Smart Stick for Hurdle Detection and Location Tracking For Blinds

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Abstract: *Vision is a beautiful gift to the human being by the god. The proportion of visually impaired and blind people in the world has been increased very largely. In this paper, we are introducing a smart stick system for assisting the blind people. The smart stick comes as a solution to enable visually impaired people to find difficulties in detecting obstacles and dangers in front of the blind people during walking and to identify the world around. The system consists of various sensors along with the Arduino Uno microcontroller and the GPS-GSM. Microcontroller receives the sensor signals and process them to short pulses to the Arduino pins where buzzers and vibrator are connected, which get starts if the obstacle finds in the way. GPS and GSM technology helps for tracking the device. The aim of this research is to provide a good understanding to make a suitable system in the future. It can be made available to all segments of the society and families who need them.*
Keywords: *Smart stick, Ardunino Uno, GSM, and GPS*

I. Introduction

Visually impaired persons have difficulty to interact and feel their environment. They have little contact with surrounding. Physical movement is a challenge for visually impaired persons, because it can become tricky to distinguish where he is, and how to get where he wants to go from one place to another. So the main problem with blind people is mobility. This paper proposes a tool for visually impaired people that will provide them navigation. Long white cane is a traditional mobility tool used to detect obstacles in the path of a blind person. We are modifying this cane with some electronics components and sensors so that this traditional cane can become smart cane. . Our project aims to design and implement of an intelligent and cheap stick with sensors like ultrasonic sensor, water sensor and flame sensor with Global Positioning System (GPS) and Global System for Mobile Communication (GSM) for the visually impaired peoples, which will detect the obstacle and hurdle in the path and also determine the position and location through GPS-GPS.

II. Literature Survey

A smart stick for blind people is a popular project which has contiguous improvement and modification. The basic tool for blind people is white cane, which is innovated for help them to balance while walking and detects the obstacle by tapping stick on ground surface. But it requires lots of practice to get the directions only by using that white cane. The born blind people can be comfortable with it, but the people who lost their eyes in suddenly happened accidents can't do well with that. So they want more reliable solution for it other than that white cane. Now a day's many smart sticks with different sensors are available which detects the obstacle within the path of that blind person and alert them about that obstacle. This smart stick provides many advantages to the blind people to reach their destination without any problem and also helps them in their day to day work. Currently available blind sticks are not that much popular as per their high cost and lack of accuracy. The people require more reliable, low cost and accurate stick which helps them during the movements and alerts them about the obstacles in path. So it's needed to develop a more reliable and low cost 'Smart Stick' for people who cannot afford the high cost and high technological sticks.

III. Problem Identification

For blinds, it is difficult to walk and know their surrounding without the help of stick. This project aims at assisting blind person to move around and enable to recognize important objects. Most of the blind peoples use the white cane to move from one place to another place. Although it might be helpful, it doesn't guarantee saving blind people from risks. These traditional ways can be used for low level obstacles detection only. Blind

Aid Stick has been a popular project with the constant enhancements and modifications. Currently the commercially available blind stick is not that popular due to high cost and lack of accuracy. The blind people also face the problem they cannot afford the dogs for guidance because of high cost for dogs. The blind people also face the problems to identify the objects in house like kitchen tools, cloths and other important things. They also face the problem while handling the electronic and electrical devices which can harm them. The project can reduces these kind of problems of blind person.

Proposed Solution

Our works aims at providing the help for blinds with the third type of aid. The blind stick is integrated with ultrasonic sensor along with flame and water sensor. The proposed system detects obstacles in his path ahead using ultrasonic waves on sensing obstacles passes this data to the microcontroller. The microcontroller then processes this data and calculates if the obstacle is close enough. If the obstacle is not that close the circuit does nothing. If the obstacle is close to the microcontroller sends a signal to sound a buzzer and produces appropriate alerts to save the person from hitting obstacles. The ultrasonic sensor is used in this project for detecting obstacles because it is light weight, user friendly, easy to use, flexible and less expensive. We have also included flame sensor to detect the obstacle in the form of heat and then microcontroller alerts about it through buzzer. The blind people can also face problems of water in their path; this can be detected by water sensor and alerted by buzzer.
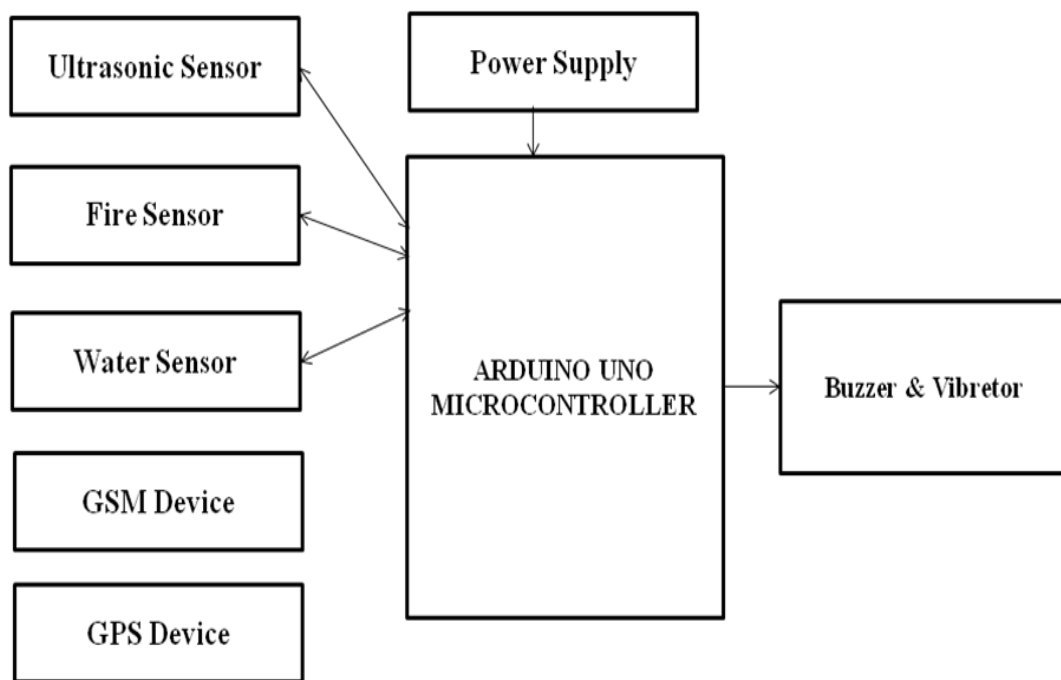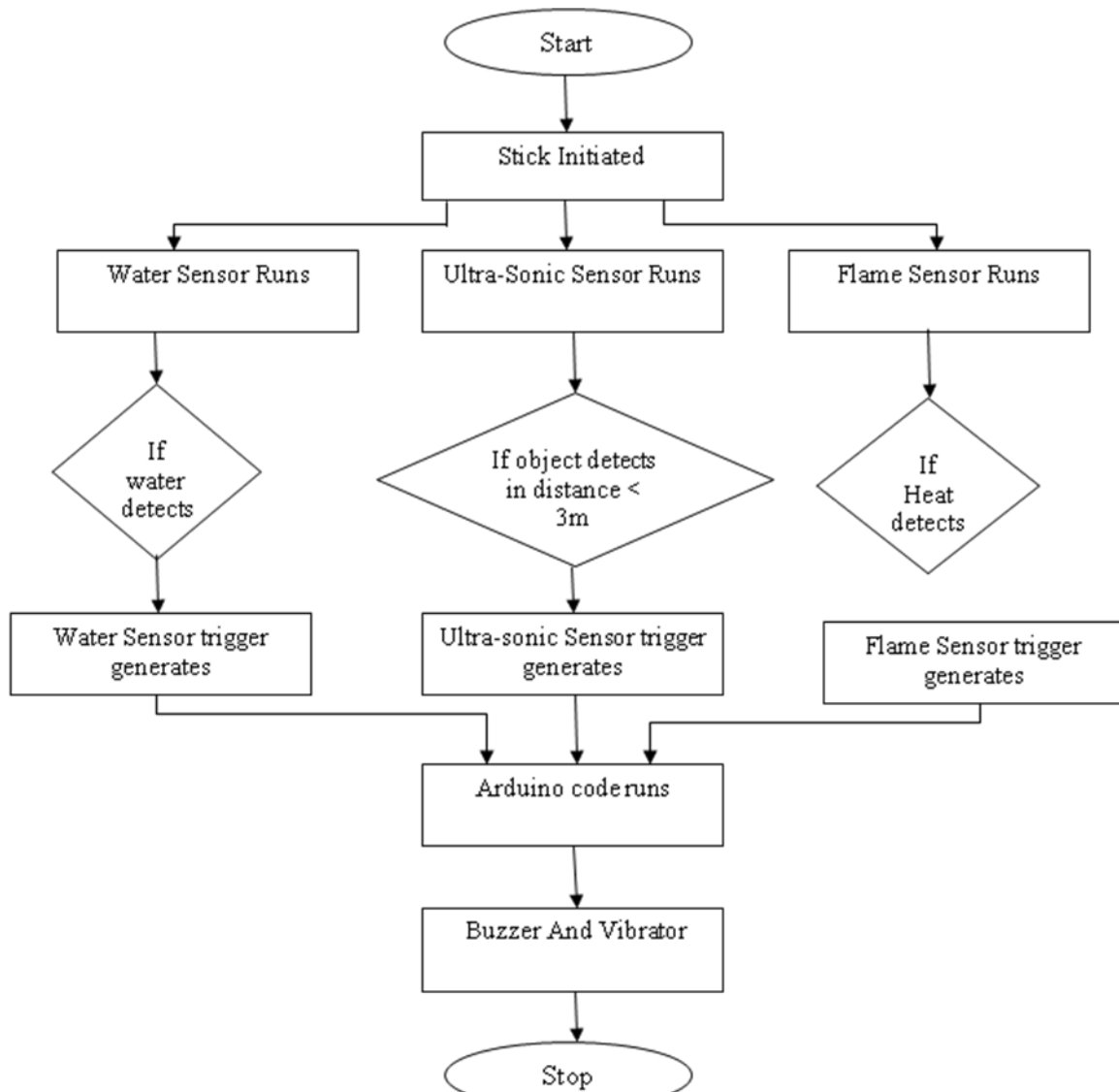

Fig: System Architecture of a smart stick

Fig: Flow Chart

IV.   Conclusion

This project presents the concept of Smart Stick for Blind People. It includes the detection of obstacles while blind people moves from one place to another place. The stick is generated using many sensors like Ultrasonic, Flame sensor and Water sensor etc. When the blind person moves from one place to another place with the help of sensors the message is passed to the blind person through the Arduino UNO microcontroller in the form of different types of beeps and vibration. The triggers are generated from the sensors if any danger or inconvenience is there. That trigger is passed to the microcontroller and it passes the alerts to the blind person through the beep message and vibration which are connected to the smart stick. Because of this stick blind people can move easily from one place to another without help of others and it also increase the autonomy for the blind.

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