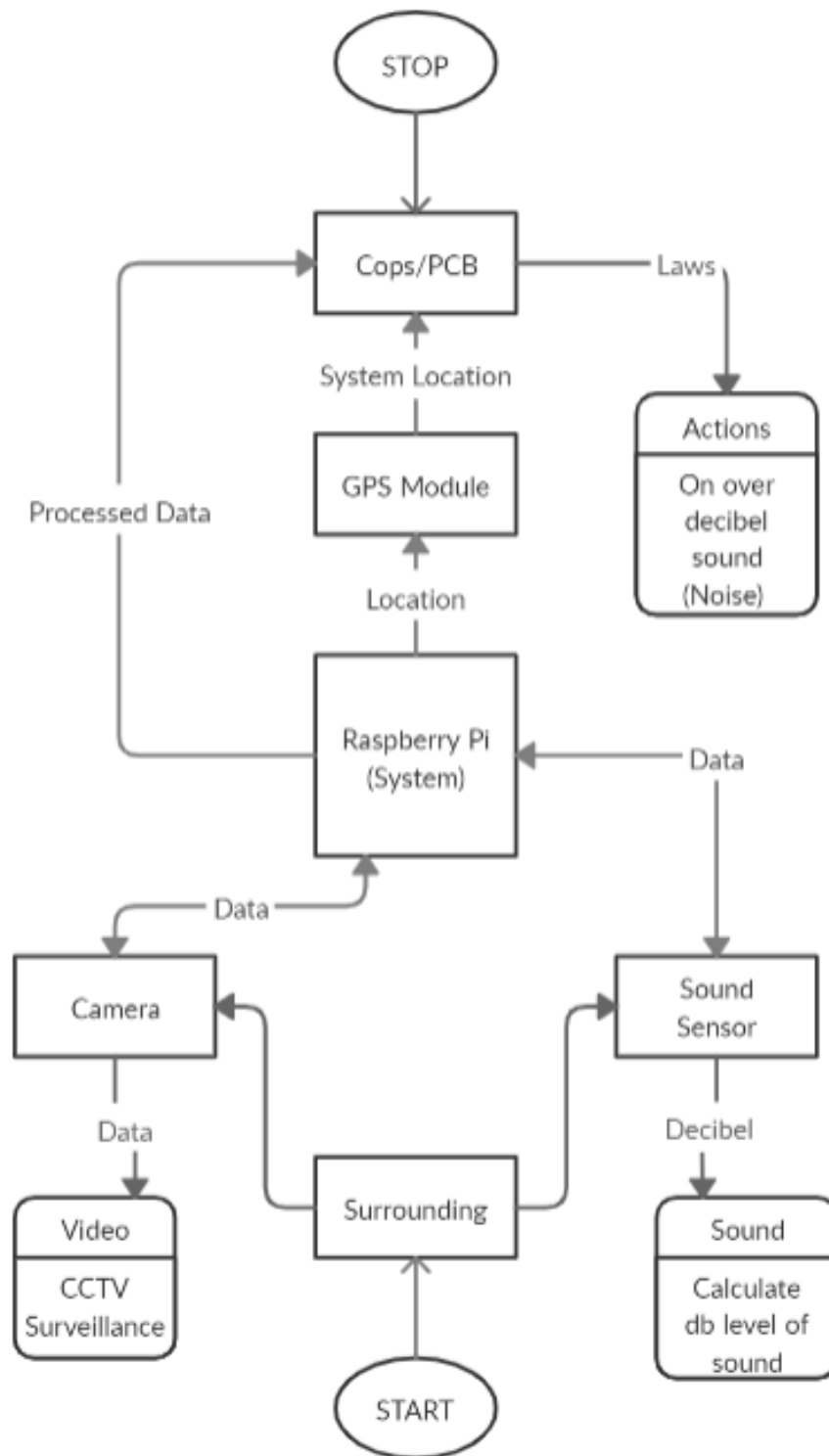


Figure 10

### Data Flow Diagram:



**Figure 11**



## Circuit Diagram:

