

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY
BELGAUM-590014, KARNATAKA**



**A PROJECT REPORT ON
“COLLISION AVOIDANCE DEVICE FOR THE VISUALLY IMPAIRED”
Submitted in partial fulfilment of the curriculum for the award of degree
BACHELOR DEGREE
IN
ELECTRONICS AND COMMUNICATION ENGINEERING
Prescribed by VISVESVARAYA TECHNOLOGICAL UNIVERSITY.**

Submitted By

**KIRAN G VETTETH
1BY09EC032**

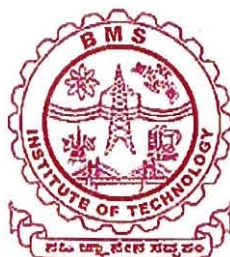
**K PRITHVI GANESH
1BY09EC027**

**DURBHA SRIKAR
1BY09EC019**

Under the esteemed guidance of

Prof. C S MALA
Head of Department
Dept. of ECE

Mrs. SHAILA S MATH
Assistant Professor
Dept. of ECE



**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
B. M. S. INSTITUTE OF TECHNOLOGY
DODDABALLAPURA MAIN ROAD, AVALAHALLI,
YELAHANKA, BANGALORE-560064
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ABSTRACT

There are about 15 million visually impaired or blind persons in the India alone. Many of these persons use the white cane – the most successful and widely used travel aid for the blind. This purely mechanical device is used to detect obstacles on the ground, uneven surfaces, holes, steps, and other hazards. The main problem with the white cane is that users must be trained. In addition, this device requires the user to actively scan the small area ahead of him/her, and it cannot detect obstacles beyond its reach of 1 - 2 m. Another drawback of the white cane is that obstacles can be detected only by contact. This can become inconvenient to the user and the people around the user, for example, when travelling in a crowded street. Guide dogs are very capable guides for the blind, but they require extensive training as well. Fully trained guide dogs are extremely expensive, and their useful life is typically on the order of only five years. As a result, only 2% of the visually impaired people in the world have guide dogs.

This device focuses on bringing about an approach which would make a visually impaired person to walk through busy roads without any trouble and helps in identifying obstacles. The device uses a digital camera to capture the image frames directly in front of the user, and the processor implements image processing to determine the obstacle and a set of vibrational motors warns the user. The system also provides audio response. The sonar sensors detect obstacles in the user's immediate vicinity. Upon detection, the vibrational motors caution him/her regarding the presence of obstacles. Image processing is used to provide the lateral distance between the obstacle and the user, so as to provide distance perception. Being a real time system, it accounts for real time changes by processing on current frames and is reactive by providing instant responses.

Collision Avoidance Device for the Visually Impaired is a pedestrian navigation system. It integrates several technologies including wearable computers, image processing, audio processing and sound navigation and ranging. This device is programmed in software to caution the user by providing a vibrating response when the user encounters an obstacle in his/her path, to avoid collision. The system also provides audio assistance to the visually impaired for obstacle detection and collision avoidance.