Smart Walking Stick Using IoT

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Abstract: - One of the biggest problems faced by the visually impaired is navigating from place to place, be it indoors or outdoors. Further, the adverse conditions of the roads make it even more difficult for them to walk outdoors. They have to be alert at all times to avoid consequences like colliding with stable or moving obstacles, ascending or descending staircases, slipping down wet terrain. Also, at times they may be in distress and might want to send an alert message to their relatives or friends about their whereabouts. These problems of blind people can be addressed with the intervention of technology. The proposed solution employs the Internet of Things (IoT) paradigm to provide a medium between the blind and the environment. Several sensors can be used to detect anomalies like obstacles, staircases and wet terrains respectively. The prototype discussed here is a simple, sophisticated and affordable smart blind stick equipped with various IoT sensors and modules. Also, this solution provides a way to send a message about the whereabouts of the user to the concerned people who can track on Google maps and also be updated in online server where we can monitor online. System also calls when user press emergency button after sending all alerts to concern people to talk about their emergency. Misplacing the stick indoors can also be a substantial issue; it can be solved by RF stick finder.

Key Words: — ***Smart walking stick, IOT, Obstacles monitoring, Water monitoring.***

I. INTRODUCTION

In now-a-days, we hear many of the blind peoples having issues for going outside. They face many huddles/obstacles on walking to the road or cross the road, they are stuck in many accidents also. So, we are building the module to rectify those accidents and loss of concentration of the blind people. In our module we have lot of applications like detecting the obstacles, detect the staircase and also can detect the water pouring on the path using water sensor. Also, if we forgot the stick in somewhere we can find the stick easily by using remote. We will see details about our module proposed system, block diagram, circuits, and referred papers in below.

II. PROPOSED SYSTEM

The prototype discussed here is a simple, sophisticated and affordable smart blind stick equipped with various sensor and modules.

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Also, this solution provides a way to send a message about the whereabouts of the user to the concerned people who can track based on GSM tower id. System also calls when user press emergency button after sending all alerts to concern people to talk about their emergency. Misplacing the stick indoors can also be a substantial issue; it can be solved by RF stick finder. Obstacles can be monitored by using ultrasonic sensors. The Arduino UNO R3 boards, ultrasonic sensors, water sensor, GSM/GPRS/GPS modules, Voice module, vibrator and RF receiver need 5v DC for their operation. The Arduino can be powered by connecting it to a USB connection or 12V adaptor or battery. The ultrasonic sensors are connected to Arduino, which are used to measure the object if front of the person and potholes or steps by two ultrasonic transducers. The one acts as a transmitter which converts electrical signal into 40 KHz ultrasonic sound pulses. The distance calculated from any object or obstacles and potholes or stair can be identified by providing voice alert and vibration alert which are connected to Arduino. GPS module is attached to Arduino acts as receiver of the GPS location, then the location is extracted from the data received is used for tracking in the emergency situations. GSM/GPRS module connected to the system is used to send data over TCP connection to online server in order to monitor the real time location of the person in case of any emergency.

The system also comes with stick finder option when it is misplaced. It can be done with RF remote and RF receiver module connected to Arduino. Whenever it is misplaced, it can be identification by voice alert by pressing RF remote.

Fig.1. GPS Module Interfacing Model

2.1 Hardware Used

- ARDUINO UNO
- GSM Module
- Sensors
  - ➢ Ultrasonic Sensor
  - ➢ Water sensor
- Mic/Speaker
- Voice module
- RF RX Module
- Vibrator
- Rechargeable Battery

2.2 Software Used

- Arduino IDE
- Embedded C
- HTML
- PHP
- MYSQL

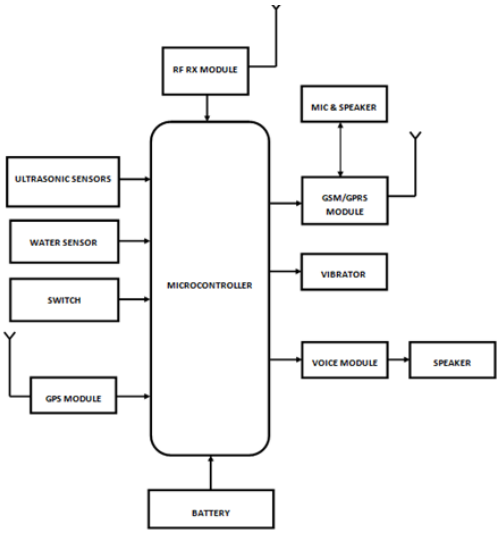

Fig.2. Block Diagram

III. RESULTS AND DISCUSSION

Our module proposed system works as like follows, first we code the Arduino UNO using Arduino IDE Software for enabling the sensors (ultrasonic sensor & water sensor) then it works to detect the obstacles and huddles which is faced by blind peoples in normal days. Then we include emergency switch for their safety purpose, if there are in trouble, they have to press the emergency button and the Alert message and emergency call goes to the important person of that blind people with location of nearby tower and also emergency alert going to the nearby police station and ambulance. Nearby police station and ambulance was detected only by using nearby tower. We have RF RX Remote for detect the stick if we misplaced it or forgotten the sticks placement. We have use rechargeable battery for this proto type, it used for power the module.

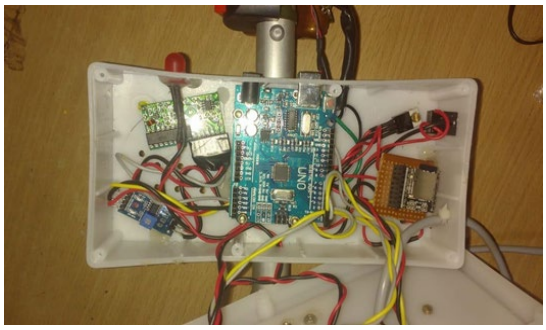

Fig.3. Prototype of Proposed Application

IV. CONCLUSION

In proposed system, we create the SMART BLIND WALKING STICK for to assist the blind peoples, also it monitoring the obstacles and huddles in front of the blind peoples. Our module will detect the obstacles in a particular distance only because of the safety purpose. It will have a huge impact in future and we can avoid most of the accident/incidents of the blind peoples.

REFERENCES

[1]. S. Mohapatra, S. Rout, V. Tripathi, T. Saxena and Y. Karuna, "Smart Walking Stick for Blind Integrated with SOS Navigation System," 2018 2nd International Conference on Trends in Electronics and Informatics (ICOEI), 2018.

[2]. M. A. Ikbal, F. Rahman and M. H. Kabir, "Microcontroller Based Smart Walking Stick for Visually Impaired People," 2018 4th International Conference on Electrical Engineering and Information & Communication Technology (iCEEiCT), 2018.

[3]. Shruti Dambhare and A. Sakhare, "Smart stick for Blind: Obstacle Detection Artificial vision and Real-time assistance via GPS", 2nd National Conference on Information and Communication Technology (NCICT).

[4]. A. A. Nada, M. A. Fakhr and A. F. Seddik, "Assistive infrared sensor based smart stick for blind people," 2015 Science and Information Conference (SAI), 2015.

[5]. Z. Saquib, V. Murari and S. N. Bhargav, "BlinDar: An invisible eye for the blind people making life easy for the blind with Internet of Things (IoT)," 2017 2nd IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT), 2017.

[6]. S. Rao and V. M. Singh, "Computer Vision and Iot Based Smart System for Visually Impaired People," 2021 11th International Conference on Cloud Computing, Data Science & Engineering (Confluence), 2021.

[7]. V. Kunta, C. Tuniki and U. Sairam, "Multi-Functional Blind Stick for Visually Impaired People," 2020 5th International Conference on Communication and Electronics Systems (ICCES), 2020.

[8]. S. Murali, R. Shrivatsan, V. Sreenivas, S. Vijjappu, S. J. Gladwin and R. Rajavel, "Smart walking cane for the visually challenged," 2016 IEEE Region 10 Humanitarian Technology Conference (R10-HTC), 2016.

[9]. H. Tang, J. Shi and K. Lei, "A smart low-consumption IoT framework for location tracking and its real application," 2016 6th International Conference on Electronics Information and Emergency Communication (ICEIEC), 2016.

[10]. S. Chaurasia and K. Kavitha, "An electronic walking stick for blinds", Proc. IEEE Info. Comm. and Emb. Sys. Conf, pp. 1-5, 2014.