

Human Detection Through Processing Video Captured By Camera Module Interfaced Using Raspberry Pi And Open CV

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ABSTRACT

Face detection is concerned with finding whether or not there are any faces in a given image and, if present, returns the image location and content of each face. This paper describes a simple and easy hardware implementation of face detection system using Raspberry Pi, which itself is a minicomputer of a credit card size and is of a very low price. In the proposed system we would be using raspberry pi module as the controlling unit which would transfer the video signal from the pi camera to the screen connected. Open CV software is used for image processing which would calculating the number of pedestrian entering and leaving the premises. Programming in open CV can be done using c++, ruby, java, python etc. We would be programming it in python as it is an open source language.

Keywords: *OpenCV, Raspberry Pi, Face detection & counting, Python.*

i. INTRODUCTION

The project implementation is the main idea behind thinking something new innovative for mankind development. Thinking about the latest security technologies we are trying to get various different innovations by using main control over sensors and seeking their data and controlling the results required. Face detecting using raspberry pi technology

Most face detection algorithms are designed in the software domain and have a high detection rate, but they often require several seconds to detect faces in a single image, a processing speed that is insufficient for real-time applications. This report describes a simple and easy hardware implementation of face detection system using Raspberry Pi, which itself is a minicomputer of a credit card size and is of a very low price. The system is programmed using Python programming language. Both real time face detection and face detection from specific images, i.e. Object Recognition, is carried out and the proposed system is tested across various standard face databases, with and without noise and blurring effects. Efficiency of the system is analyzed by calculating the Face detection rate for each of the database. The results reveal that the proposed system can be used for face detection even from poor quality images and shows excellent performance efficiency.

Given an arbitrary image, the purpose of a face detection system is to determine if that image contains any faces. As computer science develops, face detection is becoming common place in many applications, such as face recognition, face tracking, facial feature detection, video surveillance, human computer interfaces, and robotics. The problem of face detection is challenging owing to textual differences among the faces, pose, facial expressions, orientation, facial size, lighting conditions, gender, different skin tones and changes in background. Scene changes can also be detrimental to face detection since a background can be simple as well as complex.

This paper is focused on the design and implementation of a low cost, smart and compact real time monitoring home security system using Raspberry Pi (RPI) and OpenCV. It has motion detection and face detection capability that can provide precaution to potential crimes. It also has remote monitoring facility to allow user to do live monitoring from any place in the world. The system uses Pi camera for capturing image or video. It also provides comparison between different models of Raspberry pi and Comparison of Raspberry pi's performances with similar prototype platforms. Open Source Computer Vision (OpenCV) software, a powerful library of image processing tools is a good choice. The library is written in Python and runs under Linux, Windows & Mac OS X. OpenCV is a free software that can help optimize code for basic image processing infrastructure.

ii. SYSTEM DEVELOPMENT

This block diagram consists of following components:

1. Raspberry pi module
2. Pi camera
3. Screen
4. RJ 45 cable

The pi camera captures the real time video frames and sends the video to the raspberry pi module, which processes the video frames and display the video on the screen. The screen has virtual line which indicates the people count on the screen placed at the remote location

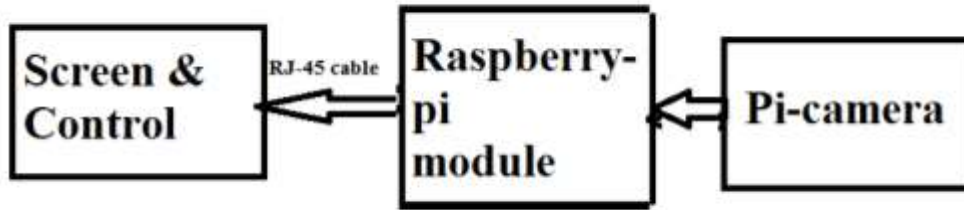


Fig. Block Diagram

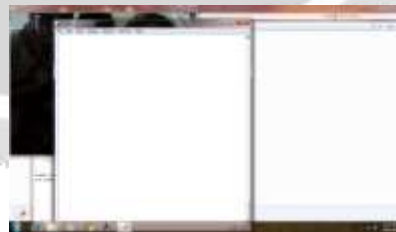
The Viola Jones object detection algorithm has been implemented. Although this algorithm can be trained to detect a variety of object classes, it was motivated primarily by the problem of face detection. A computer needs precise instructions and constraints to make the task more manageable, Viola Jones requires full view frontal upright faces. In order to get efficient results the entire face must point towards the camera and should not be tilted to either side. The algorithm has four stages : Haar Feature Selection, Creating an Integral Image, Adaboost Training, Cascading Classifiers.

iii. PERFORMANCE ANALYSIS

In this we have tested various situations, in that if the photo is provided as an input it will recognize the human beings and detect them will count the number of persons and will make the bordered box to the faces of people. In this if animal or robots photos are provided as an input it will not count anything so only peoples are been counted, And in the video processing the real time video is captured and the video is shown on the output screen as well as it will detect the no of peoples and shows the bordered box to the human faces even in real time video processing the animals are not detected.



Output window



Counter output

Advantage:

1. The invention of small size personal computers has raised a new revolution in the IT industry, which started a new competition.
2. Although Raspberry Pi is as small as the size of a credit card, it works as if a normal computer at a relatively low price.
3. It is possible to work as a low-cost server to handle light internal or web traffic. Grouping a set of Raspberry Pi to work as a server is more cost-effective than a normal server. If all light traffic servers are changed into Raspberry Pi, it can certainly minimize an enterprise's budget.
4. System can be connected with the company's existing Ethernet network.
5. Management of buildings.
6. Reachable from any place using web application.

Applications:

1. Museums.
2. Shopping centers, malls.
3. Airports, bus stand, and railway stations.
4. Casinos.
5. At the doors of transport vehicles like bus trains and subways.

iv. CONCLUSION:

Embedded face recognition system based on Raspberry Pi single-board computer is introduced in this report. The system was programmed using Python Programming language. Report is divided in two parts - the software part and the hardware part. Software part describes the algorithms for face detection, localization, and feature extraction. Hardware part describes how the system was built and what modules does it use. System was built with an option to connect with other biometric systems such as palm print and palm vein biometric system. Various literature found in this survey was selectively reviewed and summarized in this report.

v. REFERENCES

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