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Guidance to Visually Impaired with Image Detection using Raspberry Pi - The Vision

Kafil Ahmed Shaikh¹, Vaidik Trivedi², Dharik Shah³

Department of Information Technology, Sardar Patel College of Engineering, Bakrol, Anand, Gujarat, India

ABSTRACT: There are around 37 million blinds in globe. Out of which many dies due to accident because they don't have vision. Blind people are always dependent on others for guidance. This system will identify a person or an object easily. It will provide guidance to visually impaired so that blinds won't be dependent on others for guidance.

KEYWORDS: Object Detection, Face Recognition, Character Detection, Text to Speech conversion, providing guidance to blinds.

I. INTRODUCTION

This system is to give vision to visually impaired. Blind people who are totally dependent on others like they need someone everywhere either a person or an animal to guide them. So the product which we are developing will give blinds the vision so that they can live their life independently. The vision to visually impaired means providing the details about what is in front of them like objects, faces and giving them details using text-to-speech conversion so that blinds can easily hear it with help of earphones and get idea about what's happening around. The product will capture the image using a camera and process using a Raspberry pi. Once the image is processed it will provide details to the user. The product will be trained using Machine Learning and more training leads to more efficient results [1].

II. RELATED WORK

The work done related to this system is a hardware based stick which has various features:

- The proposed solution for Blinds was a hardware based stick, which only provides warnings using a vibration so that blinds can know that object is near them, but they will not be able to know what the actual object it is.
- A stick, which provides warning regarding the object, that comes in between the path where that blind person travels.
- Stick provides confusion because it vibrates for all small objects.
- Due to this working blinds gets annoyed for each and every single vibration.
- Due to this problems faced by Blinds this system will be implemented.

III. ALGORITHMS FOR VARIOUS DETECTIONS:

A. FACE DETECTION

1) Eigen Faces: Eigen face method is one of the generally used algorithm for facerecognition. This method is successfully used to perform dimensionality reduction. Principal component analysis is used by face recognition and Detection Eigen picture. [4]

2) Fischer Faces: Fisher faces is one the most successfully widely used method for face recognition. It is based on appearance method. In 1930 R.A Fisher developed linear/fisher discriminant analysis for face recognition. [4].

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3) **LBP** (**Local Binary Pattern Histogram**): Fisher faces and Eigen faces are comprehensive Techniques to face recognition. The pixels are the vector of the data some point in High dimensional vector space. High dimensional vector space gives some ambiguity during face recognition.[3]

Thus, in this system **LBP** algorithm is used for speed and accuracy for face detection.

B. OBJECT DETECTION

1) **YOLO** (**You Only Look Once**): We present YOLO, a new approach to object detection. Prior work on object detection repurposes classifiers to perform detection. Instead, we frame object detection as a regression problem to spatially separated bounding boxes and associated class probabilities. [5]

2) **SDD**: This paper aims to achieve real-time and accurate detection of surface defects by using a deep learning method. For this purpose, the Single Shot MultiBox Detector (SSD) Network was adopted as the meta structure and combined with the base convolution neural network (CNN) Mobile Net into the Mobile Net-SSD. [2]

Thus, in this system **YOLO** algorithm is used because of its easy to use, faster and decent accuracy for object detection.

C. CHARACTER DETECTION

1) **OCR**: Optical Character Recognition has a number of applications in day-to-day existing or OCR has been commonly applied to the plate identification, barcode recognition, legal billing document, finance and insurance documents many others. An optical character recognition system with a high identification rate is challenging to expand. One of the major features to OCR errors is mark characters. Many factors lead to the mark of nature such as bad scanning quality and a poor linearization technique.[7]

2) **KNN** (**K Nearest Node**): Text categorization (also called text classification) is the process of identifying the class to which a text document belongs. This paper proposes to use a simple non-weighted features KNN algorithm for text categorization. We propose to use a feature selection method that finds the relevant features for the learning task at hand using feature interaction (based on word interdependencies).[6]

Thus, in this system **KNN** algorithm is used because of fast recognition and it takes less time to train.

IV. TECHNICAL DESCRIPTION

A. Raspberry Pi 3 B+:

The Raspberry Pi 3 Model B+ is the latest product, an updated 64-bit quad core processor running at 1.4GHz with built-in metal heatsink, dual-band 2.4GHz and 5GHz wireless LAN. Raspberry pi can also be used for processing the images captured by camera.



Fig. 1. Raspberry Pi 3b+

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B. Camera

The high-definition 5MP camera delivers outstanding photos but can also shoot video, ideal for drones or a CCTV project. The light weight camera is also useful as pi camera or used in Raspberry Pi.

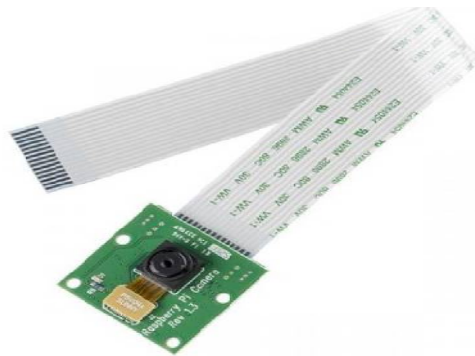


Fig. 2. Camera 5mp

V. PROPOSED SYSTEM

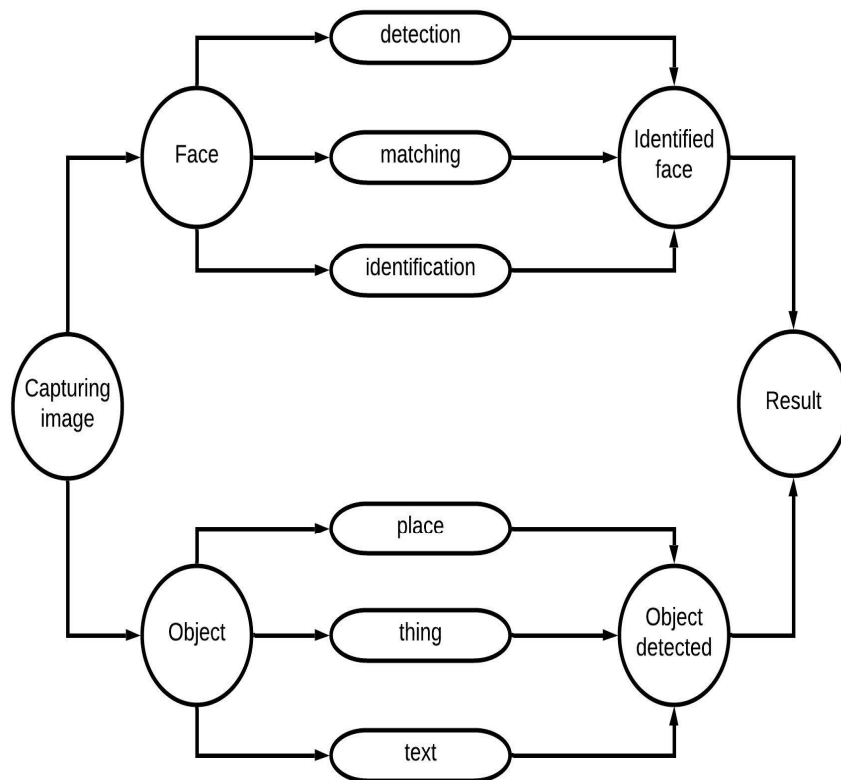


Fig 3: Proposed System

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VI. IMPLEMENTATION

The system is working on image detection and image recognition. Initially, camera module capture the image then image is converted into various algorithm, after that it is compared with trained dataset then certain similarity calculation is done, by which we get confidence. If the confidence is above threshold then it will define label otherwise it will define unknown. If confidence below threshold then we have to train machine so that result will be displayed on the nearest device.

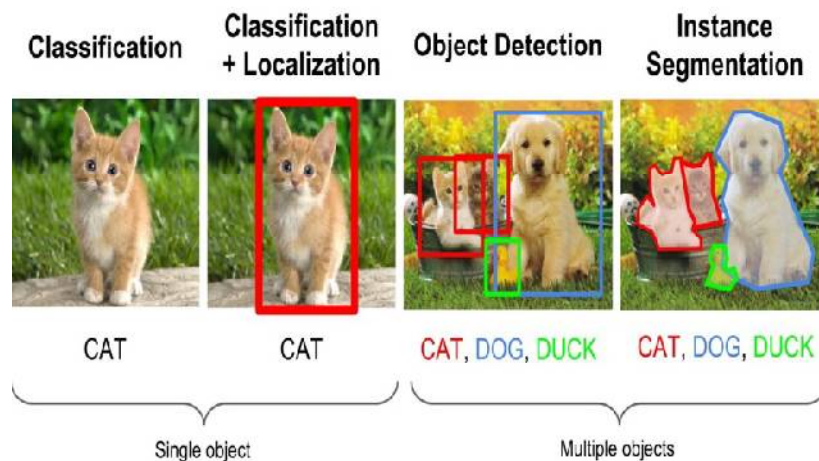


Fig. 4. Implementation

VII. CONCLUSION

This system will be easy for identifying various faces, things, objects and get the details efficiently and provides guidance to visually impaired. This can be achieved by training the machine and with the help of different algorithm, Accuracy of the output will be increased so our program is Adaptive.

REFERENCES

1. C. Dong, C. C. Loy, K. He, and X. Tang. Image super-resolution using deep convolutional networks. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 38(2):295–307, Feb 2016.
2. Yiting Li, Haisong Huang, Qingsheng Xie, Liguoyao, and Qipeng Chen. Research on a surface defect detection algorithm based on mobilenet-ssd. *Applied Sciences*, 8:1678, 09 2018.
3. Moses and Ullman. Face recognition. In *Face Recognition: The Problem of Compensating for Changes in Illumination Direction*, pages 721–732, July 1997.
4. Riddhi Patel and Shruti B Yagnik. A literature survey on face recognition techniques. *International Journal of Computer Trends and Technology (IJCTT)*, 5(4):189–194, 2013.
5. Joseph Redmon, Santosh Divvala, Ross Girshick, and Ali Farhadi. You only look once: Unified, real-time object detection. In *Proceedings of the IEEE conference on computer vision and pattern recognition*, pages 779–788, 2016.
6. P. Soucy and G. W. Mineau. A simple knn algorithm for text categorization. In *Proceedings 2001 IEEE International Conference on Data Mining*, pages 647–648, Nov 2001.
7. Shrinivas Zanwar, U B Shinde, Abhilasha S Narote, and Sandipann P Narote. An effectual optical character recognition using efficient learning system. Abhilasha S. and Narote, Sandipann P., An Effectual Optical Character Recognition Using Efficient Learning System (February 24, 2019), 2019.