ROBOTS FOR DISABILITY
Term Project

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INTRODUCTION

Problem Statement : There are a lot of challenges that a blind person has to face in their daily lives. They face difficulty in navigating outside the spaces like the streets, the market, in commuting, in need to find a washroom and several things likewise etc. Travelling or merely walking down a crowded street seems to be very difficult for them with lack of assistance. In several occasions they are unable to get help even if someone is around or passing by because they can’t see.

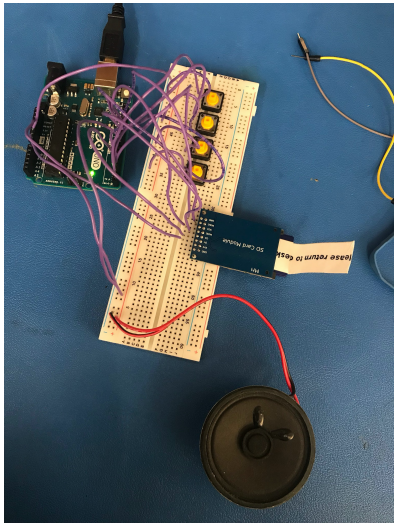
Solution : Visually impaired in particular those who belong to low or middle class families cannot afford expensive heavy equip devices for their assistance. A solution that can provide them assistance through canes by equipping it with audio message signals that can be played by them so that people nearby can listen and come forward for their assistance. Along with this, a feature for their safety that will be included in the prototype is the detection of any object that comes along their way.

HARDWARE

- 3D printed cane model
- Arduino UNO (2)
- Ultrasonic sensor HC-SR04
- SD card
- SD card reader module
- Active buzzer
- 8 ohm speaker
- Push buttons (4)

DESIGN and CIRCUIT

- A 3D printed compact cane model controlled using arduino uno.
- Aligned the sensor at the bottom of the cane for obstacle detection, connected with a buzzer to alert.
- Recorded general audio messages to be played when in need of help on the streets from passersby.
- Set obstacle detection range to alert individual



CODE OVERVIEW

- Library <SimpleSDAudio> to play messages with the press of push button.
- SPI Communication protocol between the arduino and the SD card to read audio files.
- Audio files set to MONO audio channel with 16000 Hz of sampling rate and 8 bit resolution.
- Check activation of push button before playing the audio message.
- Check distance of obstacle,if within range from the sensor activate buzzer.

UPDATE

- The sound of the speaker was amplified using a LM386 audio amplifier chip with a 10K potentiometer.
- The LM386 uses a low power supply and provides a voltage amplification of 20
- The recorded audio signals were modified with a different sampling and bit rates to avoid static and fritzing during the audio play and also to get original sound of the audio file.
- Sampling rate 41000 Hz for .wav format audio files includes a lot of static and fritzing and so 16000 Hz sampling rate retains the original sound of the file

THANK YOU