

PROJECT VISION

Independent mobility for a visually challenged person is a day-to-day problem. They encounter difficulties such as detecting & avoiding obstacles and finding the right way to their intended destination. Such challenges may undermine their autonomy, cause emotional distress, and even expose them to injury. Although they can detect obstacles on the ground with an ordinary stick, however, these sticks have many limitations. The user only detects an obstacle when their stick either come in contact with it or they collide and then they have to change their direction awkwardly and determine a path around it. That's like walking in a minefield for them, where we suddenly encounter an obstacle. This constant fear of getting collided and getting hurt, dissuade many people from even stepping out of the house. These visually challenged people need some aid to move around and cope up with the busy world.

Problem statement and basic idea:

- **Ordinary stick cannot detect anything from knee till head height** like an open window in a corridor, hanging tree branches or overhead signboards. Also while travelling on the street, there may be a truck parked on the side of the road, and the normal stick may not be able to detect it because the chassis of the truck is high and the stick can go below the chassis, and their head may get banged against the body of the truck. (Solution: Stick with sensors such as **camera and ultrasonic sensor** to detect the obstacles, much before when the stick or the user comes in contact with it.)
- **Blind people are particularly sensitive towards environmental sounds** as it helps them to orient themselves, and we should not cause interference with it. (Solution: The idea is to use **vibrations** as output, i.e. convey the distance information to the end-users through vibratory patterns that will change with obstacle distance.)
- **If they are walking in a crowded place**, then they may get irritated if the device is continuously vibrating. (Solution: **Flexibility** to change the detection range, so that they can reduce the detection range when they are indoor or in a crowded place)

Further implementations:

- Ordinary sticks may also find it very difficult to **detect potholes** while walking on the road. (Solution: Pothole Detection can be done using **ultrasonic Sensor** or an **accelerometer Sensor**)
- They cannot detect if there is **water ahead** in the path. (Solution: To use a **water sensor** that activates a distinct **buzzer** if it detects water.)
- **Navigation** from one place to another is the biggest challenge for a blind person. (Solution: **GSM-GPS module and built-in speakers** can help to pinpoint the location of the blind person and inform the user using the voice assistant. Or pairing the stick with a **smartphone app** and integration with google maps can help them know about the directions, right through the speakers in the stick.)
- Sometimes **locating the stick** might also be a problem for them. (Solution: Installing **RF module** in the device and then using a mobile application we can we ring a **buzzer** on the stick and thus helps the blind person to find their stick.)

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