International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 05 Issue: 05 | May - 2021 ISSN: 2582-3930

Bus Crowd Analytics in Real Time(B.C.A.R.T)

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Abstract –Now a days, as the technology going on rapidly. So this project help us to face detection and count the people. And show the result on LED display. It will help the passanger to manage their time for the journey. The haar classifier is used for face detection. Python algorithm is used in this project. OpenCV is used for saving the data in cloud. Raspberry pi is used as a hardware.

Key Words:Face detection, Raspberry pi, GPS.

1.INTRODUCTION

The most important asset of man Today is time along with safety of health. In order to save time of majority of population who travel daily by buses better travel planning is required.

Traffic information is critical to wide population living in the city. Comprehensive knowledge of instant urban traffic conditions contributes to commuters better travel planning, improved urban transportation and commuting efficiency.

Having a crowd monitoring within bus will help state government manage usage of buses at a particular time instance & controlling the frequency of buses as well.

Having a Raspberry pi along with a camera module or CCTV feed and then processing the video to count the number of people within a bus will give an overview of crowd. This data can further be fed to keep a track of instances of crowd along with its timestamp.

2. LITRATURE SURVEY

For face detection python programming language is used. Haar classifier is used. It reports the innovations accessible in the Open-Computer-Vision (OpenCV) library and technique to execute then utilizing python. For face detection Haar-cascade is used. The process is included with stream diagrams for each stage of the frame. Next the outcomes are indicated including plots and screenshots pursued by an exchange of experienced difficulties.[1]

Camera board object is create to connect to the raspberry pi. Capture images from the camera and process them in python programming language. In this project to count the number of people entering from the door, Raspberry pi board has been used which is a SBC, on which we interfaced a pi camera. Pi camera is used for capturing the images of the people. The raspberry pi board is connected to the monitor through HDMI port, for getting the result. The monitor shows the number of people captured by pi camera. The face count is displayed on the counter. Opencv is a library that is used to place the camera on the board.[2]

The system is operated by GPS to acquire latitude & longitude co-ordinates. The system is operated by GPS which is attached to the bus. Firstly, it receives the satellite signals & then the position coordinates with latitude and longitude are determined. Locations are determined with the help of GPS and transmission mechanisms. Data can be received from a satellite or bus via a terrestrial radio-cellular connection to a radio receiver.After receiving the location, the tracking information can be transmitted using any wireless communication systems. This system uses GSM to transmit the information.[3]

3. PROPOESD SYSTEM

3.1 Hardware requirements:

3.1.1 .Raspberry pi4:

Fig 1-Raspberry pi4

The Raspberry pi4 model is the latest version of the low cost raspberry pi computer. It is small like credit card found in pc or laptop.

Raspberry pi is the heart and brain of our project system in which it perform all kind of operations.

3.1.2.Raspberry pi camera:

Fig 2-Raspberry pi camera

Pi camera is like eye for our system from which we can capturing image of known and unknown persons.
Raspberry pi camera capable of high resolution and the 8mp camera module is capable of 1080p video.

3.2. Software Requirements:

3.2.1.OpenCV:
OpenCV is a library of programming function mainly aimed at real time computer vision.

3.2.2. Python flask:
Flask is a microweb framework written in python.
It is classified as a micro frame work because it does not require particular tools or libraries.

3.2.3. Basic HTML for real time GPS plot:
In this provide real time communication capability
In our web application receive incoming events as the position of a remote object (latitude and longitude)changes.

3.2.4. Leaflet GPS:
A leaflet control plugin for tracking GPS position.
Leaflet GPS used for put real time data on a leaflet map live tracking GPS units, sensor data or just about anything.

4.BLOCK DIAGRAM

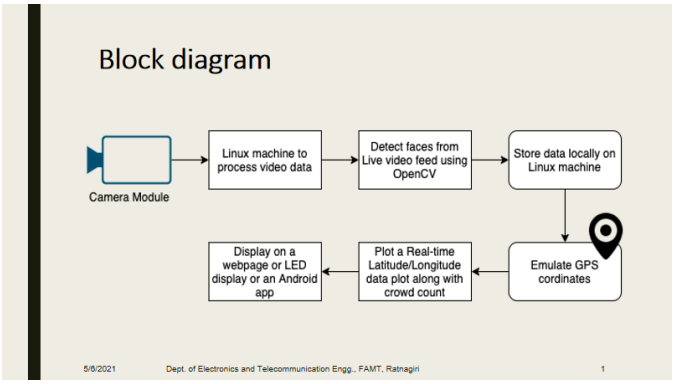

Fig 3-Block diagram

Camera Module:It will be capturing frames in real time and identifying faces.

Embedded Linux machine**:** A Raspberry Pi will be used to host a server that takes realtime video from a camera connected to it. The Linux machine will run a face detection algorithm on the video captured by camera. OpenCV will be used for detection of faces.

Emulate GPS co-ordinates:Leaflet maps will be used to emulate the GPS co-ordinates which will help in plotting the route of the bus.

Display on a webpage**:** Real time plot of bus along with crowd details will be displayed on a web page or an LED or android app.

5.METHODOLOGY

1. Emulating a GPS route from Maruti Mandir to FAMT by capturing all data points.

2. Plot co-ordinates on Maps and get a count of crowd from bus using face detection by using openCV.

3. Keep a track of count stored locally in a Linux machine along with a timestamp.

4. Show Real-time data using a webpage or an Android app or using a LED display.

6.RESULT

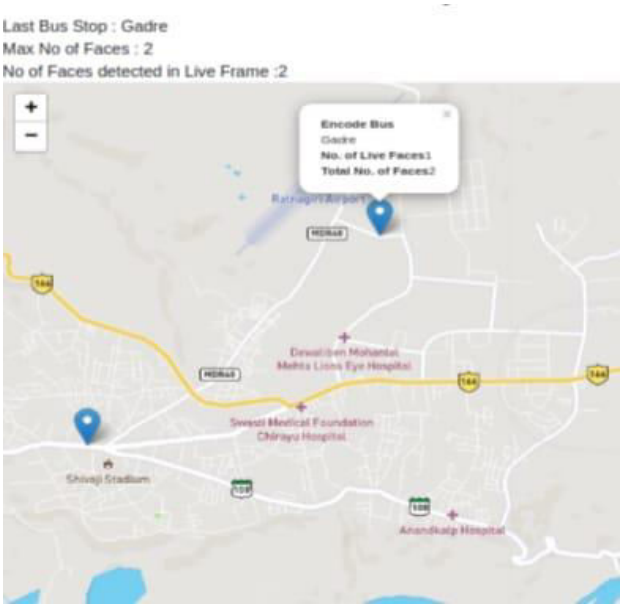

Fig-4 Web page

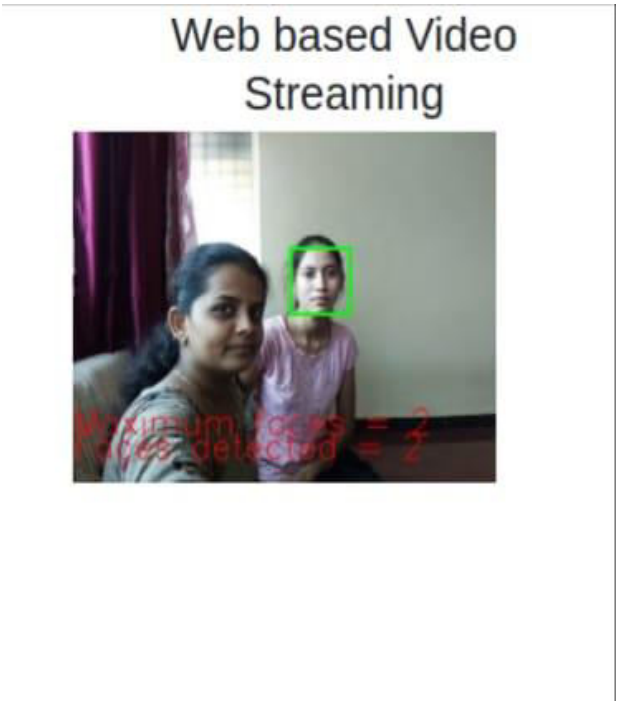

Fig-5 Web based video streaming

7. CONCLUSIONS

In this thesis details of a bus crowd analyzing system are stated. A Raspberry Pi is used as a controller to manage the capturing and keeping track of bus crowd data along with its location in real time. A Raspberry Pi camera will be used to capture live frames and OpenCV can be used for face recognition. Movement of bus is emulated using Leaflet GPS and the precise location of bus along with crowd details will be shared with the travelers either through a web page or mobile android application. These data will be updated after every bus stop. Thus, passengers will not only save time with the help of this application but it will also ensure their safety by helping them follow the norms of social distancing. A detailed analytics about crowd will also help authorities to manage the bus service accordingly.

8. FUTURE SCOPE

1.Alerts and crisis signaling mechanisms are added to the software:
Bus breakdowns are a common problem especially in thecase of local transport buses. To avoid wasting time in thatcases the conductor can request for help through themobile application itself, which will search the nearest bus station and request for a repair.Mechanisms for emergencies like fire, accidents, etc. canalso be integrated into the product.

2.Support for online ticket purchasing can be integrated into the product:
This would include purchasing a ticket from the mobileapplication itself, using UPI and other paymentmethods. This simple feature can help to save paper andavoid usage of plastic made tickets, while being convenient for the regular commuters.

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