



Smart Conveyance for Blind People

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Abstract: Technology is ameliorating in its characteristics day by day so we could find solutions to the quandaries that people face. There are many of the people who couldn't walk due to visual impairment, for those people travelling is one of the major quandary. If they require to utilize public conveyance they must depend on the good will of the people around them to avail. Thus an Perspicacious electric conveyance can solve their quandary. This conveyance is composed of many technologies such as Digital image processing for obstruction detection, road detection, traffic signals and sonar, infrared LiDar predicated obstruction avoidance. GPS and map predicated location guidance for conveyance. We design a thoroughly perspicacious electric conveyance for blind which can be implemented prosperously. The conveyance is designed in such a way that it complies with all the traffic signals so that the design is apt for genuine world.

Keywords—Ultrasonic sensor, Image processing, Traffic Management , Auduino

INTRODUCTION

Affections in the visual system can lead to visual impairment and in the worst cases to optical incapacitation, which may avert individuals from performing several activities of daily living, including study, work, and sports practice. According to the World Health Organization , there are approximately 38 million people suffering from visual impairment ecumenical, whereas other 110 million have other types of visual impediments. These statistics designate that several degrees of optical incapacitation affect seven in 1000 people, considering an estimated world population of 5.3 billion. Haplessly, above 90% of the people suffering from optical incapacitation live in developing countries. For them travelling with safety is a major quandary. Independent mobility is a key component in maintaining the physical and psychosocial health of an individual. Further, for people having blind, independent mobility increases vocational and edifying opportunities, abbreviates dependence on caretakers and family members, and promotes feeling of self-reliance.

One obstruction for visually impaired is safely operating a conveyance. Thus, an astute conveyance for blind is introduced. This conveyance is given by rechargeable battery and very less time is required for charging. It can be operated in automatic as well as in manual mode. To make it distinguishable a plethora of features are integrated to it such as Artificial Astute, Digital image processing, sensors, GPS and GSM.

METHODOLOGY

It includes :

- 1) Sensor techniques
- 2) Speech to text and text to speech interface for GSM
- 3) Interfacing of GPS and map with voice commands
- 4) Digital image processing techniques
- 5) Electronic control unit
- 6) Mechanical design.

i.Sensors techniques:

We utilize two types of sensors i.e. Ultrasonic sensors and LiDar sensors.

Ultrasonic sensors use ultra-sonic waves to detect objects or to quantify the distance between itself and the object. Ultrasonic waves are those whose frequencies are beyond mundane auricularly discerning limit (more than 20KHz). These sensors will have transducers one for transmitter and one for receiver. The transmitter emits object sonic waves at the rate of 40KHz. And these waves peregrinate through air and when they are blocked by an object, these waves will get reflected and bounced back to the sensors. These waves are received by the receiver of the sensor.



Ultrasonic sensors have 4 pins:

- i. Vcc pin: It is utilized to power on the sensor it is given with 5V.
- ii. Trig pin: It is the input to the sensor.
- iii. Echo pin: Once the waves are reflected by the object and optically canvassed by the receiver this pingoes gradual.
- iv. Gnd pin: This is connected to raspberry pie or arduino gnd.



Fig 1. Ultrasonic sensor

LiDar (Light Detection and Ranging) acts an ocular perceiver of the self driving and providing 360 view of its circumventing in order to enable safe driving. Perpetually rotating LiDar system senses thousands of laser pulses every second. These signals collide with the sundry objects around the conveyance and reflect back the signals. These light reflection are then used to engender a 3D point cloud and on board computer records each laser reflection point and transmits these expeditiously updating point cloud into an animated 3D-representation.

The 3D representation is treated by quantifying the haste of the light and distance coverer with it which avails to determine the conveyance position with reverence to the object circumventing. The 3D representation withal monitors the distance between the conveyance that pass by an any another conveyance in front.

ii. Speech to text and text to speech interface for GSM

Persons can utilize voice commands for GSM communication. The received message is converted to verbalization by this application. To agnize each commands android application for verbalization apperception is made which avail the person to call and send message. Text to verbalization system converts mundane language text into verbalization.

iii. Interfacing of GPS and map with voice commands

Utilizing android a voice guided navigation system is made by interfacing with GPS map. So blind can find the destination and can reach the place with the avail of conveyance. Voice guided navigation is coded and it sends 2 bit data to ECU, where it decodes and engender control signals to run the motor. Digital Image Processing Technique. Face recognition:

A consummate face apperception system consisting of a face detection subsystem, a down sampling module and a face apperception subsystem. It utilizes the Eigen face algorithm.

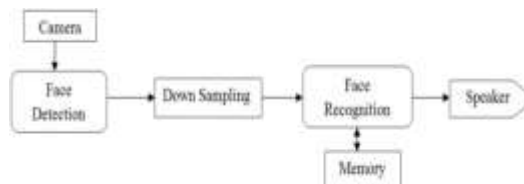


Fig 2. Face recognition flow chart Road, Footpath and Traffic recognition

Pre-processor will load the image and check effulgence and pellucidity. The system will detect colors and probe for the colors like red, yellow and green that constitute road signs. The ebony color is width, more preponderant than or equipollent to minimum predefined width is detected to ascertain that it is road. The processing unit will engender control signals corresponding to the detected signals and send command to ECU to perform task. For digital image processing techniques we utilize ARM process for processing data.

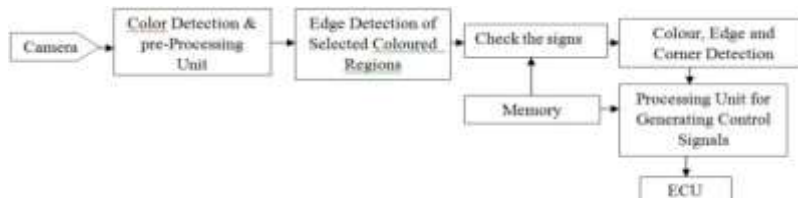


Fig 3. Road footpath and traffic recognition flow chart



iv. Electronic Control Unit (ECU)

It is the heart of the conveyance and control the overall performance of the conveyance. It receives 6 bit binary data from video processing unit, a single data bit data from obstruction evade mux, 2 bit binary data from code engenderer and 4 data from manual control of conveyance unit. All these data's processed and given 4 bit binary output of motor driver to control the motors. Working Conveyance can be operated manually as well as automatically. If it is in automatic mode, then sonar start to sense obstacles, if obstacles are not present in front of conveyance then it checks whether it is road or not. If it is road then it will check for traffic signals, if any traffic signal is found then traffic guidance unit guides the kineticism else it is guided by GPS code guidance unit. If any impediment is detected then it checks for any sonar is dormant. If affirmative, then conveyance will move in that direction to eschew obstacles else it ceases. Blind can detect persons with the avail of face apperception.

CONCLUSION

In this we have learnt about Keenly intellectual Electric conveyance utilizing embedded system and digital image processing. Features associated with it are obstruction avoidance, footpath road face and signal detection and GPS predicated navigation.

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