

ISIGHT

COMPUTER VISION AND ULTRASONIC SENSOR BASED SMART CANE AND GLASSES FOR VISUALLY IMPAIRED PEOPLE

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Bring vision to life

ABSTRACT

One of the major physical incapabilities around the globe is visual impairment. To provide assistance to these people, we intend to design and implement state-of-the-art product based on technology. Our cutting-edge project consists of a smart cane based on ultrasonic sensors and smart glasses with camera, providing obstacle detection, navigation, obiect identification and facial recognition.

OBJECTIVE

We aim to deliver a product having the following features:

- Detect front, right and left obstacles and perform navigation. Furthermore, estimate the height of the front obstacle.
- · Guide and help the user in detecting staircase and potholes.
- Help in smoke and water detection to keep the user safe from hazards.
- · Capable of doing facial recognition and object identification.

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ACKNOWLEDGEMENTS

Dr. Ubaid-Ullah-Fayyaz | Supervisor

Ali Hassan | Legally Blind Worker in

Dr. Kashif Javed | Co-Supervisor

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Data Acquisition

Data for navigation is acquitted using five ultrasonic sensors [1]



Rpi 8MP Camera is used to capture live frames of surroundings [2]

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SUMMARY

The product proposed is an attempt to

make the challenging life of blind people

a bit less challenging and reduce their

dependency on others by guiding them in daily-life tasks. It will also have a great

social and economic impact on the soci-

ety, upgrading life of millions.



Microcontroller **Processing**

The readings from ultrasonic sensors and frames from camera processed by Raspberry Pi 3B+. An interrupt has been configured to switch between navigation and vision mode via a toggle button



METHODOLOGY

Processing Algorithms

In navigation mode, the output is generated using decision-tree machine learning algo-

In vision mode, trained models for faces and objects are used to detect required feature



UET Office



Audio & Haptic Output

- Navigation
- Staircase Detection
- Height and Depth



- Face Detection
- Face Recognition





VERSION 1 Obstacle Detection ecognition and audio feedback Featured on Waqt News.







Response Time: 0.5s Accurav: 99%

Response Time: 0.5s

Accuracy: 95 %

Accuracy: 88%

ACHIEVED





- Added staircase detection
- Thesis Submission

- REFERENCES
- [1] AS. Sharma, M. Gupta, A. Kumar, M. Tripathi, and M. S. Gaur, "Multiple distance sensors based smart stick for visually impaired people," in 2017 IEEE 7th Annual Computing and Communication Workshop and Conference (CCWC), Jan 2017, pp. 1-5.
- [2] J. Bai, S. Lian, Z. Liu, K. Wang, and D. Liu, \Smart guiding glasses for visually impaired people in indoor environment," IEEE Transactions on Consumer Electronics, vol. 63, no. 3, pp. 258-266, August 2017.

FEATURES AND RESULTS



- Response Time: 0.1s
- Response Time < 0.1s
- Accuray: 99%
- >>>>
- Response Time: 1.4s Range: 90 Objects
 - Response Time: 0.1s Accuray: 91%









- Endorsed by LRBT