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# IOT BASED SMART STICK FOR PATIENT

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**Abstrac*t*-** We've created a smart walking stick that helps patients with mobility issues stay safe and healthy. This stick uses sensors and GPS to track the patient's health and location in real-time. If the patient falls or needs help, the stick sends alerts to their caregivers or family members. Our goal is to help patients stay independent, get better care, and live healthier lives. This smart stick has some amazing features that help keep users safe and healthy. It's got a heart rate monitor that keeps track of the user's heartbeat, and a sensor that checks the temperature and humidity around them.

The GPS tracker lets caregivers know exactly where the user is, and they can check in on them using a special app. Plus, there's a tiny screen on the stick that shows a special code with the user's important medical and personal info, so they can get help quickly in an emergency.

This smart walking stick is a innovative for people who need help getting around. It sends alerts in real-time and makes sure users get help fast in an emergency. This stick is designed to be easy to use and really effective, giving people more freedom, safety, and access to healthcare. By combining the latest technology with assistive tools, we've created a modern solution for people who need constant support and monitoring.

**Keywords- Smart Stick, ECG Sensor, IOT.**

## I. INTRODUCTION

We've created a smart walking stick that helps patients stay safe and healthy. It tracks their health, location, and sends alerts to caregivers when needed. This stick is especially helpful for older adults and people with disabilities.

For patients with mobility issues, daily life can be a challenge, as every step, every move, and every task can become a troubling obstacle, but traditional walking sticks, while somewhat helpful, often lack the advanced features needed to provide real-time support and monitoring, leaving a significant gap in the care and support of these individuals.

To address this gap, we present the "Smart Stick", a ground breaking , innovative, IoT-based walking stick that is specifically integrating cutting-edge sensors, GPS, and wireless connectivity to provide real-time monitoring, fall detection, and alerts to caregivers or family members, thereby ensuring that patients receive the support and care they need, when they need it.

This intelligent assistive device aims to -driven approach enhances resource efficiency, reduces wastage, and improves overall crop yield.

stick that is specifically designed to enhance patient safety, independence, and overall well-being, by integrating cutting-edge sensors, GPS, and wireless connectivity to provide real-time monitoring, fall detection, and alerts to caregivers or family members, thereby ensuring that patients receive the support and care they need, when they need it. This intelligent assistive device aims to improve patient outcomes, reduce healthcare costs, and enhance the overall quality of life for those with mobility damage, support them to live more independently, confidently, and safely.

## II. LITERATURE REVIEW

Dr. C K Gomathy, This research aims to assess students' knowledge of the Ge loT topic covered by the Internet of Things. IOT initiatives that address design, development, and other requirements are relevant to our field of study. The Smart Stick Assistant For Visually Impaired People Using Al Image Recognition is the project I've chosen to work on as a result. A blind assistance app called "The Smart Stick Assistant For Visually Challenged People Using All Image Recognition" basically came from the conventional white or blue cane and improved into the present day technology. It's a project to improve accessibility for blind individuals so they may receive assistance when travelling. A contemporary automation of utilizing cutting-edge technological components, such as the Blynk app and ESP shield, would lessen the challenges faced by the community of visually impaired persons in getting better responses from their surroundings.

Prof. Poonam Pawar, Person(s) with vision impairment find it challenging to communicate and perceive my surroundings. For someone who is visually impaired, moving around might be difficult because it can be difficult to tell where he is and how to get from one area to another. The development of an intelligent and smart stick to help and an alert system to warn visually impaired people about obstacles and provide information about their whereabouts has taken decades of research. In this essay, we'll talk about developing a smart kit system to help the blind. The smart gear is provided as people struggle to recognize the world and obstacles in front

The apparatus is intended to function as an artificial eyesight and the visually impaired person through beeps which is assigned to a particular action. The designed system consists of hardware and software .part; hardware detects the slippery area, potholes on the road or path where the user is walking and the objects that comes in contact with the stick through ultrasonic sensor, infrared sensor and water sensor; software uses various algorithms to processes images for face recognition, to detect the text through image processing.

N.Loganathan, When travelling from one spot to another, a blind person finds it challenging to identify the presence of any impediments in their path, and it is quite challenging to locate the stick's exact location if it has been misplaced. Therefore, the smart stick is presented as a suggested remedy to assist the visually impaired in their day-to-day living without the assistance of others. Using an ultrasonic sensor in the blind stick, we suggested a solution for the blind in this research. He is able to detect impediments at a distance of four metres, while infrared technology is utilised to detect closer obstacles in front of blind persons. In this way, the radio frequency transmitter and receiver enable the user to precisely locate the smart stick using a buzzer. When an obstacle is recognised, the smart stick's vibration motor, which is housed there, activates and vibrates. The Arduino UNO serves as the controller in this suggested manner. The branch is capable of detecting every challenge in front of the user. The user-friendly, quick-response, and extremely low power consumption of the smart stick lighter weight, and it is simple for the user to grip and fold.

Priyanka Abhang,People who are blind or partially sighted have difficulty moving securely from one location to another. They find it more and more difficult to complete simple activities without substantially relying on others. Our suggested system seeks to offer a simple solution to this problem. In this system, we employ infrared sensors to help detect raised surfaces like staircases and ultrasonic sensors to help detect obstructions. Additionally, we employ ISD1820 to provide speech warnings in the event that a barrier is encountered. The user can send panic messages to the predefined emergency contacts by using facilities for a panic button. The message informs the emergency contact of the user's GPS coordinates. Our smart blind stick seeks to offer a cheap, effective, quick, and light alternative.

Rajath V, This report will present a n order to help the visually challenged people, we design smart sticks. One of the many problems that people have little control over is blindness. It steals away from a person's life the intense visual beauty of the world. However, as they must overcome countless obstacles in order to carry out even the most basic duties in their daily lives, missing out on the beauty of nature becomes one of their least concerning problems. One of their biggest issues is transportation, whether it be using the roads, railroads, or other public spaces. It is known as the "Smart Stick." It is a tool that directs the user by detecting obstructions in the user's line of sight. With the aid of numerous mounted sensors, it will identify all obstructions in the way.

Vanitha Charitha, The proposed system consists of Arduino Nano, in which Jumper wires are used to link these parts to the Arduino's digital and analogue pins. When using the suggested approach, an input voltage of It has the following characteristics: 9V/12V. It can check for a setting with a range of obstacles of varied sizes and appropriate vibratory and auditory alarms are raised. It can be recognized. Surfaces that are moist or wet might warn the user. And it is able to communicate the user's location to friends via SMS can be used in the event of an emergency or crisis RF remote control-based locator when lost. An Arduinobased algorithm checks for input from each of the sensors.

T. S Aravinth, When a blind person gripping this as they cross the street walking cane When a barrier is present, it is being photographed with a camera and that picture is sent to the object identification microcontroller that issues a warning of that item through the ear pad. Raspbian is a walking stick inserted at which the Pins are used to interconnect an ultrasonic sensor. The camera should be attached at the same time. where both should face in Raspberry Pi the same way on the highway. Moreover, the device features a connection between the RF receiver and the walking stick. When a blind person presses button 1 on the RF transmitter, a beep sound emanating from their walking stick will be heard, allowing them to locate their walking stick in case they misplace it or it falls. In a similar vein, pressing button 2 will cause it to instantly read our present position. Each command is transmitted by depressing a button on the RF transmitter that they are holding.

## III. METHODOLOGY

### 1.Overview

The research methodology outlines the systematic approach taken to develop the IoT-Based Smart Stick. This project integrates various sensors and communication modules to assist visually impaired individuals by providing real-time health monitoring and location tracking. The methodology covers hardware selection, system architecture, data acquisition, processing, and output visualization using the Blynk application.

### 2.System Design and Architecture

The system is designed with a ESP8266 microcontroller as the central processing unit. The following components are integrated:

- DHT11 Sensor: Monitors temperature and humidity to ensure user safety in different environmental conditions.
- ECG AD8232 Sensor: Captures the user's electrocardiogram (ECG) signals for real-time health monitoring.
- OLED Display: Provides immediate visual feedback on sensor readings.
- Neo-6M GPS Module: Tracks the real-time location of the user, ensuring safety and navigation assistance.
- Blynk Application: Acts as the IoT interface to visualize data, send alerts, and enable remote monitoring.

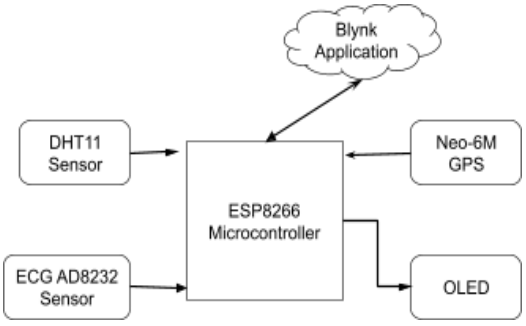
**3.Data Acquisition and Processing**

Each sensor continuously collects data, which is processed by the ESP8266 microcontroller. The ECG sensor monitors heart activity, the DHT11 sensor measures environmental parameters, and the GPS module provides location details. The processed data is then transmitted wirelessly to the Blynk Cloud, where it can be accessed via a smartphone or web dashboard.

**4.Real-Time Monitoring and Alert System**

The system ensures real-time monitoring through the Blynk IoT platform, which displays live data from all sensors. Alerts are triggered when the ECG values exceed a predefined threshold, indicating possible heart irregularities. Similarly, temperature extremes or abnormal environmental conditions can prompt alerts.

**BLOCK DIAGRAM**




**DESCRIPTION**

**1.Sensors (ECG, DHT11, GPS) → ESP8266 Microcontroller**

- ECG AD8232 Sensor: Measures heart activity and transmits the readings to the ESP8266 for processing.
- DHT11 Sensor: Monitors environmental temperature and humidity, sending real-time data to the ESP8266.
- GPS Neo-6M Module: Tracks the user's location and provides latitude-longitude coordinates to the microcontroller.

Role: These sensors act as input devices, collecting critical health and environmental data before transmitting it to the ESP8266 microcontroller

**2.ESP8266 Microcontroller → Blynk Application**

- The ESP8266 processes data from all the sensors and sends it to the Blynk App via Wi-Fi.
- The Blynk App acts as the user interface, displaying real-time health metrics and GPS location for caregivers or family members.

Role: The ESP8266 is the central processing unit of the system, enabling wireless communication between sensors and the Blynk app

**3. OLED QR Code Display**

- The 0.96-inch OLED screen generates a QR code containing the user's personal information (such as medical history, emergency contacts, and identity details).
- In case of emergencies, scanning the QR code provides immediate access to the user's critical information for paramedics or caregivers.

Role: The OLED screen serves as an identification tool, ensuring quick access to vital personal data during emergencies.

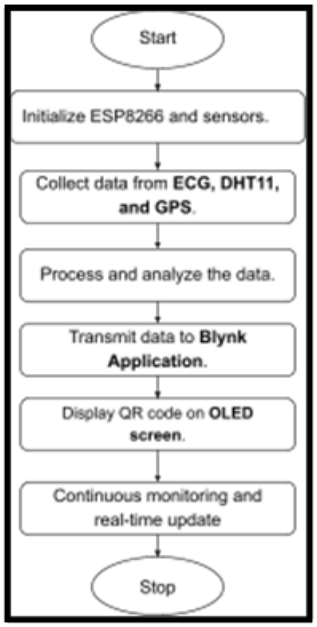
**4.Data Transmission & Real-Time Monitoring**

- Processed sensor data is continuously updated and transmitted to the cloud via the Blynk application.
- Users and caregivers can monitor real-time heart activity, temperature, and GPS location from their smartphones.

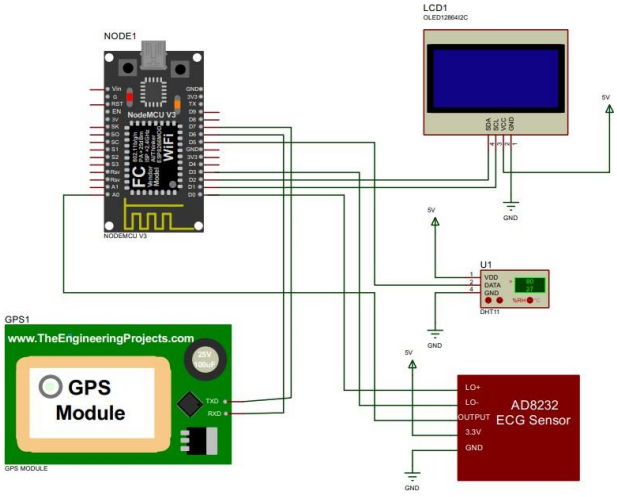
Role: The IoT-based approach ensures remote accessibility and real-time monitoring, enhancing safety and medical response capabilities.

The system effectively monitors soil moisture levels and automates irrigation, ensuring water is

## FLOWCHART




## CIRCUIT DIAGRAM




## WORKING

The IoT-Based Smart Stick is designed to assist visually impaired individuals by integrating various sensors and communication modules for real-time health monitoring and location tracking. Below is the step-by-step working of the project:

### 1. System Initialization

- The ESP8266 microcontroller is powered on, initializing all connected sensors and modules.
- The Blynk application is activated on the smartphone to establish a connection with the IoT platform.

### 2.Sensor Data Collection

- The DHT11 Sensor measures temperature and humidity levels.
- The ECG AD8232 Sensor continuously monitors the user's heart activity.
- The Neo-6M GPS Module determines the user's current location and updates coordinates periodically.

### 3.Data Processing by ESP8266

- The ESP8266 microcontroller receives data from all sensors.
- It processes the sensor readings and formats the data for transmission.
- If any critical condition is detected (such as anormal heart rate or high temperature), an emergency alert is triggered

### 4.Real-Time Data Transmission to Blynk Application

- The processed data is sent to the Blynk Cloud Server via Wi-Fi.
- The Blynk mobile application displays the real-time readings of ECG, temperature, humidity, and location on an interactive dashboard.
- If the user's health parameters exceed the safe threshold, an alert notification is sent to caregivers or emergency contacts.

### 5.GPS Tracking and Navigation

- The GPS module continuously updates the user's location at regular intervals.
- The real-time coordinates are displayed on the Blynk application for tracking purposes.
- If the user gets lost or requires assistance, the location data can be shared with emergency responders.

### 6.OLED Display for Instant Feedback

- The OLED display provides immediate feedback on the sensor readings, displaying ECG, temperature, and humidity values in real-time.
- The user can check the readings without needing a smartphone, ensuring accessibility.

Role: These sensors act as input devices, collecting critical health and environmental data before transmitting it to the ESP8266 microcontroller.

**2.ESP8266 Microcontroller → Blynk Application**

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Role: The IoT-based approach ensures remote accessibility and real-time monitoring, enhancing safety and medical response capabilities.

**7.Emergency Alert System**

- If any abnormal ECG reading is detected, an emergency alert message is sent to the connected mobile application.
- If the temperature or humidity crosses the safe limit, a warning notification is displayed on the Blynk app.

**8.Continuous Monitoring and System Maintenance**

- The smart stick continuously collects and updates data, ensuring real-time tracking.
- The system can be calibrated or reset if required via the Blynk app or manual intervention.
- The power supply is monitored to ensure efficient battery usage.

## IV. RESULT

The IoT-based Smart Stick was successfully integrated with the Blynk cloud platform to provide real-time monitoring of vital parameters such as ECG signals, temperature, and GPS location. The system offers an interactive dashboard for continuous tracking and analysis, ensuring the smart stick serves as an assistive tool for visually impaired individuals with enhanced safety features.

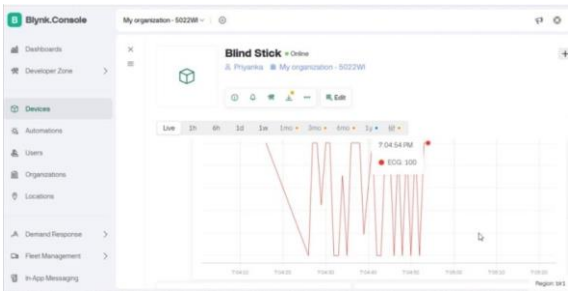


**Fig shows the Blynk App ECG Output**

**Real-Time ECG Monitoring**

The Blynk dashboard displays a dynamic ECG signal graph that continuously updates in real-time. The ECG readings fluctuate, indicating live heart rate monitoring. This feature is crucial for detecting any abnormalities in the user's heartbeat, providing a proactive health alert system. The system logs each reading with a timestamp, allowing for historical trend analysis. This functionality ensures That caregivers and medical professionals can access ECG data remotely and respond to any critical condition promptly.

### Temperature Monitoring

The smart stick is also equipped with a temperature sensor that measures and transmits temperature readings to the Blynk platform. The current recorded temperature in the displayed results is 89°F, which is shown through an interactive gauge on the Blynk dashboard. This feature ensures that the user is aware of environmental conditions, which is particularly useful for extreme weather conditions where additional safety precautions may be needed.

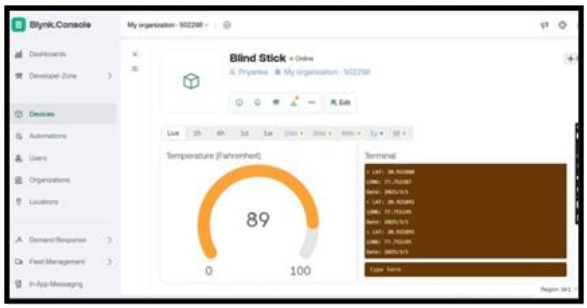


**Fig Shows the Temperature and GPS output of the project**

### GPS Tracking and Locating Logging

A key feature of the system is its ability to track the user's location in real time. The Blynk terminal displays latitude and longitude coordinates, ensuring precise location monitoring. Each entry is timestamped, enabling caregivers or emergency responders to track the movement and position of the user at any given time. This feature is vital for ensuring safety, especially if the user encounters difficulties or needs assistance in an unfamiliar area.

## V. CONCLUSION

The IoT-Based Smart Stick successfully enhances mobility and real-time health monitoring by integrating advanced sensors and wireless communication. With the ESP8266 microcontroller managing data from the DHT11, ECG AD8232, and GPS Neo-6M module, the system ensures continuous health tracking and location monitoring, improving the safety of users. The Blynk application offers a user-friendly interface for caregivers to access real-time data, while the OLED display with a QR code facilitates quick identification in emergencies.