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Smart ID for Blind People's

Mrs. Sumaiya[1], Ms. Bhoomika M[2], Mr. Chandan Kumar[3], Ms. Honika GB[4], Ms. Supritha S[5]

[1] *Assistant Professor, Dept. of Computer Science and Engineering, Maharaja Institute of Technology, Thandavapura*

[2,3,4,5] *Students, Dept, of Computer Science and Engineering, Maharaja Institute of Technology, Thandavapura*

Abstract - The study outlines a theoretical framework and a system design for a smart ID system for blind individuals. The system's overall measurements are meant to include artificial vision and object detection as well as real-time GPS support. The system includes proximity sensors, ultrasonic sensors, a GPS module, stereo cameras, and a dual feedback system in addition to auditory and vibratory feedback circuits. The overall system's goal is to give blind people a low-cost, effective navigational aid that gives them a sensation of artificial vision by supplying details about the environment and the static and moving items nearby.

Key Words: Arduino, GSM module, GPS module, IR sensor, and ultrasonic sensor.

1.INTRODUCTION

When we cannot rely on our own sight, navigating in an unfamiliar area becomes a significant difficulty. Blind persons improve their sense of hearing to locate dynamic impediments because they frequently make sounds while moving. The most popular mobility aid for the blind is a white cane. It does not, however, provide information on barriers that are higher than knee level or farther away than one metre. Even though blind people's first companions were guide dogs, technology later on became extremely important. To assist the blind, elbow canes, walking sticks with changeable lengths, were manufactured for the market. These initiatives did not entirely succeed in helping the user, nevertheless. To resolve these problems The Ultrasonic sensor for Obstacle detection, backed by heat and water detection, is part of the Smart electronic aid's design. Vibratory motors are utilised in this system to alert users to moving obstacles. The speed of the moving obstacles affects the vibration's intensity.

To create a wonderful tool that gives the user a better walking experience, much research is being done. It includes Smart Vision. Both moving and stationary impediments can be detected by the gadget. The gadget can identify particular locations and will let the user know how far away an obstruction is. Another tool that can be installed on the current white cane and detect low-hanging objects like tree branches is called HALO. It is made up of an eccentric-mass vibrating motor and an ultrasonic range sensor that vibrates noticeably in response to obstacles on the ground and in low hanging areas. An intelligent guide stick can use ultrasonic sensors to identify obstructions, but it cannot determine whether the impediment is moving or not.

For persons with visual impairments, Smart id is a special and useful tool that allows for improved and simple navigation. We are aware that persons with vision impairments rely on other people or certain animals, such as trained dogs or a wood stick, to move around the house or outside. We suggested a creative Smart id that makes it simple for persons with visual impairments to navigate utilising cutting-edge technologies. In order to enable the guardian of the blind subject find their whereabouts in the event that they become lost or encounter a crisis, we included safety features using GSM Module. The guardian will receive an SMS with the subject's location and can then call the subject to find out where they are. By fabricating the entire module, we also improved the stick's ability to function in wet conditions. Our idea is a speech-based smart id that leverages WI-FI technology for navigation and prerecorded voice commands for guiding.

1.1 Overview

The major goal of this study is to assist those who are blind in navigating by assisting them in spotting hazards. Additionally, it makes it easier for individuals to navigate the streets on their own without the need for assistance. This also seeks to keep users away from hazardous areas.

1.2 Problem Statement

Current Augmented Reality and Virtual Reality games are too expensive as the need of costly sensors to recognize movements is very high. Training of players, athletes and dancers' posture and response time currently needs an experienced human supervision. Motion detection using cameras is not much used in game development due to its accuracy Issues also as it hinders profit margin of console developers. Understanding community, and provide mental health guidance.

2. EXISTING SYSTEM

There are numerous gadgets currently available to detect obstacles using eyewear, a walking stick, and other

means. These devices have a limited range of object detection, which makes them unusable in many situations. The presence of bumps, potholes, and other road hazards cannot be detected by this equipment.

3. PROPOSED SYSTEM

The current system must definitely be improved. The tag in this system has an embedded sensor and camera for object detection. Through voice aid, the user will be informed about the challenge that lies ahead. The objects can be found between certain distance. The family members will be informed of the user's location utilizing this system.

4. SYSTEM DESIGN

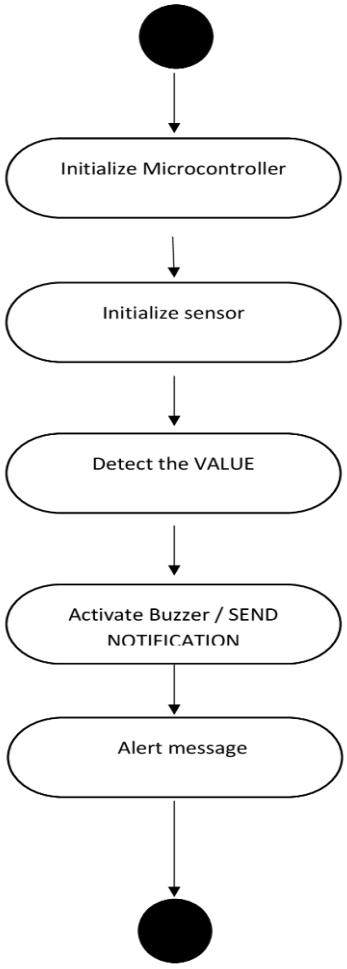

Fig -1: Low-Level System Design

The proposed design of application of internet of things and a combination of android and cloud technology.

5.MODULE DESCRIPTION

Sensor Manager Module: A sensor is a device that measures an objective physical quantity and transforms it into a signal that can be decoded by a human observer or an instrument. The accelerometer found in mobile phones is used in this project. A tool for detecting acceleration and forces caused by gravity is an accelerometer. Depending on how the accelerometer is moving or vibrating, these forces may be dynamic or static, such as the continual pull of gravity on your feet. An accelerometer calculates its acceleration and gravity. Both are frequently expressed in terms of g-force or in SI units, meters/second2 (ms-2). In this project, the accelerometer detects a fall, after which the programme is launched.

Fig -2: IR Sensor for smart id

Threshold Manager Module: Setting up events and alerts (also known as thresholds) is simple using Threshold Manager (TM). When a threshold value is surpassed, a report is generated. A threshold is a test of one variable against another. The result is that it grows to the biggest networks with minimal traffic overhead. If we don't have a mechanism to extract the information from the device, just evaluating if variables exceed or go below threshold levels isn't going to be very useful. Traps are likely something we wish to use to alert us to major happenings. The mere logging of less important threshold crossings could enough for us. The threshold value that is compared with the accelerometer data in this project can be changed by the user. The value must not exceed

Contact Manager Module: In this lesson, we'll go through how to add people to your social contact list. It is possible for the user to add more than one social contact to the list. When a fall is detected, a notification is delivered individually to each contact. There are also choices provided to the user so that they may add contacts and remove contacts.

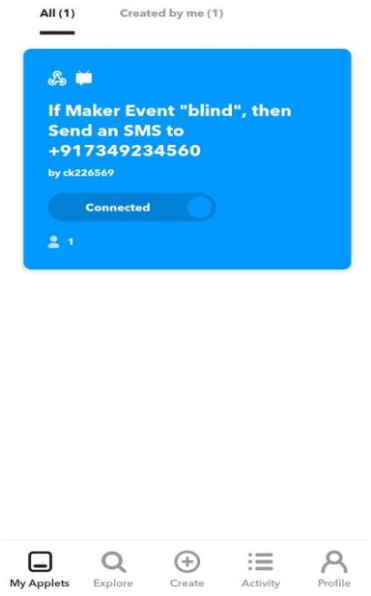

Fig -4: Contact Manager

SMS Manager Module: The exchange of short written messages between fixed-line phones or mobile phones and fixed or portable devices across a network is known as text messaging or texting. A robust rule editor is available in the SMS/MMS Manager and may be used to automate message processing. This enables the deployment of both widely used situations, such as SMS voting polls, and considerably more intricate plans.

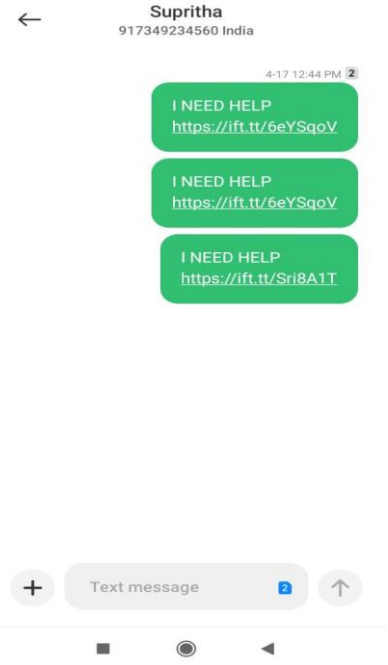

Fig -4: SMS Manager

Reply Verification Module: The user-specified social contact receives the notification when a fall is detected. The password or keyword is then looked up in the reply message. The call is placed if the message contains the keyword and was sent by the same contact; otherwise, the message is ignored.

6.FLOWCHART

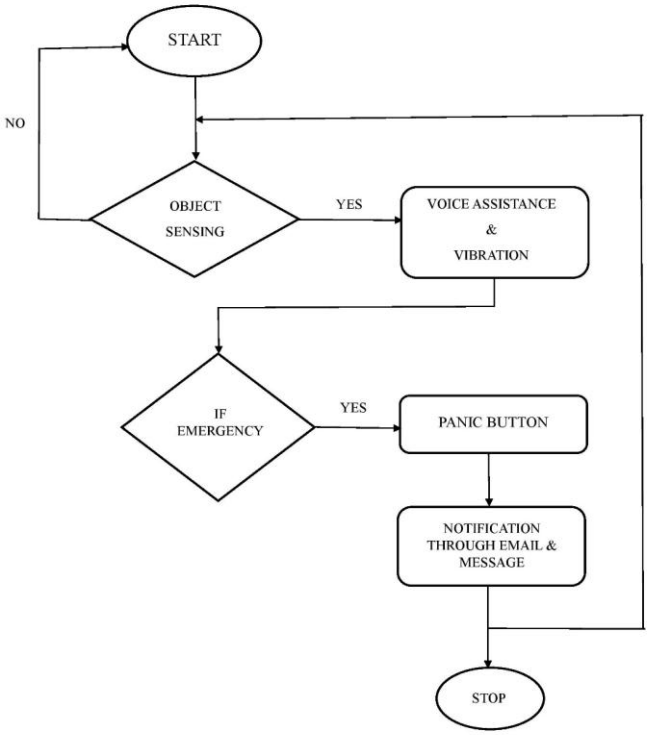

Fig -6: Methodology Flowchart

1.The object is sensed by the IR sensors which is connected to NodeMCU.

2.If the object is detected in left, then voice assistance is given through the speaker connected to APR kit

3. If the object is detected in right, then voice assistance is given through the speaker along with vibration

4. If the object is detected in bottom, then voice assistance is given through the speaker connected to APR kit

5. If the object is detected in top, then voice assistance is given through the speaker connected to APR kit

6.If emergency occurs panic button connected to NodeMCU will be operated by the user.

7.The notification through email(along with captured image) and message is sent with the help of GSM module.

8.The image along with the exact location of the user can be traced and analyzed by the guardian who has received the notification and message.

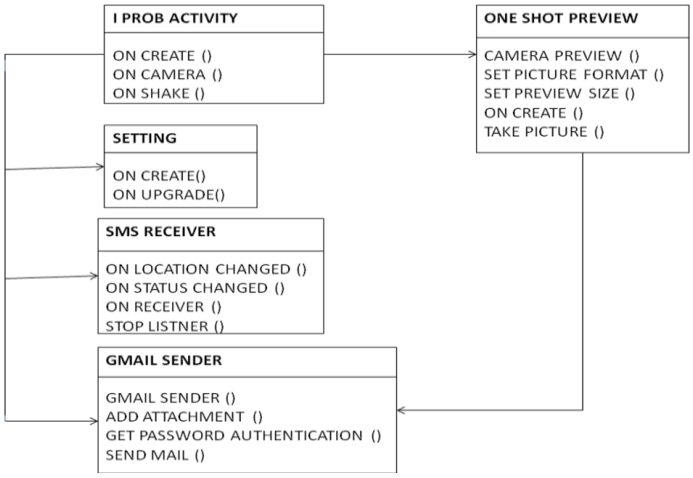

Fig -7: Class Diagram

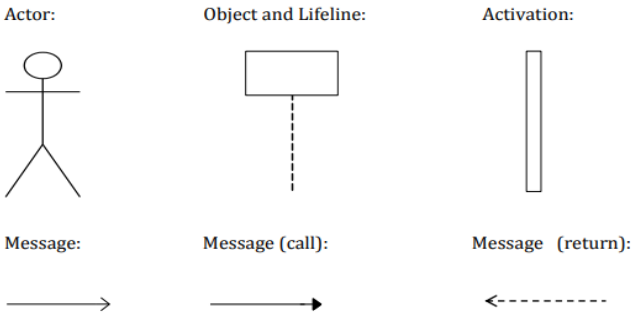

Fig -8: Sequence Diagram

7.EXPERIMENTAL RESULTS

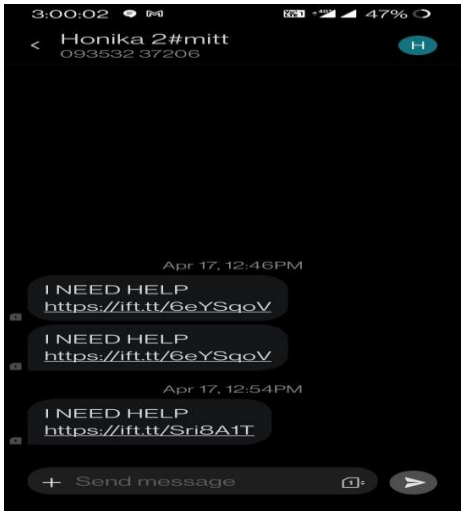

Fig -9: Location of Blind Person

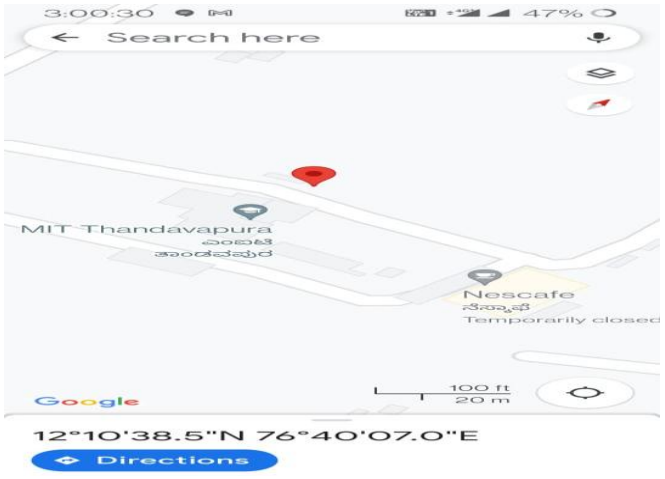

Fig -10: Location of Blind Person

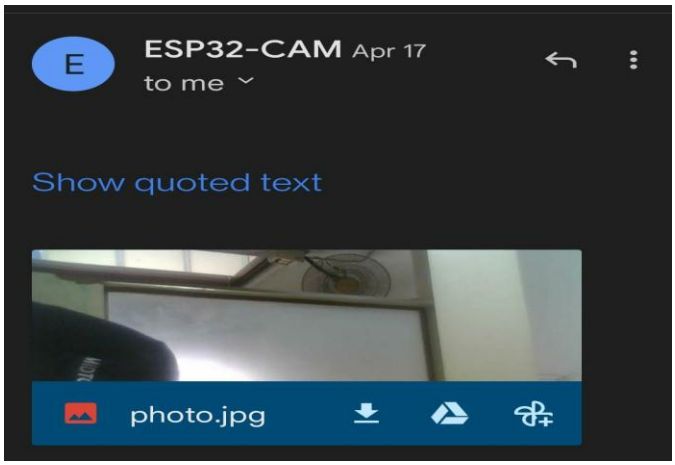

Fig -11: Panic Button Image view

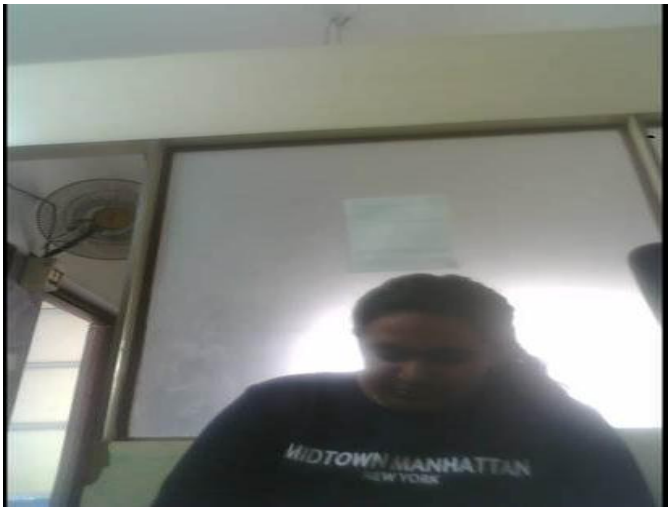

Fig -12: Front Object Picture

8. CONCLUSIONS

The study suggested a brand-new Smart Id concept for blind people, complete with architecture and design. The system's benefit is that it may prove to be a very affordable option for millions of blind people throughout the world. The suggested combination of multiple functional elements creates a real-time system that tracks the user's location and gives dual feedback, enhancing navigational security. This project created a smartphone app and server-based user-friendly navigation system for visually impaired persons. While using the system, the smartphone continuously sends pictures of the scene in front of the user to a server over a Wi-Fi or 4G network. The server then goes through the recognition procedure. The final output is returned to the smartphone, which informs the user of obstacles through speech notifications. This project also ensures the safety of the user.

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