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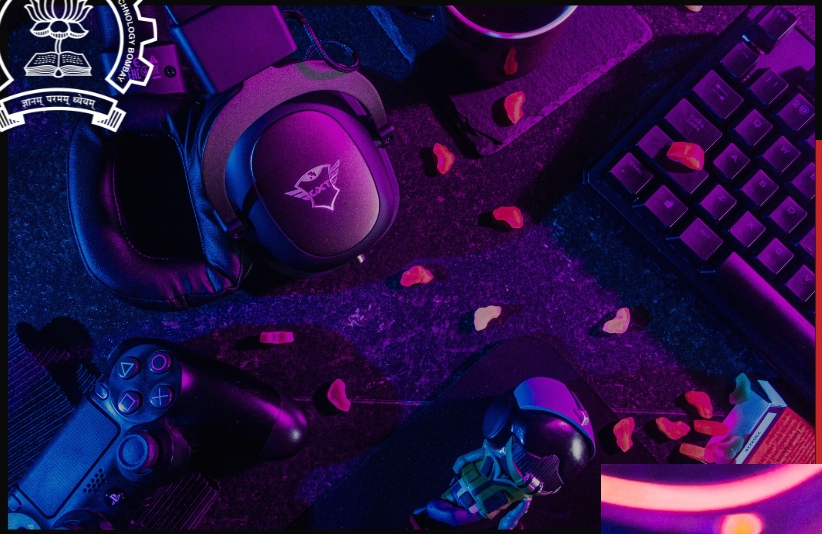
HACKATHON 2023



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Team and Project Details

Team Name: Robotrons
Team Member 1: Ankit Chawla
Team Member 2: Bhajneet Singh Bedi

Institute Name: Chandigarh University

Project Domain: Indoor Mapping and Navigation
Project Idea Title: Stereo Camera Based Navigation Assistant For Blind People

Project Idea Details

People with visual impairments face a lot of challenges when it comes to navigation, including:

1. Obstacles in path while navigating.
2. No idea about orientation.
3. No information about their surroundings.
4. Identifying the person and their expression.
5. Problem in finding things.

Technology Stack:

Linux, ROS(Robot Operating System), Rviz, Gazebo, Arducam stereo camera, Raspberry pi 4.

Solution Description

Literature Survey

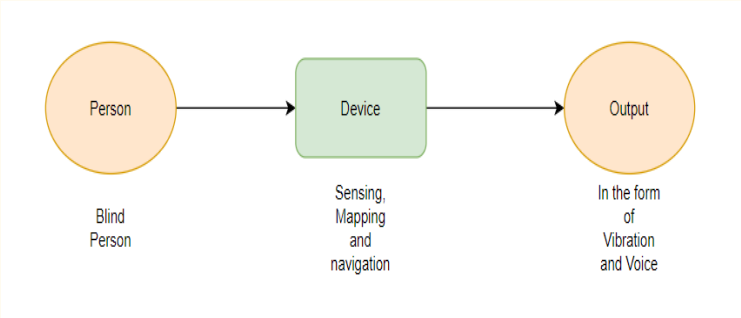
- One study, published in the International Journal of Human-Computer Interaction in 2017, examined the use of a smartphone app with auditory and haptic feedback to assist blind individuals in outdoor navigation. The study found that the app was effective in providing accurate and timely navigation instructions and that users were satisfied with its performance.
- A more recent study, published in the Journal of Medical Internet Research in 2020, evaluated a navigation system for the blind that utilise a combination of GPS, a compass, and a tactile map. The study found that the system was able to provide accurate and reliable navigation instructions and that users were able to navigate unfamiliar outdoor environments with greater independence.

Idea

This device is a stereo camera based assistive tech device which helps the visually impaired person in navigation while avoiding obstacles an detecting objects nearby and help them identify their surrounding.

Solution Novelty:

The device has a wireless feedback haptic bands which helps a person who is both deaf and blind in navigation.



Software and Hardware to be used:

Ubuntu,
ROS(Robot Operating System),
Rviz,
Gazebo,
Lipo Battery
3d printed case
Raspberry pi 4 8gb
Arducam Stereo camera or Intel Realsense

Solution Description

Describe your solution/idea here:

●The blind person will wear the headset which would have RGBD camera (arducam stereo camera) which is used to measure RGB values in addition with depth, which further helps us to get an overview of distance of any object.
●Now using ROS the camera will map the area around it and will guide the wearer to move around the area avoiding any obstacles. Using SLAM technique a map will be created and saved for future use.
●The voice assistant or vibration band will help the user in taking instructions and moving around.
●Further object detection can be implemented for helping the person in finding and handling things placed in different places of the house.

Applicability of the solution:

1. The device will provide valuable information such as the distance and location of obstacles, and descriptions of the environment and guide them to the desired place in the house through audio instruction.
2. Identifies the object in the surrounding and stores the location of it in the database.
3. Provide hands-free control of the device and instruction through voice assistant.
4. Ability to download pre existing 3d maps of famous areas and airports to navigate easily in these unfamiliar areas.
5. People with both visual and hearing impairment will be guided by two wireless haptic feedback bands placed on both hands

THANK YOU