International Journal of Advanced Science and Technology
Vol. 29, No. 9s, (2020), pp. 7538-7543

Visual Product Identification for Blind People

[1]Prof. G. S .Mate, [2]Harshada Godambe, [3]Madhuri Maske, [4]Akash Gomare
[1]*Research Scholar, JSPM's Rajarshi Shahu College of Engineering Pune*
[2,3,4]*Information Technology Department Rajarshi Shahu COE, Pune*

Abstract

This project is developed to make the life of blind people easy. This is a camera based system to scan the product behind the image and read the description of the product with the help of Id stored in the product. This is very beneficial in case of finding out the description of packaged goods to the blind people and thus helping them in deciding to purchase a product or not especially which are packaged. This is because it becomes very difficult for the blind people to distinguish between the packaged goods. In order to use this system, all the user needs to do is capture the image on the product in the device which then resolves the product which means it scans the image to find out the Id stored. Thus this application really benefits blind and visually impaired people and thus making their work of identifying products easy. This is very easy to use and affordable as it requires a scanner to scan the product and a camera phone to take the picture of the image containing the product. This is now easy to implement as most of the devices today have the required resolution in order to scan the product to identify the Id stored in it and read out the product description. This project can be implemented in any shopping mall, supermarket, Book stores, Medical stores etc

1 Introduction:

The ability to identify products such as groceries and other products is very useful for blind and visually impaired persons, for whom such identification of information may be inaccessible.

This is now easy to get information & price of product but we need scanner for the same. Mobile phones can also help to get information but it need proper internet access.

2 Lıterature Survey

A. Toolkit for Bar Code Recognition and Resolving on Camera Phones – Jump Starting the Internet of Things by Robert Adelmann, Marc Langheinrich, Christian Flörkemeier which describes System developed a freely available EAN-13 bar code recognition and information system that is both lightweight and fast enough for the use on camera-equipped mobile phones.

Limitations: If barcode were not in scanable condition, the system won't work properly.

B. Real time object detection & tracking system (locally & remotely)with rotating by S. Kresic, D. madej, Fadil Santosa Which describes System present a novel approach to edge detection in bar code signals

using a hidden Markov model (HMM). System also present an algorithm for selection of an optimal filter scale used in smoothing the data. Limitations: It needs network connection for object detection and tracking system in this proposed model.

3 Proposed System

A. Background

Although a number of reading assistants have been designed specifically for the visually impaired, to our knowledge, no existing reading assistant can read text from the kinds of challenging patterns and back-grounds found on many everyday commercial products. To assist blind persons to read text from these kinds of hand-held objects, we have conceived of a camera based assistive text reading framework to track the object of interest within the camera view and extract print text information from the object

B. Relevance

Today, there are already a few systems that have some promise for portable use, but they cannot handle product labeling. For example, portable bar code readers designed to help blind people identify different products in an extensive product database can enable users who are blind to access information about these products. Through Speech and Braille. But a big limitation is that it is very hard for blind users to find the position of the bar code and to correctly point the bar code reader at the bar code.

C. Project Undertaken

There are many people who are Visual impairment or blind. Blind people face several problems in their life, one of these problems that is the most important one is detection the obstacles when they are walking.

Blindness is a state of lacking the visual perception due to neurological or physiological factors The main objective of this project is to develop an application for blind people to detect the objects in various directions.

D. Features Of System

1. Hardware setup:

connect raspberry with camera and install drivers.

2. Image Capture: Capture real time image and send for processing.

3. Apply YOLO Algo

4. send voice output:

Process the image using image detection algorithm and send voice output.

4 Design And Architecture

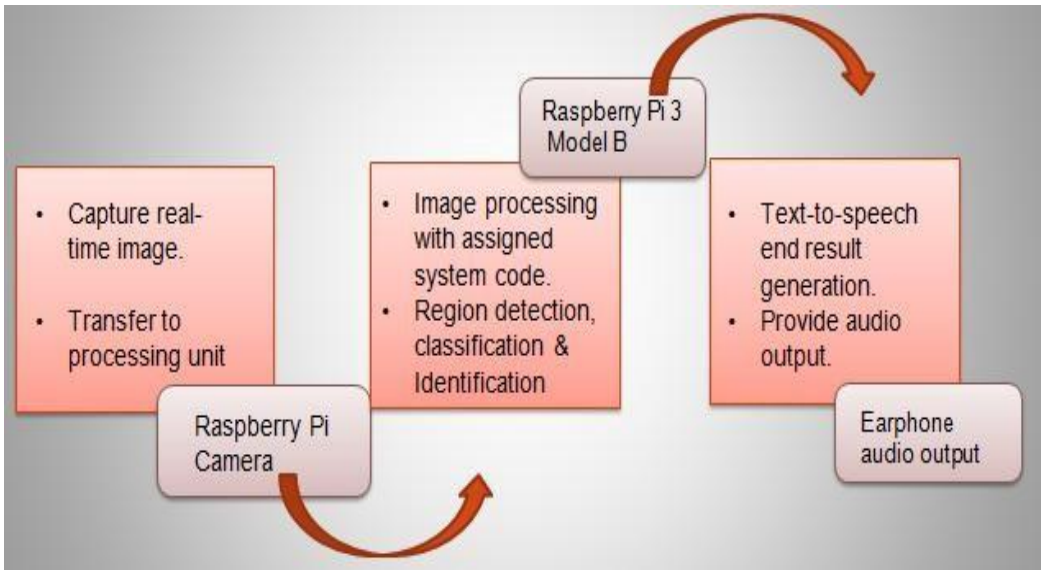

Fig no. 1

A. Module

1. Hardware set up:

Connect raspberry with camera and install drivers.

Connecting the hardware

Execute below command:

raspistill -o image.jpg

Above command will start the camera and click the pic, and image will be save

1. Image Capture:

Capture real time image and send for processing.

2. Apply YOLO Algo:

Applying the YOLO algo for Object Identification:

YOLO model divides an image into S×S grid. Each grid cell predicts B bounding boxes, and boxes' confidence scores for the prediction and detect if a class falls in the boxes. The confidence is defined as P r(object) × IOUtruth pred , which represents the confidence of a class in the box and accuracy of the box coordinates. Thus, each box has five parameters to predict: x, y, w, h and confidence. Each grid cell also

predicts P r(Classi |Object). Thus the confidence for each box is P r(Classi |Object) × P r(object) × IOUtruth pred = P r(Classi) × IOUtruth pred . The overall variables to be predicted can be represented as a S × S × (B × 5 + C) tensor

5 Raspberry pı 3:

The **Raspberry Pi** is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote teaching of basic computer science in schools and in developing countries. The original model became far more popular than anticipated, selling outside its target market for uses such as robotics. It does not include peripherals (such as keyboards and mice) or cases. However, some accessorieshave been included in several official and unofficial bundles.

The organisation behind the Raspberry Pi consists of two arms. The first two models were developed by the Raspberry Pi Foundation. After the Pi Model B was released, the Foundation set up Raspberry Pi Trading, with Eben Upton as CEO, to develop the third model, the B+. Raspberry Pi Trading is responsible for developing the technology while the Foundation is an educational charity to promote the teaching of basic computer science in schools and in developing countries.

6 What is yolo ?

Object detection is one of the classical problems in computer vision where you work to recognize *what* and *where* — specifically what objects are inside a given image and also where they are in the image. The problem of object detection is more complex than classification, which also can recognize objects but doesn't indicate where the object is located in the image. In addition, classification doesn't work on images containing more than one object.

YOLO uses a totally different approach. YOLO is a clever convolutional neural network (CNN) for doing object detection in real-time. The algorithm applies a single neural network to the full image, and then divides the image into regions and predicts bounding boxes and probabilities for each region. These bounding boxes are weighted by the predicted probabilities.

YOLO is popular because it achieves high accuracy while also being able to run in real-time. The algorithm ―only looks once‖ at the image in the sense that it requires only one forward propagation pass through the neural network to make predictions. After non-max suppression (which makes sure the object detection algorithm only detects each object once), it then outputs recognized objects together with the bounding boxes.

7 Conclusıon

In this project, we investigate the need from blind and visually impaired people. Base on the impetus of the CNN, we develop a blind visualization system that helps blind people better explore the surrounding environment. A portable and real time solution is provided in the project. We present a platform that utilizes portable cameras, fast HD video link and powerful server to generate 3D sounds. By using YOLO algorithm and advanced wireless transmitter, the solution could perform accurate real time objective detection with live stream at a speed of 30 frames, 1080P resolution. A prototype for sensory substitution (vision to hearing) is established in the project. Through this project, we hope to demonstrate the possibility of using computer vision techniques as a type of assistive technology

8 Acknowledgment

We take up this opportunity to thank all the teaching and nonteaching staff of Information Technology department for their continuous support and cooperation through the each development phase of this project.

We would also like to thank all those who are directly or indirectly connected with our project, especially to our seniors to whom we owe a note of thanks to our seniors to whom we owe a note of thanks.

References

1. Joseph Redmon and Anelia Angelova, Real-Time Grasp Detection Using Convolutional Neural Networks (ICRA), 2015.
   A. Quattoni, and A.Torralba. Recognizing Indoor Scenes. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2009.
2. Saurabh Gupta, Ross Girshick, Pablo Arbelaez and Jitendra Malik, Learning Rich Features from RGBD Images for Object Detection and Segmentation (ECCV), 2014.
3. Tadas Naltrusaitis, Peter Robison, and Louis-Phileppe Morency, 3D Constrained Local Model for Rigid and Non-Rigid Facial Tracking (CVPR), 2012.
4. Andrej Karpathy and Fei-Fei Li, Deep VisualSemantic Alignments for Generating Image Descriptions (CVPR), 2015.
5. David Brown, Tom Macpherson, and Jamie Ward, Seeing with sound? exploring different characteristics of a visual-to-auditory sensory substitution device. Perception, 40(9):1120–1135, 2011.
6. Liam Betsworth, Nitendra Rajput, Saurabh Srivastava, and Matt Jones. Audvert: Using spatial audio to gain a sense of place. In Human-Computer Interaction– INTERACT 2013, pages 455–462. Springer, 2013.

AUTHORS PROFILE

Harshada Godambe, Information Technology department, Rajarshi Shahu College Of Engineering, Pune, India. Email: godambe96@gmail.com

Madhuri Maske, Information Technology department, Rajarshi Shahu College Of Engineering, Pune, IndiaEmail:maskemadhuri07@gmail.com

Akash Gomare, Information Technology department Rajarshi Shahu College Of Engineering, Pune, India. Email:akashankushgomare@gmail.com

Prof. G. S. Mate, Information Technology department Rajarshi Shahu College Of Engineering, Pune, India. Email:gsmatenew@gmail.com

ISSN: 2005-4238 IJAST