**SYNOPSIS**

* **Title:**

SMART BLIND STICK

* **Statement:**

The project will basically detect the obstacles in front of them, water also &insufficient light. It has feature of GPS tracking which is used for the persons caretaker or parents to track location.

* **Why this project?**

In our country there are many blind person and they typically use the white colour stick to navigate and detect obstacle with the help of physical touch to that obstacle. But this device is useful for them to detect the obstacle with the specific range and the sensors which are used in this system i.e ultrasonic sensors, soil moisture sensor, light dependent resistor sensor will help to detect if water is ahead and insufficient light and main feature is GPS tracking which is used to track the location of that visually impaired person and from the safety point of view also .so this will be the modern type of stick which is more useful or more advanced than the earlier one.

* **Objective or scope of object:**

Smart blind stick is specially designed to detect obstacles whether its solid or water in front of visually impaired person which may help to navigate freely like sighted person and from the safety point of view of GPS tracking used.

Scope:

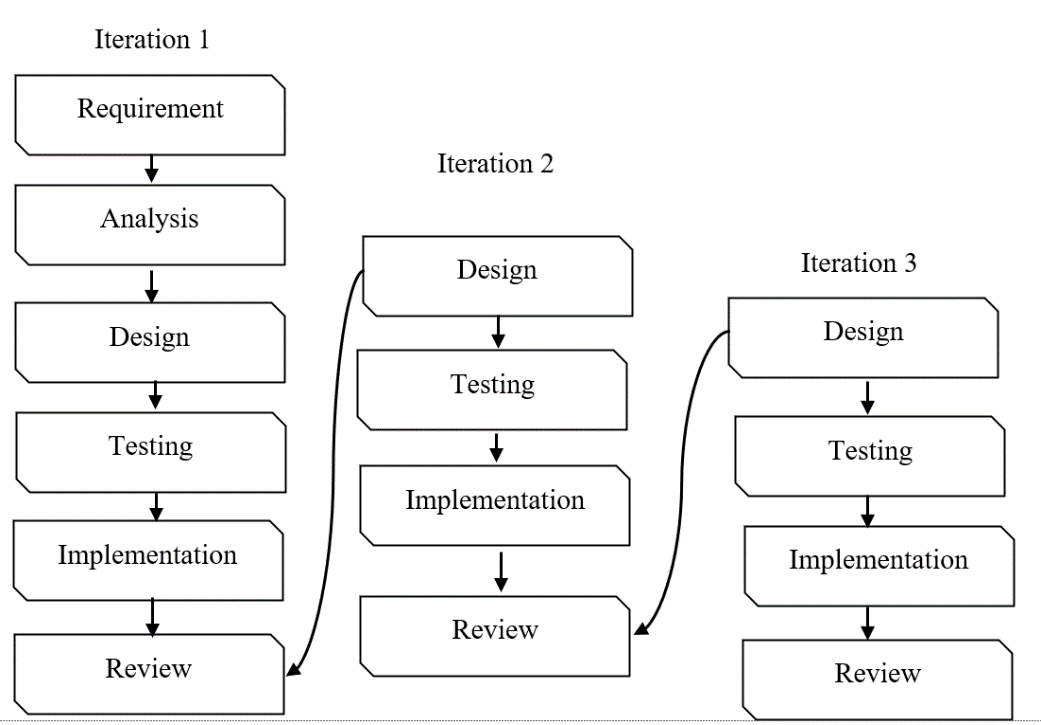
From this project visually impaired person can walk freely like sighted person. And the persons parents or caretaker can track the location so they will also don’t have to worry about that person with the help of SMS to authenticated device.

* **Methodology for developing project:**

EDLC Model and SDLC Model

* **SDLC Model**

In this system I am going to use iterative model.



* **Proposed architecture of project:**

Standalone project

* **Requirements:**

1. Software requirements:

Operating system :Windows 7,8,10 or Mac OS, Arduino IDE for coding, Arduino software, Blynk app.

1. Hardware requirements:

Arduino uno, ultrasonic sensor, LDR, Soil moisture sensor, resistor, breadboard, GPS module, Node MCU Esp8266, power supply.

* **Platform required:**

Arduino IDE

* **Contribution of society:**

With this project the visually impaired person can walk with the confidence as sighted person and main feature is the GPS location through Blynk app.

* **Need:**

In our country the people who are visually impaired have the the blind stick which can detect obstacle by only physical touch, but this system which I am developing through sensors it can detect obstacle, water, & insufficient light and main feature is live location through Blynk app for the visually impaired persons parents or caretaker so that they can walk freely like sighted person .

* **Conceptualization/concept scope:**

From this project visually impaired person can walk freely like sighted person and person’s parents or caretaker can track the live location so they don’t have to worry about that person. It is all possible through sensors.

* **Targeted end user:**

Visually impaired person

* **Analysis:**

1. Functional requirements:
2. The system should detect the obstacles in front of them with the help of sensors
3. The system should track the live location of person with the help of Blynk app.
4. While tracking the location, systems wifi or network should be on.
5. While doing this things system should have the stable power supply.
6. Non functional requirements:
7. The system should be secured
8. It should be reliable and accurate also easy to use.
9. It should be easy to maintain.

* **Feasibility study :**

**2.1 Background:**

The previous blind stick which is in use is just a simple and foldable stick which can detect the obstacle by physical touch only and some modern blind sticks made from IOT can detect obstacle in front from sensor. The smart blind stick can detect obstacle from front other than that water , and insufficient light with the help of sensors and main feature is live GPS location to the person who is authentic (parents or caretaker).

**2.2 Objective:**

This system is specially designed to detect obstacles whether its solid, water in front of visually impaired person which may help to navigate freely like sighted person and from the safety concern there is GPS tracking is used.

**2.3 Purpose , scope, applicability:**

**2.3.1 Purpose:**

In our country the people who are visually impaired have the blind stick which can detect obstacle by only physical touch. But in this system there are sensors which can detect obstacle, water and insufficient light and main feature is the live location through GPS, people can view like sighted person through this system.

**2.3.2 Scope:**

From this project visually impaired person can walk freely like sighted person and persons parents or caretaker can track the live location so they don’t have to worry about that person .

**2.3.3 Applicability:**

By implementing this project the visually impaired person can walk freely like sighted person. The main use of this project is for the visually impaired person in our society.

1. **Arduino** : Arduino is the leading company on the iot market that produces electronic devices and software for them. They are having software products and represented by Arduino ide, Arduino cloud, iot cloud remote and coding is done in c.
2. **Flutter:** Another hardware product for iot solution is flutter a programmable processor core. It’s based on Arduino. It has complete kit , solar panel ,3D printed parts for device parts. For device dart language is used.
3. **Raspberry pi**: It’s formerly known as Raspbian .It’s official operating system for raspberry pi hardware and programming are done in python.
4. **Kinoma**: It’s open source software and hardware product for iot and embedded solutions. kinoma create, kinoma studio(IDE),kinoma connect(for android ios) are products.
5. **Node-red**: It’s a free programming tool based on node.js .It works primarily in linux environment but can be installed on android and windows.as well. You will need linux subsystem for windows.
6. **Eclipse Iot** :A wide range of open source project for iot development is gathered under eclipse umbrella. They include software development platforms framework ,tools and many more. It uses java language.

* **Technology I am going to use for this project is:** Arduino
* **Reason for selecting this technology:**

The Arduino software is easy to use for beginners and it runs on mac, windows, and linux. The main reason for selecting this technology is it’s inexpensive, cross platform support ,simple clear programming environment , open source and extensible hardware.

**REQUIREMENTS AND ANALYSIS**

4.1 **Problem definition:**

Smart blind stick is specially designed to detect obstacles whether it’s solid or water in front and also insufficient light which help visually impaired person to navigate freely like sighted person. And for the safety point of view of that person GPS tracking system is also used with the help of Blynk app.

**4.1.1** **Problem Description:**

This stick will help the blind person to walk freely like sighted person, as it detect obstacles, water, insufficient light with the help of sensors and main feature of it is that it can track the live location of person also.

**4.1.2 sub problems :**

1. obstacle detection
2. water detection
3. insufficient light detection
4. GPS tracking

1. Obstacle detection : In this with the help of ultrasonic sensor obstacle detection is done with the help of this we can detect the obstacle in front by 1 to 25 feet of range before.
2. Water detection: If the water is present in front of the person it will beep, for that soil moisture sensor is used.
3. Insufficient light detection: If there is absence of light particular room or on that specific road or lane also.It will beep so that person will not go in that area.It is done using light dependent resistor(LDR) sensor.
4. GPS tracking : For the safety point of view the feature of GPS tracking is there it can give the current location of that person to the authorized device with the help of Blynk app.

**4.2 Requirement specification:**

For my system I have used google forms to collect feedback from users and according to the responses I have added the functional , non-functional and system requirements for the system.

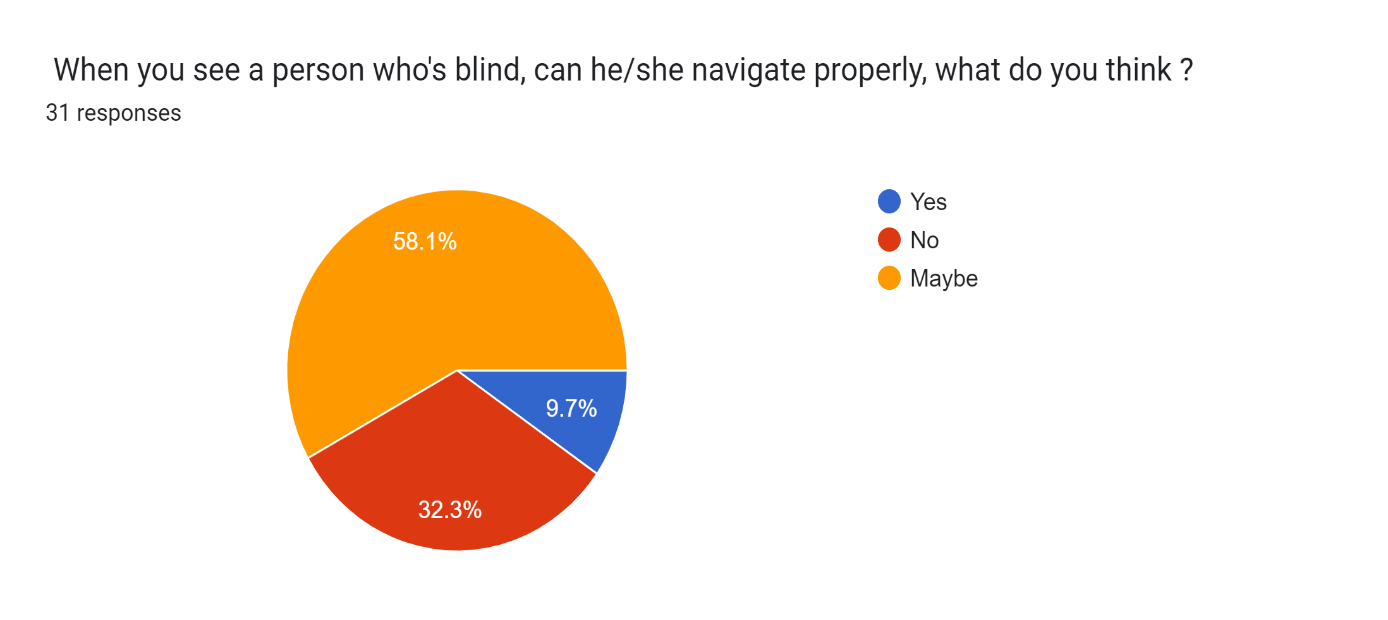
**4.2.1 Requirement Gathering:**

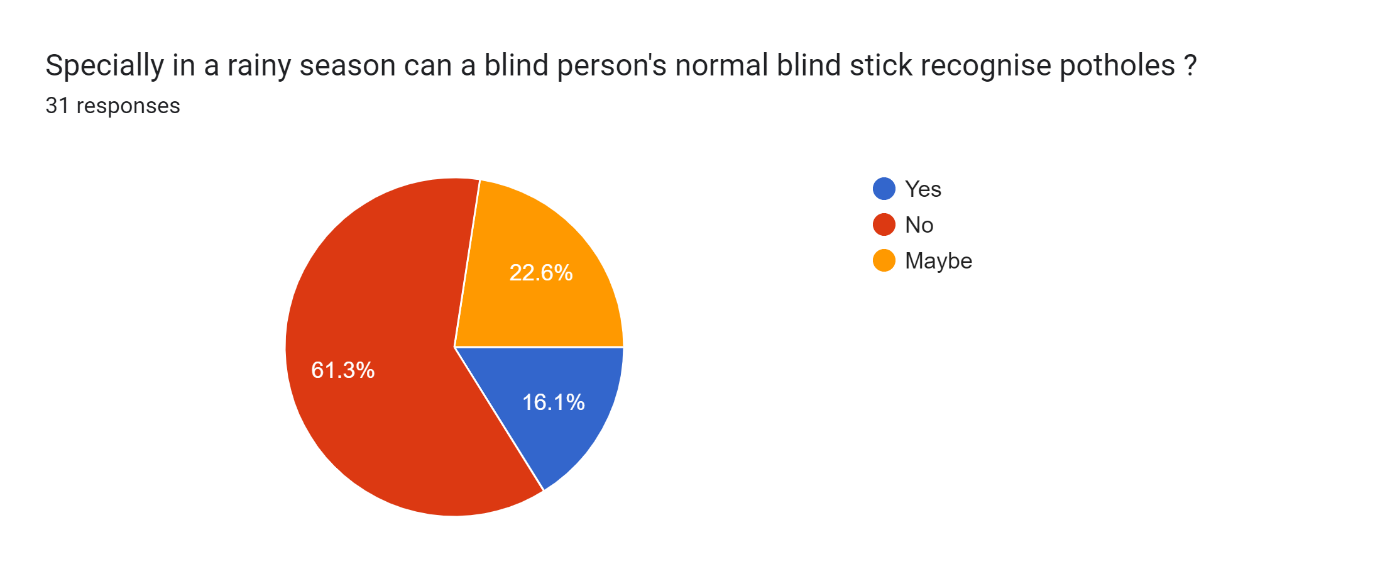
The link of the google form that I provided to the users is given below:

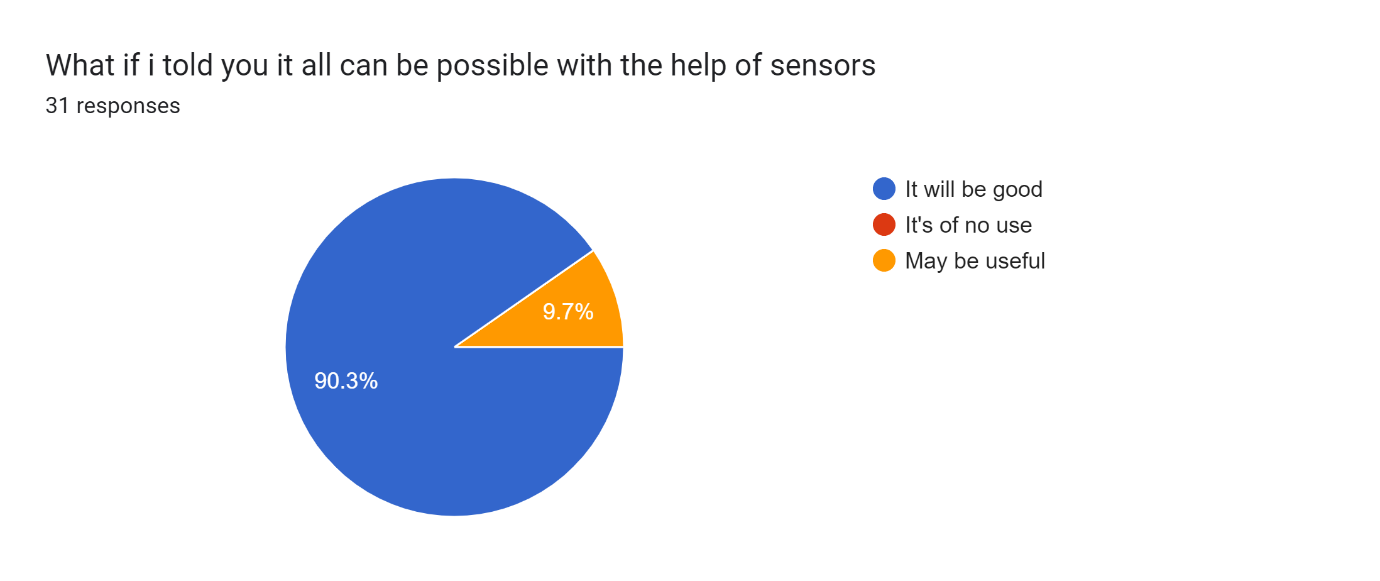
<https://docs.google.com/forms/d/1YxGAKoBTpvLbhDwQ49kYo5k1PchBtLSVXWYTSUfATIs/edit>

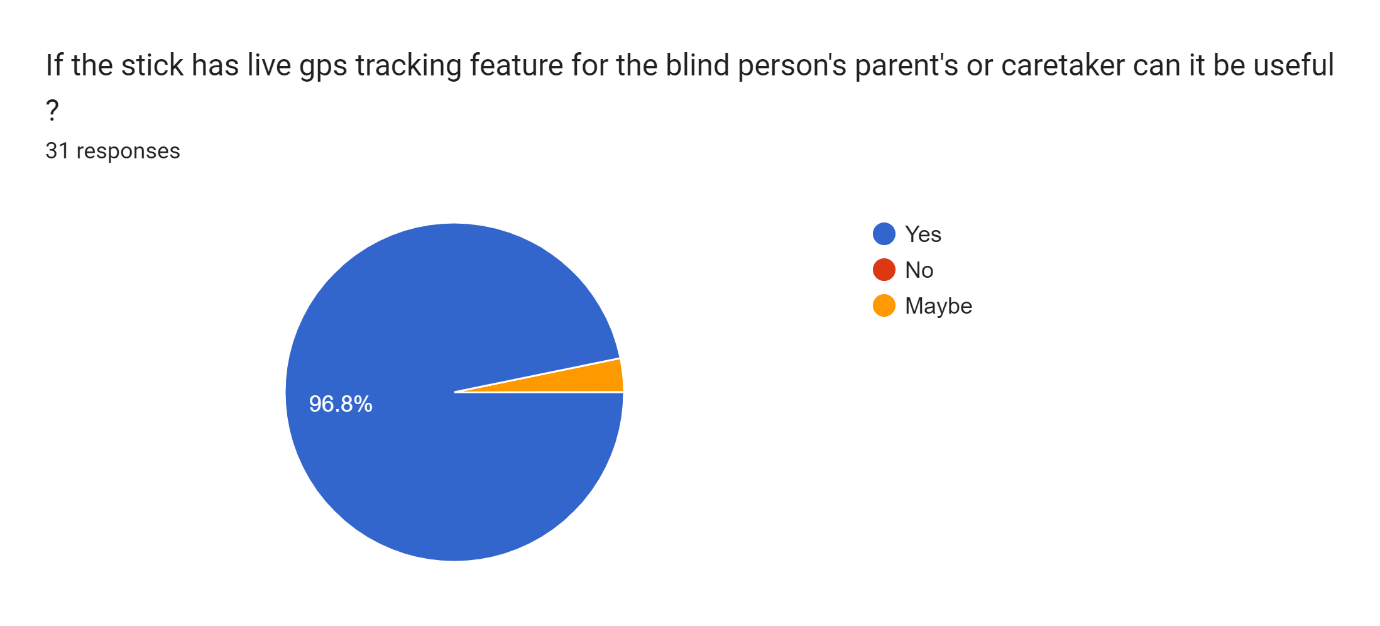
Based on the responses I got from the users, I may conclude that:

According to the response 58.1% people think that blind people may navigate properly. Almost 61.3% people think that blind people can’t recognize potholes during the rainy days.90.3% people think that it will be good if it is done with the help of sensors.96.8%people think that the live GPS tracking feature can be helpful.









**4.2.2 Requirement Analysis:**

**4.2.2.1 Functional Requirements:**

The system should detect the obstacles in front with the help of sensors. The system should track the live location of the person with the help of Blynk app. While tracking the location , systems wifi or network should be on.

While doing this things system should have power supply.

**4.2.2.2 Non Functional Requirements:**

The system should be secured. It should be reliable and accurate and easy to use. It should be easy to maintain. Sensors should detect the respected obstacle correctly in to the person.

**4.2.2.3** **System Requirement:**

* Obstacle detection:

**Input:** Any object which is physically present.

**Source**: sensors

**Output**: beep sound will be generated.

**Destination**: user will get alerted through beep sound.

**Action**: After detection user will get alerted.

**Pre-condition**: user must have to walk.

**Post-condition:** User should skip or go by another way.

* Water detection:

**Input:** water is present ahead.

**Source**: sensors

**Output**: beep sound will be generated.

**Destination**: user will get alerted through beep sound.

**Action**: After detection user will get alerted.

**Pre-condition**: user must have to walk.

**Post-condition:** User should skip or go by another way.

* Insufficient light detection :

**Input:** if insufficient light is there

**Source**: sensors

**Output**: beep sound will be generated.

**Destination**: user will get alerted through beep sound.

**Action**: After detection user will get alerted.

**Pre-condition**: -

**Post-condition:** User should skip or go by another way.

* GPS Tracking:

**Input:** From GPS mdoule.

**Source**: Blynk app

**Output**: show current location on Blynk app.

**Destination**: users caretaker or parent will get the current location of that person.

**Action**: parents get live location after of the person after tracking.

**Pre-condition**: Network connection should be on.

**Post-condition:** -

* Sound beep while detecting :

**Input:**sensors.

**Source**: obstacle detection.

**Output**: it will beep.

**Destination**: with the help of sensors obstacle detected.

**Action**: -

**Pre-condition**: Network connection and power supply should be on.

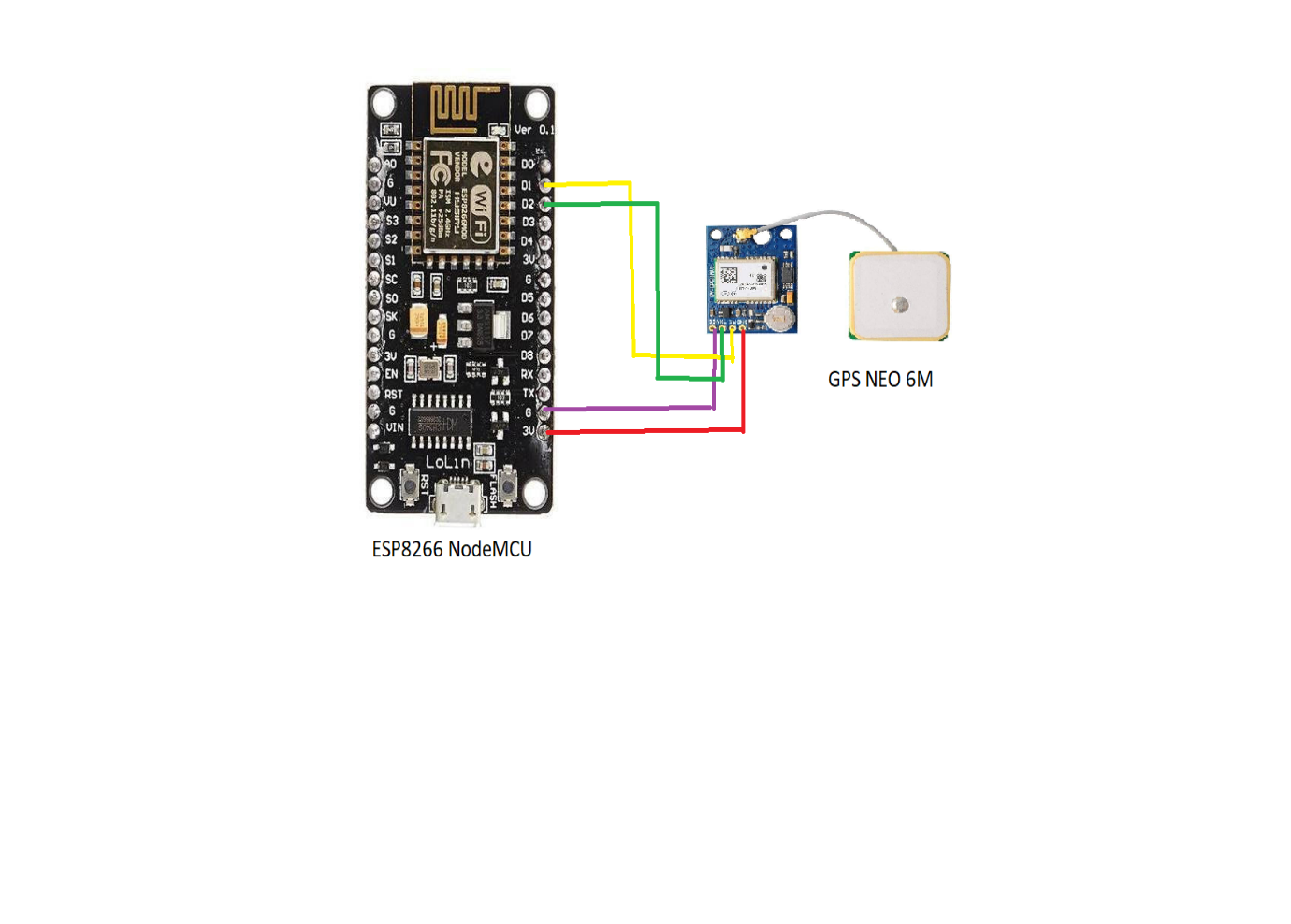
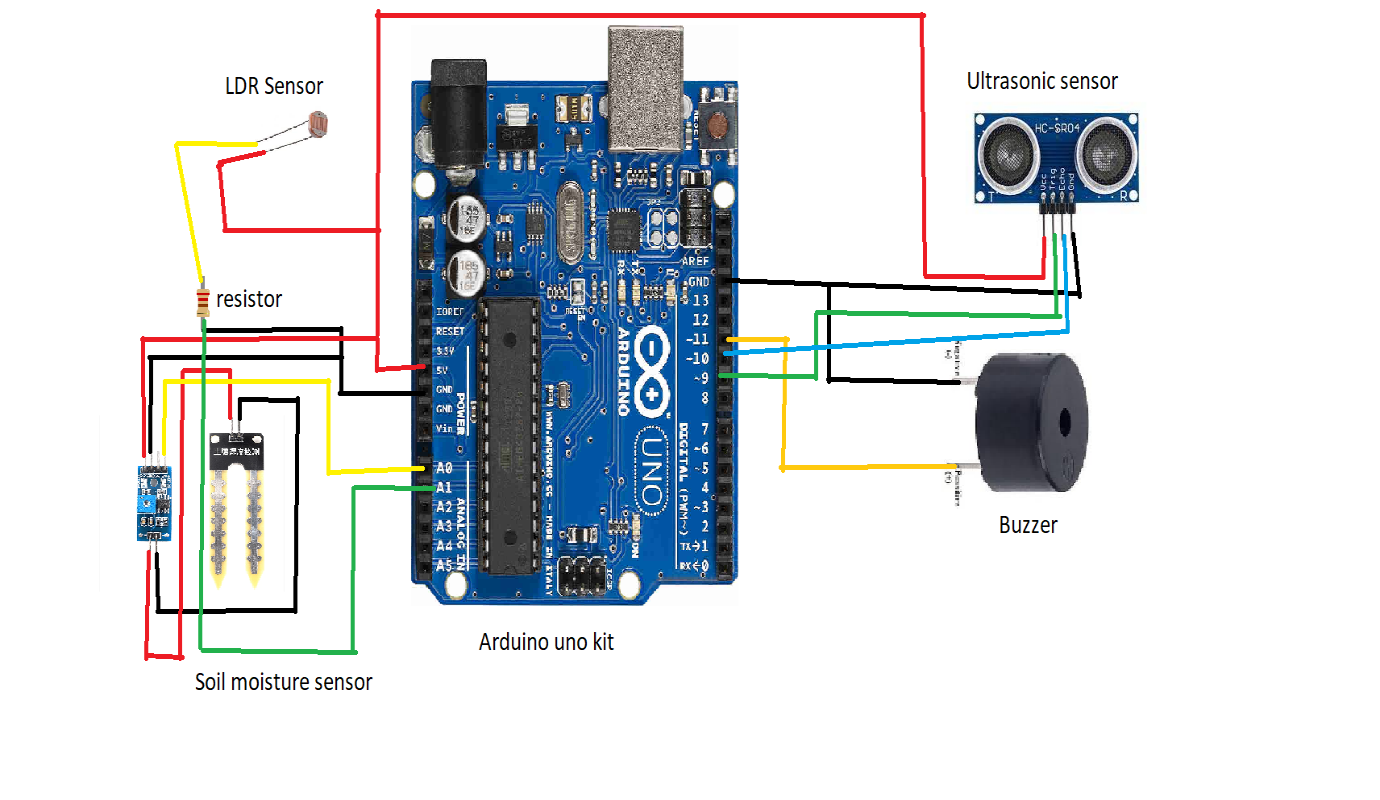
**Post-condition:** -

Planning and scheduling

* **Activity table:**

|  |  |  |
| --- | --- | --- |
| Task | Start date | End date |
| Synopsis | 01/06/22 | 20/06/22 |
| Introduction | 20/06/22 | 27/06/22 |
| Survey of Technologies | 20/06/22 | 27/06/22 |
| Problem Definition | 27/06/22 | 04/07/22 |
| Requirement and Analysis | 04/07/22 | 11/07/22 |
| System Design | 18/07/22 | 23/07/22 |
|  |  |  |
|  |  |  |
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|  |  |  |
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Circuit diagram:



Activity Diagram:

