RESEARCH ARTICLE OPEN ACCESS

An Approach for Object and Scene Detection for Blind Peoples Using Vocal Vision.

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ABSTRACT
This system help the blind peoples for the navigation without the help of third person so blind person can perform its work independently. This system implemented on android device in which object detection and scene detection implemented, so after detection there will be text to speech conversion so user or blind person can get message from that android device with the help of headphone connected to that device. Our project will help blind people to understand the images which will be converted to sound with the help of webcam. We shall capture images in front of blind peoples .The captured image will be processed through our algorithms which will enhances the image data. The hardware component will have its own database. The processed image is compare with the database in the hardware component .The result after processing and comparing will be converted into speech signals. The headphones guide the blind peoples.

I. Introduction:

Vocal Vision is an application made for visually impaired people. From long years ago till the date it is seen that blind people face many problems in doing their activities. They are dependent on others for doing everything. This motivated us to design the system called "VOCAL VISION". This is a small approach to make the blind people independent. This project is a vision substitute system designed to assist blind people for autonomous navigation. Its working concept is based on 'image to sound' conversion. The webcam captures the image in front of blind user then object detection algorithm process this image and enhances the image data that image compare with image in database .If comparison successful then message through android device deliver to user or blind person with the help of headphone about object name and for scene name of the sce A webcam is used to capture the image of the object in the surrounding. This captured image is processed through algorithms. Algorithms includes blurring, gray scaling, edge detection, threasholding, boundary detection, cropping, RGB to HSV, histogram, normalization. After this the object or scenes are compare with the database images so if comparison is successful then it inform blind person about that object or scenes.

Previous System:
technologies and devices includes:
1. Electronic Travel Aids (ETA).
2. Augmented Reality (AR) technology.
3. Navigation Assistance for Visually Impaired (NAVI)

II. ETA:

This technology propose a new system for blind navigation using RFID tags to set up a location tagging infrastructure within buildings such that the blind can use an RFID equipped ETA (such as a cell phone) to determine their location as well as software that can utilize this localization data to generate vocal directions to reach a destination. Electronic Travel Aids (ETAs) are electronic devices designed to improve autonomous navigation of blind people. ETAs design varies from the sizes, the type of sensor used in the system, the method of conveying information and also the method of usage. Image of the scene in front of blind user is captured using video camera and it is transformed into sound pattern. The intensity of the pixel of the image is transformed into loudness .

III. AR Technology:

Augmented Reality (AR) technologies have the potential to support some of the activities for the blind people. This paper presents a design for how a walking cane can be augmented with a camera to detect Semacodes and a Braille device to deliver information. Based on the design they have developed a prototype and described its characteristics, limitations, and lessons learned. Augmented Reality (AR) technologies make the daily life easier for people with disabilities. Smaller and smaller computers enable these people to wear powerful information devices that can help navigating and recognizing objects. Otherwise impossible tasks could be doable by introducing AR concepts and special designed tools. This outlines three strategies in the field of augmented reality: 1) Augmenting the user, 2) Augmenting physical objects and 3) Augmenting the environment.

IV. NAVI:

This technology proposes a new object identification and color recognition module for blind people. Image processing techniques are proposed to

identify objects in the captured image and then the processed image is transformed into stereo sound patterns. Color information from the interested object is evaluated to determine the color of the object.NAVI system consists of tiny vision sensor attached on a sunglass, a stereo earphones and a Single Board Processing System (SBPS) interconnected. SPBS selected for this system is PCM-9550F with Embedded Intel low power PentiumMMX 266 MHz processor, 128 MB SDRAM, 2.5" light weight hard disk, two Universal serial bus and RTL 8139 sound device chipset assembled in Micro box PC-300 chassis. The weight of SBPS is 0.7 Kg. Constant 5V and 12 V supply for SBPS is provided from the batteries. Vision sensor selected for this application is a digital video camera, Zion PN615CMOS. Figure shows the processing equipment of NAVI system.

Drawbacks of system:

1) ETA system uses the ultrasonic sensors which is expensive which contains few electronic components.
2) In AR technology walking cane can be augmented with a camera to detect Semacodes and a Braille device to deliver information.
3) NAVI system only useful for object detection but we also included the scene detection technique in this project.

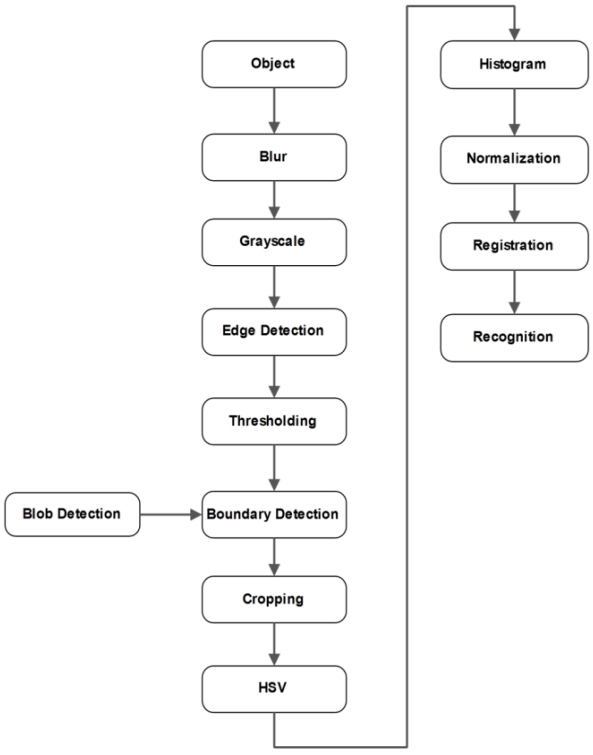
Proposed System:

Definition:

Vocal Vision is an application made for visually impaired people. From long years ago till the date it is seen that blind people face many problems in doing their activities. They are dependent on others for doing everything. This motivated us to design the system called "VOCAL VISION". This is a small approach to make the blind people independent. This project is a vision substitute system designed to assist blind people for autonomous navigation. Its working concept is based on 'image to sound' conversion. The webcam captures the image in front of blind user then object detection algorithm process this image and enhances the image data that image compare with image in database .If comparison successful then message through android device deliver to user or blind person with the help of headphone about object name and for scene name of the scene.

Overall Description

Different blocks includes in this systems are blurring, gray scaling, edge detection, threasholding, boundary detection, cropping, RGB to HSV, histogram, normalization. After this the object or scenes are compare with the database images so if comparison is successful then it inform blind person about that object or scenes.



Blurring:

Using this image looks more sharp or more detailed and it is use for the noise reduction from the grabbed image. Blurring can be achieved using filters such as:

1) Mean filter
2) Weighted average
3) Gaussian filter

Gray Scale:

In a (8-bit) grayscale image each picture element has an assigned intensity that ranges from 0 to 255.A grey scale image is different from black and white image since a grayscale image also includes shades of grey apart from pure black and pure white color.

Edge Detection:

Edge of the object detected from this technique. Sobel operator or Sobel filter use within edge detection algorithm.

Threasholding:

From a grayscale image, threshoulding can be used to create binary images i.e. image with only black or white colors. It is usually used for feature extraction where required features of image are converted to white and everything else to black. (or vice-versa)

Boundry Detection:

Boundry which separate object from the surrounding detected.

Cropping:

Only the required object cropped and other eliminated from image.

RGB to HSV:

HSV separate color information from image intensity .It is use for histogram equalization of color image because it only require the intensity information of image.

Histogram:

Graphical representation of number of pixels for each color. On x-axis range of color(0-255) and on y-axis number of pixel for each color.

Normalization:

It is the process that changes the range of pixel intensity values or spreading out most frequently intensity values. Stretches an image's pixel values to cover the entire pixel value range(0-255)

Conclusion:

Blind person can perform different activities without the help of third person using this system. Using this system blind person can do its work independently

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