

**1. Title of the project:** ARDUINO BASED INTELLIGENT WALKING STICK FOR PHYSICALLY IMPAIRED PERSONS

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**4. Keywords:** Blind, Intelligent walking stick, Physically impaired.

**5. Introduction:**

Blindness is a state of lacking the visual perception due to physiological or neurological factors. The partial blindness represents the lack of integration in the growth of the optic nerve or visual center of the eye and total blindness is the full absence of the visual light perception . Imagine walking into an unfamiliar place. One has to ask for guidance in order to reach to the destination. But what if the person is visually impaired!! Person has to completely depend on other people to reach destination. Generally we observe that white cane is the best friend of visually impaired person. But many a times this cane is not useful. In an unfamiliar surrounding visually impaired person might get confused. So this restricts their mobility. This makes them dependent on others. Regardless of the tool used the factor that most determines a person's mobility is the use of essential personal skills. Total blindness is the complete lack of form and visual light perception and is clinically recorded as NLP, an abbreviation as “no light perception”. Blindness is frequently used to describe severe visual impairment with residual vision. Those described as having only light perception have no more sight than the ability to tell light from dark and the general direction of a light source . The system has been developed using both the hardware and software implementations.

## 6. Objectives:

- The ultrasonic sensor is used to detect the presence of obstacle and calculates the distance between the source and destination.
- Light sensor is used to detect the presence or absence of light.
- Water sensor is used to detect the presence of water.
- Anti theft protection.
- Warning through voice and vibration.

## 7. Methodology:

We here propose an advanced blind stick that allows visually challenged people to navigate with ease using advanced technology. The blind stick is integrated with ultrasonic sensor along with light and water sensing. Our proposed project first uses ultrasonic sensors to detect obstacles ahead using ultrasonic waves. On sensing obstacles the sensor passes this data to the arduino Uno. The arduino uno 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 the arduino Uno sends a warning in the form of voice. It also detects and sounds a different buzzer if it detects water and alerts the blind. The stick also includes the vibrator. If the obstacle is close the arduino uno sends a warning through vibration. Water detection is done by water sensor. One more feature is that it allows the blind to detect if there is light or darkness in the room. The system has one more advanced feature integrated to help the blind find their stick if they forget where they kept it. A wireless RF based remote is used for this purpose. Pressing the remote button sounds a buzzer on the stick which helps the blind person to find their stick.

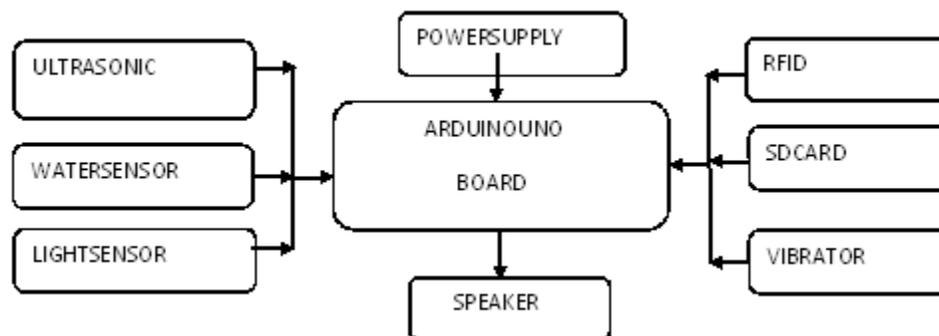


Figure: Block diagram of proposed system

## 8. Results and conclusion:

The presented system is designed and configured for practical use. The system is able to handle seven states that may face the blind people. The system will respond to each state according to a specific program which is coded and installed in the Arduino microcontroller.

- When obstacle is detected by the ultrasonic sensor in the left, right and front side of the stick, then arduino send the message to the blind through buzzer and vibrator and also send the voice message through earphone.
- The light sensor is used to detect presence or absence of light, if there is no light then the buzzer will be on, warning through vibration and voice message through earphone.
- water sensor is used to detect the presence of water and send the message to the blind through buzzer, vibrator, and also send the voice message through earphone.

A simple, cheap, configurable, easy to handle electronic guidance system is proposed to provide constructive assistant and support for blind and visually impaired persons. The system is designed, implemented, tested, and verified. The real-time results of the system are encouraging; it revealed an accuracy of 93% in detecting distances. The results indicate that the system is efficient and unique in its capability in specifying the source and distance of the objects that may encounter the blind. It is able to scan areas left, right, and in front of the blind person regardless of its height or depth. Therefore, it was favoured by those who participated in the test. The ultrasonic sensor has been fully utilized in order to advance the mobility of the blind and visual impaired people in safe and independent way.

The water and light sensors are used for the detection of presence of water and light. This system does not require a huge device to be hold for a long distance, and it also does not require any special training. This system also resolves limitations that are related to the most of the movement problems that may influence the blind people in their environment.

9. Future work of our project is the system can be supplemented with GPS and GSM module by this we can provide safety and also it helps to track the blind person.

