Real Time Object Detection

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Abstract: A The design and implementation of object counting algorithm based on image processing by using Raspberry pi on real time basis. Features of an image containing objects to be detected are extracted uses a method called BLOB (Binary Large Object) analysis. This method is used so as to identify the objects/regions using pixel connectivity and further more parameters . Preprocessing of the input test image is done to get a binary image. The number of objects identified is displayed or read out using a speaker interfaced to the hardware. The hardware Raspberry Pi, running with UBUNTU operating system flashed into a memory card, works as a standalone device with the Raspberry Pi camera being used as an image acquisition device to constantly capture image frames of objects of interest.

1. Introduction

The aim of this proposed topic   designing and development of a real time system to detect and track objects in video streams used in traffic surveillance, security cameras, etc. The goal of object detection is to detect all instances of objects from a known class, such as people, cars or faces in an image. Typically only a small number of instances of the object are present in the image, but there is a very large number of possible locations and scales at which they can occur and that need to somehow be explored. Each detection is reported with some form of pose information. This could be as simple as the location of the object, a location and scale, or the extent of the object defined in terms of a bounding box. In other situations the pose information is more detailed and contains the parameters of a linear or non-linear transformation. For example a face detector may compute the locations of the eyes, nose and mouth, in addition to the bounding box of the face.

Object detection is inextricably linked to other similar computer vision techniques like image recognition and image segmentation, in that it helps us understand and analyze scenes in images or video. But there are important differences. Image recognition only outputs a class label for an identified object, and image segmentation creates a pixel-level understanding of a scene's elements. What separates object detection from these other tasks is its unique ability to locate objects within an image or video. This then allows us to count and then track those objects.

Given these key distinctions and object detection's unique capabilities, we can see how it can be applied in a number of ways: Crowd counting Self-driving cars Video surveillance Face detection Anomaly detection

Of course, this isn't an exhaustive list, but it includes some of the primary ways in which object detection is shaping our future Creating accurate Machine Learning Models which are capable of identifying and localizing multiple objects in a single image remained a core challenge in computer vision. But, with recent advancements in Deep Learning, Object Detection applications are easier to develop than ever before. TensorFlow's Object Detection API is an open source framework built on top of TensorFlow that makes it easy to construct, train and deploy object detection models.Object Detection is the process of finding real-world object instances like car, bike, TV, flowers, and humans in still images or Videos. It allows for the recognition, localization, and detection of multiple objects within an image which provides us with a much better understanding of an image as a whole. It is commonly used in applications such as image retrieval, security, surveillance.

2. Literature survey

P. Angelov, P. Sadeghi-Tehran, R. Ramezani," A Realtime Approach to Autonomous Novelty Detection and Object Tracking" in Video Streams, International Journal of Intelligent Systems, ISSN 0884-8173, 2010, invited paper.[7] The project mainly focuses on the basis to implement the object detection and tracking based on its color, which is a visual based project i.e., the input to the project will be the video/image data which is continuously captured with the help of a webcam which is interfaced to the Raspberry Pi. It will detect the object and it tracks that object by moving the camera in the direction of the detected object. 2. "Implementation of Line Tracking Algorithm using Raspberry Pi "Conference Paper • December 2014Samreen Amir, Bhawani Shankar Chowdhry. , International Journal of Intelligent Systems, ISSN 0884-8173, 2014, invited paper[5]. The proposed system performed according to its expectation. The Raspberry pi offers better size but less speed. Accuracy of both systems was similar even if the FPS rate is very different. Our algorithm can be implemented to almost any marine environment given the task for which it is designed for. 3. Global Journal of Advanced Engineering Technologies, Special Issue (CTCNSF-2014) ISSN (Online): 2277-6370 & ISSN (Print): 2394-0921 "OBJECT DETECTION AND TRACKING USINGIMAGE PROCESSING" Vijayalaxmi, K.Anjali,B.Srujana, P.Rohith Kumar. [4] The basic detection Research Article Volume 7 Issue No.7 International Journal of Engineering Science and Computing, July 2017 14146 http://ijesc.org/ process consist of scanning the image lattice and at each location s testing whether Xs+W is classi_ed as object or background. This is typically done at multiple resoltions of the image pyramid to detect objects at multiple scales, and is clearly a very intensive computation. There are a number of methods to make it more ancient. 4. Indian Journal of Science and Technology, Vol 9(45), DOI: 10.17485/ijst/2016/v9i45/106346, December 2015 "A Hybrid Approach for Real-Time Object Detection and Tracking'' Pushkar Protik Goswami and Dushyant Kumar Singh. [8] In these days it is necessary to maintain continuous surveillance of underwater transmission lines or oil pipelines. For such purpose, we require an underwater vehicle rover capable of tracking these wires or pipelines and detect the fault if it occurs. For this purpose we havedesigned an intelligent quad leg rover. Image processing as a key deployed for tracking and tracing the fault or damage Sarthak Kaingade, Vikrant More, Dhiraj Dhule, Pradeep Gaidhani, Nitin Gupta.[1] In this paper previous work on object detection and tracking using UAV's can be classified into various areas. Some researchers have focused on implementation of the 'Follow Me' mode, in which, the UAV follows a person. Person has ground control station computer which transmits its GPS location to the flying UAV. 6. In ternational Journal of Engineering Trends and Technology (IJETT) – Volume 35 Number 4- May 2016 ISSN: 2231-5381 http://www.ijettjournal. "Object Tracking Robot on Raspberry Pi using Opencv" Pradeep Kumar.G.H Assistant Professor, Department of CSE, KSIT Rupa Gurram SweathaSuresh.B. Sneha.B.R. Sushmitha[2] In this proposed system we can use the background subtraction by using the fixed camera by generating the foreground mask. It compares the frame with normal one with background images or model which has contain the static part of the scene, everything is considered as the background part of images in general. In these back ground subtraction can be done with the raspberry pi camera. 7. International Journal of Trend in Research and Development, Volume 3(3), ISSN: 2394-9333 www.ijtrd.com IJTRD May - Jun 2016 Available Online@www.ijtrd.com 31 " Object Tracking Robot by Using Raspberry PI with open Computer Vision (CV)" M. Karthikeyan, M.Kudalingam, P.Natrajan, K.Palaniappan and A.MadhanPrabhu.[9] In this project at the end of the automatic mode, robot tracks, analyses the colour of the picked object and drops the object into the respective coloured container. At the end of manual mode, robot moves and does the task as desired by the user according to the commands given through the application.

3. Methodology

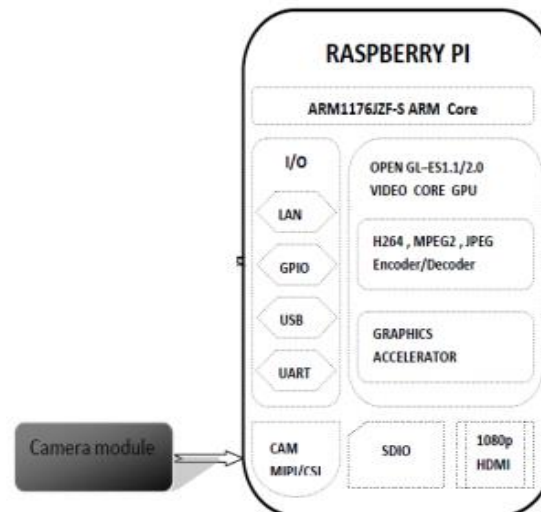The proposed system in this will be implemented.

Figure 1 Block   Diagram

The image was taken by the camera which was placed in the top head of the raspberry pi kit, the camera equipment was connected via usb port. The capturing image from the web cam connected executed in the linuxos software. The extracted image taken out from the web camera sends to the raspberry pi kit and followed to execution of python coding. In the python coding the signal are generated, these generated signals coming from the execution of kit and sent to robot. By combination of sixth sense International Journal of Engineering Science and Computing, July 2017 14147 http://ijesc.org/ robotic kit and raspberry pi followed the color object robot effectively. By tracking the ball we can monitor in pc itself. The board comes furnished with a SD card. This space licenses us to embed a SD card and that can utilize it as our gadgets. The SD card is a fundamental stockpiling gadget for raspberry pi board like a hard plate of a PC. The bootable Linux working framework is stacked onto the card, you want to utilize. The raspberry pi underpins Linux, ARM, Mac working frameworks. You can choose one OS; you should compose it to a SD card utilizing a Disk supervisor application. You can likewise utilize other capacity system, as USB outside hard drive or USB drive. There are a various brands of SD cards are accessible in the business sector in various sizes.

4. Implementation

The flow diagram of PDD

The image was taken by the camera which was placed in the top head of the raspberry pi kit, the camera equipment was connected via usb port. The capturing image from the web cam connected executed in the linuxos software. The extracted image taken out from the web camera sends to the raspberry pi kit and followed to execution of python coding. In the python coding the signal are generated, these generated signals coming from the execution of kit and sent to robot. robotic kit and raspberry pi followed the color object robot effectively. By tracking the ball we can monitor in pc itself. The board comes furnished with a SD card. This space licenses us to embed a SD card and that can utilize it as our gadgets. The SD card is a fundamental stockpiling gadget for raspberry pi board like a hard plate of a PC. The bootable Linux working framework is stacked onto the card, you want to utilize. The raspberry pi underpins Linux, ARM, Mac working frameworks.

Figure 1 Circuit   Diagram

You can choose one OS; you should compose it to a SD card utilizing a Disk supervisor application. You can likewise utilize other capacity system, as USB outside hard drive or USB drive. There are a various brands of SD cards are accessible in the business sector in various sizes.
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5. Result &conclusion

The goal of this project was to evaluate the suitability of running real time object detection on a Raspberry PiAs expected our algorithm identifies the objects by its classes ans assigns each object by its tag andhas dimensions on detected image. Its based on experimental results we are able to detect object more precisely andidentify the objects individually with exact location of an object in the picture in x,y axis..

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