HOUSEHOLD OBJECT FINDER USING WEBCAM AND CNN ON RASPBERRY PI 3

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Abstract: Blindness and low vision problems are increasing nowadays for both youth and aged society. Working members have to work outside in the day time to earn money for the family. So those people are forced to live alone and facing a difficulty because they cannot see things clearly. In this research, Convolutional Neural Networks (CNNs) for household objects finder is proposed. Raspberry Pi 3 is used to help to see objects and tell the type and location of the objects via voice. YOLO neuron network is selected because of the speed and resource images was prepared and fed into YOLO network as training inputs.   YOLO is trained in coco database.. Trained YOLO can detect objects .Prototype of wearable device is built by using a webcam, headphone, push switch, battery and Raspberry Pi 3. Device will capture an image when a push switch is pressed and Raspberry Pi returns pre recorded voice results consist of objects types and their locations through headphone to users.This device can be used for finding various kinds of objects without more delay. Availabiliry of the components create this device easily available in the market and reduces its cost.
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I.   INTRODUCTION

Most of the blind and low vision people in a family are forced to live alone in their house because their children have to work outside in the day time in order to get enough income for whole family. The most common issue for elderly is that they cannot see things clearly and always lost important objects such as glasses, cell phone and TV's remote controller. Aim of this research is to develop the prototype wearable device that can identify the objects in front of the elderly and also can tell the elderly roughly locations of that objects by using Convolutional Neural Networks (CNNs). The CNNs is trained for both classification and localization on specific common household objects such as glasses, folk, spoon, cell phone, etc. YOLO is trained on coco database to create wearable device that easy to carry around a house. Webcam and an in-ear headphone are connected to Raspberry Pi 3 to gather picture and deliver the output voice of the locations and kinds of recognized objects. Because of the flexibility,CNN can be easily implemented and can achieve the good performance even though operates in very limited resources hardware likes in Raspberry Pi platform.

II.   LITERATURRE SURVEY

Real time member recognition using Rasspberry pi fo visually impaired people- Mr Mohiuddin Ahmad,Mr Md. Tobibul Islam and Mr Akas Shingha Bappy (IEEE) on their research work firstly describes the development and estimation of raspberry PI. Raspberry Pi is a very powerful processor.

Real time object detection with audio feedback using YOLO vs YOLO-V3- Mr Mansi mahendru ,Sanjay Kumar Dubey (IEEE) describes that Object recognition is one of the challenging application of computer vision, which has been widely applied in many areas. With the rapid development of deep learning many algorithms were improving the relationship between video analysis and image understanding. This paper proposes a system that will detect every possible day to day multiple objects on the other hand promote a voice to alert person about the near as well as farthest objects around them. In this paper system is developed using two different algorithms i.e. Yolo and Yolo-v3 and tested under same criteria to measure the accuracy and performance. Both the algorithms are analyse using webcam in various situations to measure accuracy.

 Household object finder and localizer(IEEE)- Mr Amit Pandhare ,Mr Marimuthu Konar ,Mr Adarsh Hemant Kenjale and Mr Dv Karthikeyan Velladurai Object detection is an important application focused on machine learning technology, which is distinguished by its high capacity for feature learning and representation compared to conventional object detection approaches. Convolution Neural Networks for House hold object finders and localizers are suggested in this study.

Object detection and narrator for visually impaired people (IEEE)- In this paper, Mr Jawaid Nasreen Warsi and Mr Arif Asad Ali Shaikh Proposed the implementation of computer vision machine learning algorithms to detect object and use it to aid visually impaired person. This paper explain how convolution neural network are trained on Image Net dataset that can detect objects and narrate detected objects information to the visually impairs person. This implementation can be used with any device using a camera that include computers.

 Real time object detection for visually challenged people(IEEE)- Ms Sunit vaidhya, Ms Naisha shahand and Ms Niti shah , the authors of this project . The proposed approach suggests detection of objects in real-time video by using a web camera, for the object identification. YOLO model is utilized which is CNN-based real-time object detection technique. The objective of the

proposed work is to change the visual world into an audio world by notifying the blind people about the objects in their path. The external assistance just by using the real-time object This will help visually impaired people to navigate independently without any detection system. The main objective of the proposed work is to provide good accuracy, best performance results and a viable option for the visually impaired people to make the world a better place for them.
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III. OBJECTIVE

Main objectives of this work can be illustrated as:

- To develop a device that can assist blind people with recognizing their surroundings and moving freely throughout them.
- To design a device capable of detecting dynamic objects.
- The device have greater accuracy.
- To provide better performance with minimal equipment.
- Can be used in long term and budget friendly.

IV. METHODOLOGY

1)Firstly,collected the data set and clean the data for making model.

2)Pre trained model available by using coco dataset,in which YOLO is used to recognize object using raspberry pi 3.

3)The resulting program is uploaded to the memory card and inserted into the Raspberry pi 3.

4)The raspberry pi is connected with web cam,battery and headphone.

5)When push button is pressed,web cam will capture the object picture and output will be in voice format,that get by sound device like speaker or headphone.
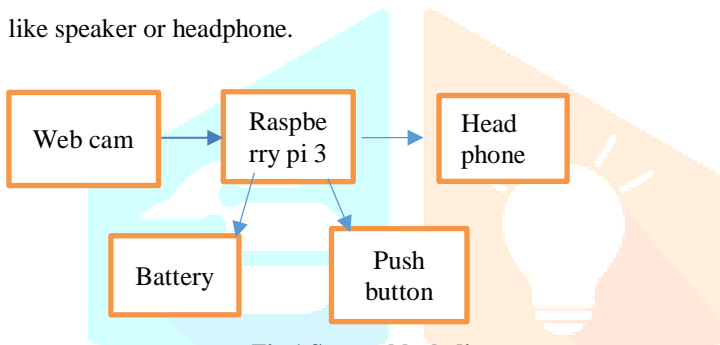

Fig 1.System block diagram

V. SYSTEM FLOWCHART
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The system will start by push button is pressed . The camera is in auto run stage so when it is started camera will capture the image of the object .The pre trained yolo is initialized and the image is transferred to through yolo v3. The yolo will identifies the object .Name is converted to speech .Voice come out through audio jack The output contain a box representing a part of the image where a particular object is detected.By using text to speech converter software ,the image is converted to voice output . The earphone connected to audiojack of raspberry pi 3 provides voice corresponding to the object.
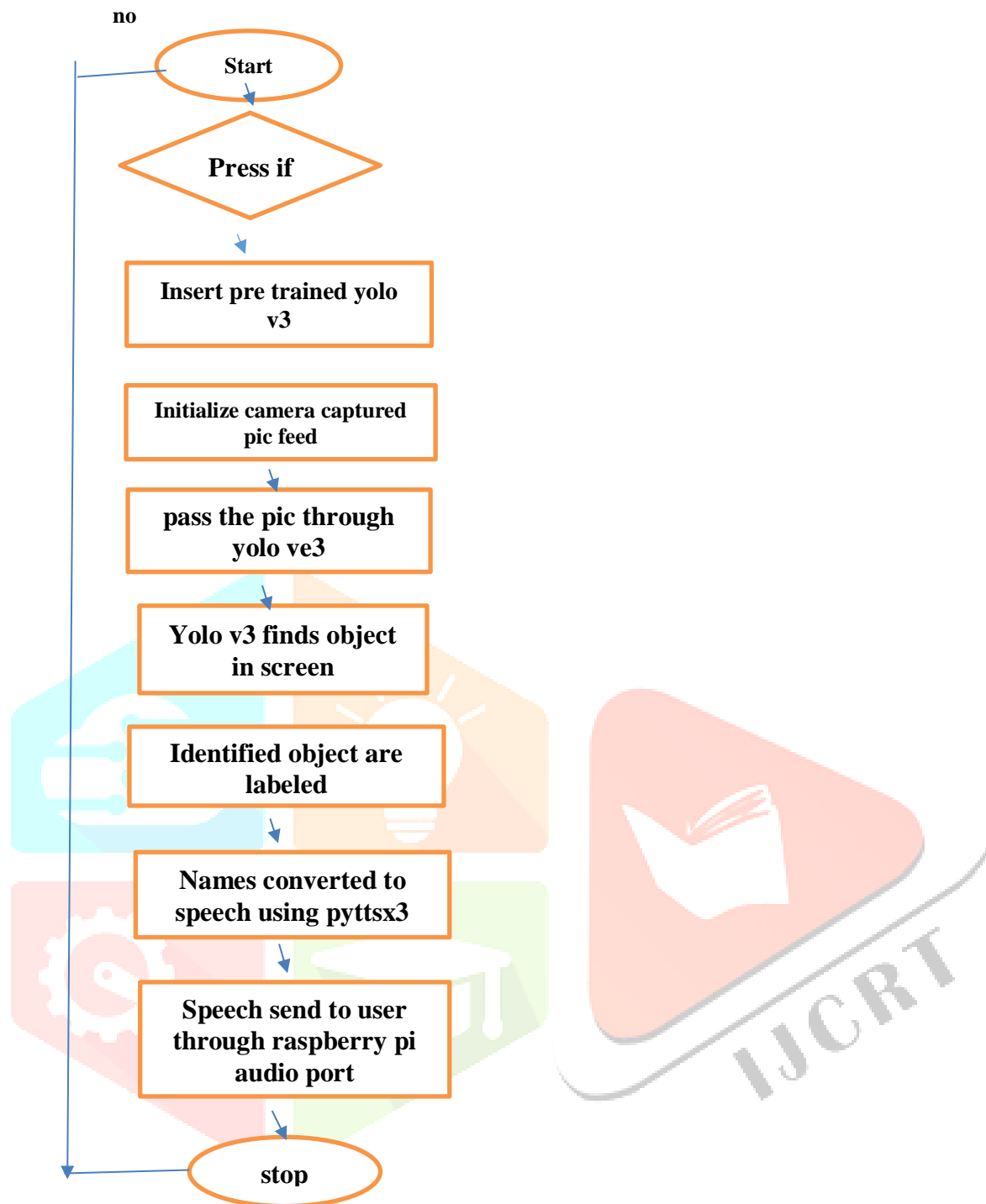
Figure 2. System Flowchart

VI. WORKING

The working of the system starts by giving suitable power to raspberry pi processor. Thus,webcam which is connected to the raspberry pi 3 by USB port gets initialized.The switch is provided so that when we press the switch the camera will automatically starts to run and capture the photo of real time object and which in turn convert to set of frames using python command.The output contain a box representing a part of the image where a particular object is detected.By using text to speech converter software ,the image is converted to voice output . The earphone connected to audiojack of raspberry pi 3 provides voice corresponding to the object.

VII. BENEFITS & LIMITATIONS

Advantages:

1)The method is implemented in raspberry pi 3 so that they are suitable to run on a low performance hardware.

2) High accuracy and frame rate to be useful in practical application.

3)Open cv is a library of programming functions which will supports multiple platforms .

4)By using raspberry pi,it looks the whole image at test time so its prediction are informed by a global context in the image.

5) Freedom of mobility.

6)YOLO is incredibly fast.

Disadvantages:

1)These models are trained by feeding a collection of pre trained images to a neural network, this procedure is very time consuming.

2) System cannot be used in dark.

3) Lots of training data is required for CNN.

4)CNN do not encode the position and orientation of object.

VIII. APPLICATION

- **This can be used for visually impaired people**
- **Device can be used to find the name of the object**

IX. FUTURE SCOPE

We can Providing a GPS locator and Wireless charger to recharge the battery . Detection of objects in full dark mode. The future perspective of this project is to increase the object recognition rate which can be achieved by using the Tensor Flow library and to provide an exact distance measurement between the people and object. Further, we can implement face recognition and text recognition in the same system. Thus, making the system compatible overall.

X. REFERENCES

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