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Human Face Detection and Tracking Using Raspberry PI Processor

K.Shiva Prasd
Embedded Systems,
Sindhura College of Engineering and Technology.

M.Shirisha
Assistant Professor,
Sindhura College of Engineering and Technology.

ABSTRACT:

This paper describes the technique for real time human face detection and tracking using a modified version of the algorithm suggested by Paul viola and Michael Jones. The paper starts with the introduction to human face detection and tracking, followed by apprehension of the Vila Jones algorithm and then discussing about the implementation in real video applications. Viola jones algorithm was based on object detection by extracting some specific features from the image. We used the same approach for real time human face detection and tracking. Simulation results of this developed algorithm shows the Real time human face detection and tracking supporting up to 50 human faces. This algorithm computes data and produce results in just a mere fraction of seconds.

Index-Terns:

Human face detection, Integral Image, Raspberry Pi processor, USB camera.

I. INTRODUCTION:

In this section, here we are using Raspberry Pi board as our platform. It has an ARM-11 SOC with integrated peripherals like USB, Ethernet and serial etc. On this board we are installing Linux operating system with necessary drivers for all peripheral devices and user level software stack which includes a light weight GUI based on XServer, XOrg middle-ware for interacting with display devices like monitors and display drivers, TCP/IP stack to communicate with network devices and some standard system libraries for system level general IO operations. By using USB type camera that is interfaced to the embedded board we can capture the live video of the particular location. The camera will continuously capture the images and send it to ARM board.

With increasing terrorist activities and augmenting demand for video surveillance, it was the need of an hour to come up with an efficient and fast detection and tracking algorithm. Many real time face tracking systems have been developed in the past. In this paper, we proposed a more efficient algorithm that consists of three intermediate steps, first is the development of a new image representation called “integral image”, which allows feature selection to be easy and rapid. Second step deals with the construction of classifiers that helps us to segregate desired features from the set of large number of features using a technique. Third step deals with the cascading of different classifiers which was introduced in step 2 for further detailed selection of features and thereby narrowing down our search and increasing speed of detection and tracking.

II. SYSTEM ARCHITECTURE:

2.1 BLOCK DIAGRAM:

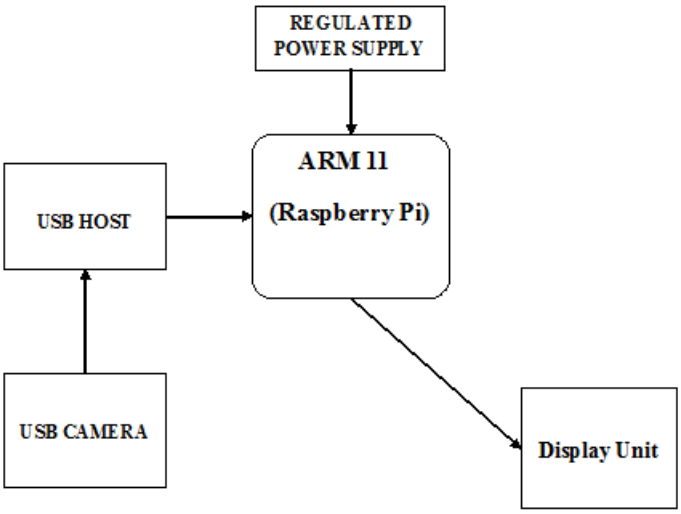

Figure-1: Block diagram

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2.2. EXISTING METHOD:

In the existing method if we want to monitor the video on internet first of all record the video by using camera. Store the video into CD or DVD or pen drive or any other device. Then the stored video can be uploaded on internet. But the main drawback present in existing system is it is not uploaded live video on internet. Therefore the users can't get live information by using this method.

2.3. PROPOSED METHOD:

With the rapid development of human–machine interaction, affective computing is currently gaining popularity in research and flourishing in the industry domain. It aims to equip computing devices with effortless and natural communication. The ability to recognize human affective state will empower the intelligent computer to interpret, understand, and respond to human. This is similar to the way that humans rely on their senses to assess each other's affective state. Many potential applications, such as intelligent automobile systems, game and entertainment industries, interactive video, indexing and retrieval of image or video databases, can benefit from this ability. Our system is designed by using ARM 32-bit micro controller which supports different features and algorithms for development of first facial recognition. The webcam combines video sensing, video processing and communication within a single device. It captures a video stream computes the information and transfers the video stream to the ARM micro controller. The image it received is processed by using image processing algorithms and processed image is classified. In classification Human is detected by using Haar algorithm and detected humans are displayed on display unit in specific format.Our system is designed by using BSC2836 micro processor developed by BROADCOM which was called as Raspberry Pi.

III. HARDWARE IMPLEMENATION:

3.1 RASPBERRY PI PROCESSOR:

In the proposed ALPR system we used the Raspberry Pi is a credit-card sized single board computer developed in the UK by the Raspberry Pi foundation. The Raspberry Pi has Broadcom BCM2835 system on chip(SoC), which includes an ARM1176JZF-S 700 MHz processor. Video Core IV GPU, and was originally with 256 megabytes of RAM, later upgraded to 512 MB. It does not include a built in hard disk or solid state drive. but uses an SD Card for booting and long term storage. The processor at the heart of the Raspberry Pi system is a Broadcom BCM2836 system-on-chip (SoC) multimedia processor. This means that the vast majority of the system's components, including its central and graphics processing units along with the audio and communications hardware, are built onto that single component hidden beneath the 256 MB memory chip at the centre of the board. It's not just this SoC design that makes the BCM2836 different to the processor found in your desktop or laptop, however. It also uses a different instruction set architecture (ISA), known as ARM. A better-quality picture can be obtained using the HDMI (High Definition Multimedia Interface) connector, the only port found on the bottom of the Pi. Unlike the analogue composite connection, the HDMI port provides a high-speed digital connection for pixel-perfect pictures on both computer monitors and high-definition TV sets. Using the HDMI port, a Pi can display images at the Full HD 1920x1080 resolution of most modern HDTV sets.

Figure-2: Raspberry Pi processor

3.2. USB CAMERA:

A webcam or USB camera is a video camera that feeds its image in real time to a computer or computer network. Unlike an IP camera which uses a direct communication using Ethernet or Wi-Fi, a USB camera is generally connected by USB cable, FireWire cable, or similar cable. The common uses as a video camera for the World Wide Web gave the webcam its name. Other popular uses include security surveillance, computer vision, video broadcasting and recording social videos. Webcams are known for their low manufacturing cost and flexibility, making them lowest cost form of video telephony. They have also become a source of security and privacy issues, as some built in webcams can be activated via spyware.

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IV. RESULTS:

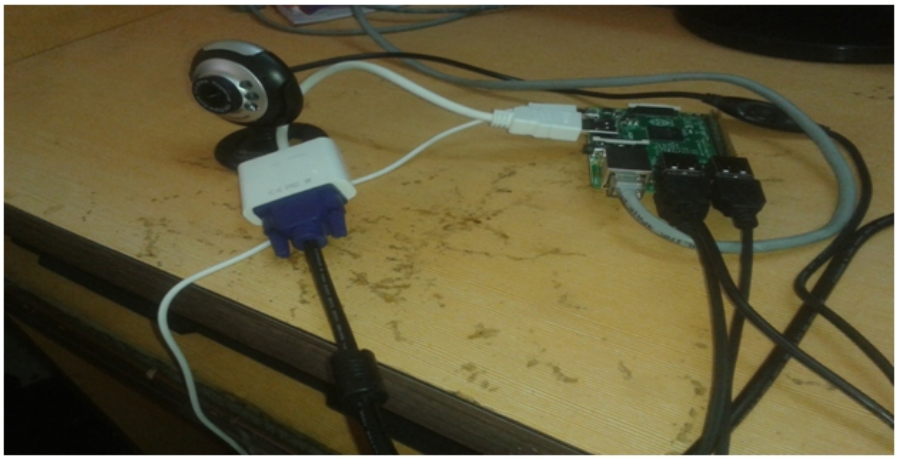

Figure-3: Interfacing camera with Processor

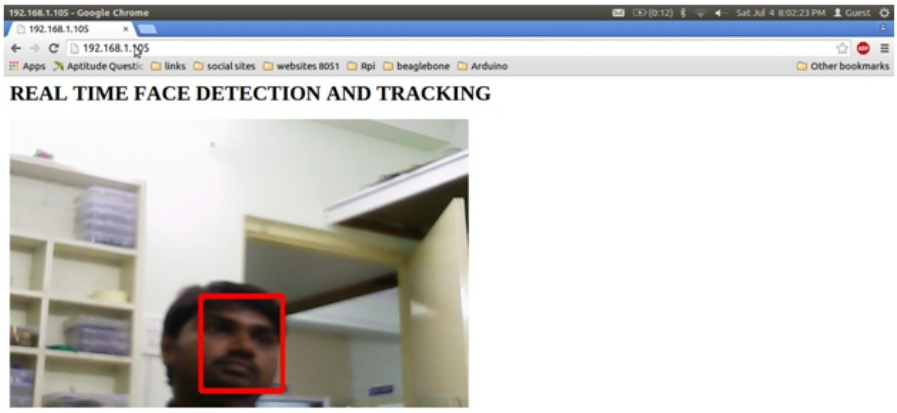

Figure-4: simulation Results (1)

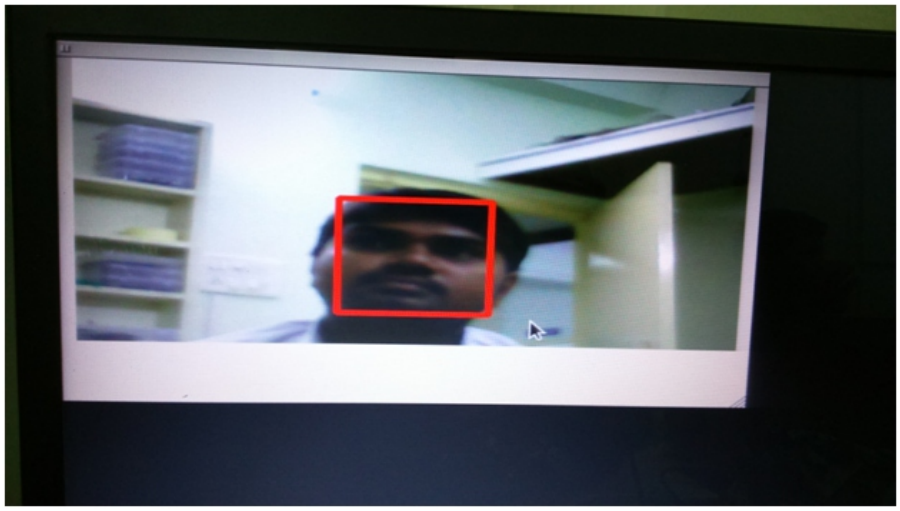

Figure-5: Simulation Results (2)

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V. FUTURE SCOPE:

Currently in our system we are just accessing the system from local PC system. So in future we can implement a system with video database storage for reference even which we can use single RAM for different system like servers in companies.

VI. CONCLUSION:

Face detection and tracking is being challenging for many researchers with real time Image sensor. With the advancement the real time face detection in remote monitoring is help for building much efficient application. Moreover such technology can be useful in tracking the lost object under dynamic environment. Further enhancement of this work can be extended with stereo depth analysis of face detection using two image sensor interfaced with High speed Processor.

VII. REFERENCES:

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