DAZZLE-PILOT GUIDES YOUR OWN WAY

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Abstract: ***In today's world everybody is busy with their own business and there is none to help the people who are physically challenged(blind) to make their movement easy . In order to avoid the problem of having a person to take care of a physically challenged (blind) person, to make an easy move we have come with a solution dazzle pilot , it is going to help the person(blind) by guiding him in his way to move. The basic need is a person(blind) must have a mobile with android operating system such that it captures the images and detects objects and sends a voice message if any object is recognized.***

Keywords: **dazzle, android, object detection, open CV**

I. INTRODUCTION

This document aims to design an android application using Open-cv which is helpful for physically challenged(blind) people to make their movement easy .this android application is device in such a way that whenever it comes across any object or person on its way it starts functioning or it becomes active. It captures images rapidly and transverse voice messages to the applicant or the person who uses the application, so that it guides the physically challenged (blind) people without any physical help from any other person. This application makes physically challenged (blind) independent and boosts their confidence.

II. FACE DETECTION AND OBJECT DETECTION

David Hubel and Torsten Wiesel, that our brain has specialized nerve cells responding to specific local features of a scene, such as lines, edges, angles or movement. Since we don't see the world as scattered pieces, our visual cortex must somehow combine the different sources of information into useful patterns. Automatic face recognition[1] is all about extracting those meaningful features from an image, putting them into a useful representation and performing some kind of classification on them.Face recognition based on the geometric features of a face and is probably the most intuitive approach for face recognition.

The recognition was performed by calculating the euclidean distance between feature vectors of a probe and reference image. Such a method is robust against changes in illumination by its nature, but has a huge drawback: the accurate registration of the marker points is complicated, even with state of the art algorithms.

Some research is going on geometric face recognition . It was found by a great research that geometrical features alone may not carry enough information for face recognition for this a 22-dimensional feature vector was used and experiments on large datasets have shown, that.

The Eigen faces method took a holistic approach to face recognition: A facial image[2] is a point from a high-dimensional image space and a lower-dimensional representation is found, where classification becomes easy. The lower-dimensional subspace is found with Principal Component Analysis, which identifies the axes with maximum variance. While this kind of transformation is optimal from a reconstruction standpoint, it doesn't take any class labels into account. Imagine a situation where the variance is generated from external sources, let it be light. The axes with maximum variance do not necessarily contain any discriminative information at all, hence a classification becomes impossible. So a class-specific projection with a Linear Discriminant Analysis was applied to face recognition .

The basic idea is to minimize the variance within a class, while maximizing the variance between the classes at the same time.

Recently various methods for a local feature extraction emerged. To avoid the high-dimensionality of the input data only local regions of an image are described, the extracted features are (hopefully) more robust against partial occlusion, illumation and small sample size. Algorithms used for a local feature extraction which are called as Gabor Wavelets, Discrete Cosinus Transform and Local Binary Patterns . It's

still an open research question what's the best way to preserve spatial information when applying a local feature extraction, because spatial information is potentially useful information.

A. Object Detection

Object Recognition is some times called Computer Vision though Computer Vision really refers to a larger problem space which includes Object Detection, Object Tracking, Object Recognition and many other types. 2D object recognition is quite common where as3D object recognition is a less developed technology though recent advances have taken it leaps and bounds ahead.

Computer vision and object recognition is an extremely difficult problem. The human brain without concious input does a great deal of what amounts to some very complex mathematical equations. Catching a ball, for example, is a calculation which includes trajectory, velocity and mass. We do it in real time.

Most computers these days can do it but most can't accomplish it in real time the way that the human brain can. As a whole this is a non-trivial project. Fortunately people intelligent than me have been working on it for a long time. We will stand on their shoulders and make it look easy but let us take a moment to acknowledge the amazing work that has beendone not only by the team that comprises Willow Garage but by the other researchers that they have built upon.

From the research on computer vision[4] we can step back through the many researchers who have developed different image recognition algorithms and technologies. To the components of those who have developed edge detection, color intensity determination and signal processing. Finally at it's base we get to the pure mathmatical research that has produced Fast Furrier Transforms and Haar Wavelets and many other algorithms and functions without which none of this would be possible. All so that I can keep my cat out of the house using a device that fits in my pocket.Since this problem is not new researchers have and continue to develop new methodologies to tackle the challenge.

Some popular techniques in use today:

Edge detection: Determining the boundries between objects is accomplished via a number of techniques including Canny Edge Detection[5],Hugh Transforms which actually extends into Blob detection: Taking edge detection to the next step blob detection is the art of identifying discrete sections of an image such as a hand,a teacup or a car. These blobs can then be used later to make decisions about the content of the image.

Corner detection: Is another technique used to break the problem up into multiple pieces which can be simplified. It is obviously very useful in determining basic shapes such as squares, triangles and circles (because they have zero) but most things have corners on them in some form or another. Which is probably why these two combine and overlap with.

Interest Point Detection:This method roughly involves determining regions of the image which can be used to identify an object (potentially a blob) such as bright spots, dark spots, corners, intersecting lines or just concrete variations in something (such as intensity) that the computer can latch on to and use to match images.

III. DAZZLE PILOT

Dazzle pilot is a special application made for physically challenged(blind) to make them independent. They will be guided by the device(mobile) by this special application in it which turns visual messages in to voice messages it is explained in detail as an android application which is helpful in guiding the person who is physically challenged (blind) with the help of voice message if it comes in contact with any obstacle in his way to walk. Firstly ,the application dazzle pilot start its work by capturing images continuously with a time gap of five seconds. Then after capturing each image it checks whether any obstacle is present in the captured image, if there is any obstacle present in the image captured the application displays a text message .This text message which can't be read by a person who is physically challenged(blind) is then converted in to a voice message. In order to overcome the problem of a physically challenged person .Inorder to detect the obstacles in an image , the Open Source Visual Studio Libraries are used which are popularly known as Open cv.

OpenCV is an image processing Library created by Intel and maintained by Willow Garage .It is mainly aimed at real time applications. It is mainly used for manufacturing inspection systems, Medical image analysis, face detection, object detection and more. OpenCV (Open Source Computer Vision Library) is an open-source library that includes several hundreds of computer vision algorithms. The document describes the so-called OpenCV 2.0 API, which is essentially a C++ API, as opposite to the C-based OpenCV 1.x API.

A. Face Detection

The Face detection [6] is nothing but detecting the faces in the captured image. Open-cv provides face detection as default when we install the libraries in to our work space.By using this method which is predefined in Opencv, we can only detect the faces ,which alone cannot be used in dazzle-pilot.As we need to process the whole image captured ,this face detection alone cannot be sufficient to detect the obstacles present in the image.

B. Object Detection

Object detection is detecting the objects present in the image captured.Even object detection method is predefined in opencv.using this object detection only the objects such a tea –cup and many other things can be detected.But this object detection alone is insuffient to guide the physicallychallenged(blind) people.

Face detection or object detection alone cannot be helpfull in guiding the person effectively.We need to guide the person through this application in such a way that the device should detect both an objects as well as faces present in the image captured.

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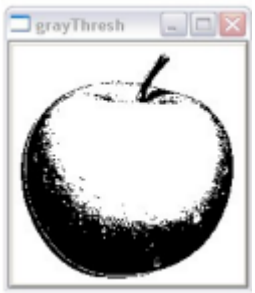
IV. RESULTS AND ANALYSIS

The application captures the images rapidly and if it catches any obstacles it sends the voice messages and it is possible with the help of Opencv object detection as shown below.



For example if any obstacle is captured then it is converted in to bitmap image where the original object on left is converted to right as shown.



At this moment a text is displayed on screen stating that there is an obstacle .As the person who is physically challenged(blind) cannot read the text displayed, we here by convert this text to voice message which can be audible to a person.

Similarly other examples:

The camera captures the images and converts them into bitmap images. If there is any object the text message displayed is then converted to voice message such that the person (blind) changes his direction .

V. CONCLUSION

The Above all ,in order to minimize the problems faced by physically challenged(blind) people this application dazzle pilot is going to help as a result of which a person(blind) can have a easy move.

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