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Computer Vision Crowd Detection System

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Abstract: ***Now days, everyone is facing with the problem of very dangerous disease that is COVID-19. The virus is transmitted through infected person coughs, sneezes or exhales. So, maintaining close face to face contact with other peoples is the best solution (way) to minimize the spread of corona virus disease 2019(covid19). COVID-19 spreads mainly among people who are in close contact for a prolonged period so this problem is mostly occurred in public places like collages, schools, malls, stations, etc. We need of surveillance system that could be monitor and detect if the people are following social distance or not. This operation of making observations proposes an artificial intelligence system for grouping distancing of persons using images. An algorithm is also instrumented for measuring and putting in order the distance between persons and to automatically check if grouping distancing rules are respected or not.***
So that's why we build project is computer vision crowd detection.
Keywords*:*
1. COVID 19 situation
2. Crowd image analysis
3. Surveillance system
4. Crowd monitoring
5. Crowd detection

I. INTRODUCTION

COVID-19 is a disease caused by a new coronavirus which appeared in china in December 2019. Now a day due to corona virus very severe condition arises all over the world. Due to this pandemic situation of COVID-19 social distancing become must in public places while wondering here and there to avoid infection of corona virus. We have to keep safe distance of at least 2m (6feet) of distance between individuals and surroundings. As COVID-19 is very deadly disease so as to slow down the infection of corona virus we need an active superintendence system which will be capable of detecting safe distance between each individual and make aware to take proper delivery. There are some projects on automation based such as home automation, automated railway crossing, contactless temperature monitoring, automatic sanitizer machine.so, in continuation with these projects we are going to build up system which is used in this critical situation of COVID-19. As we know corona virus is very infectious and caused due to touching contaminated surface of virus and due to respiratory droplets of infected person coughing, sneezing and speaking with taking less distance. The effects of corona virus are very bad it effects on new generation of our nation on their good physical development it effects on profits of our nation and on health of elderly persons. Actually it effects on all peoples by many ways so we build up "Computer Vision Crowd Detection system" using open CV and tensor flow object detection model. Actually, The aim of crowd detection technique is based on computer vision. Because it is possible to take other type of information from the captured video sequence that will be used to give benefit a large number of applications. We are going to build up computer vision crowd detection system on present pandemic condition of COVID-19 so it is a new area of interest in research community. With deep and complete study of public places such as schools, colleges, hospitals, transportation facilities, etc. On this throughly study to limit crowd is quite difficult by individual. In this crowd factor takes lot of affection as corona virus in infectious.
So, with taking in consideration of all factors we build up system which detect the and make aware of people to follow social distancing rules for safety purpose.

II. LITRATURE SURVEY

This paper presents a survey on crowd analysis techniques based on computer vision and discuss how computer graphics can help computer visions in crowd's applications. The work in this paper tackled three important problems in crowd analysis; people counting or density estimations, tracking in crowded scenes and crowd behaviour [1].
Crowd detection and density estimation from crowded images have a wide range of application such as crime detection, public safety, crowd abnormalities. This paper explains approaches to crowd detection system- a) Detection based approaches. b) Regression based approaches**.** c) Density based approaches [2].

Crowd detection and density estimations are one of the challenging problems of computer vision and machine learning. There are three approaches, Regression based approaches, Density based approaches [3].

In this paper authors propose a novel approach that uses local features defined here as features which are specified to an individual or small group within an image. Local features are used here to estimate the number of people within each group [4].

In this paper, we review crowd counting methods and detections and tracking methods. Also compare crowd density maps produced by different methods, on several crowd analysis [5].

This paper presents the study of different attributes of crowd counting, estimation of includes crowd counting, estimation of density, detection of crowd motion. It also presents the study about behaviours understanding of crowd tracking [6].

The proposed paper, involves crowd analysis interruptions of data gained staying the natural movement of groups or objects with different aspects such as people tracking, crowd density estimation, and simulation using computer vision technique. It has a wide range of applications such as crowd management, public space design and virtual environment [7].

In this paper, a novel method to detect and localize abnormal behaviours in crowd videos using social force model. Using social force model, it introduces a method to detect abnormal behaviours in crowd scene [8].

This paper presents, experimental results for the problem of estimating the number of moving objects in a dense crowd as a function of time. This work addresses the problem of segmenting moving objects in video of dense crowds [9].

This paper presents a privacy preserving system for estimating the size of crowd. This work introduces a new formulation for surveillance technology [10].

III.METHODOLOGY OF PROPOSED WORK

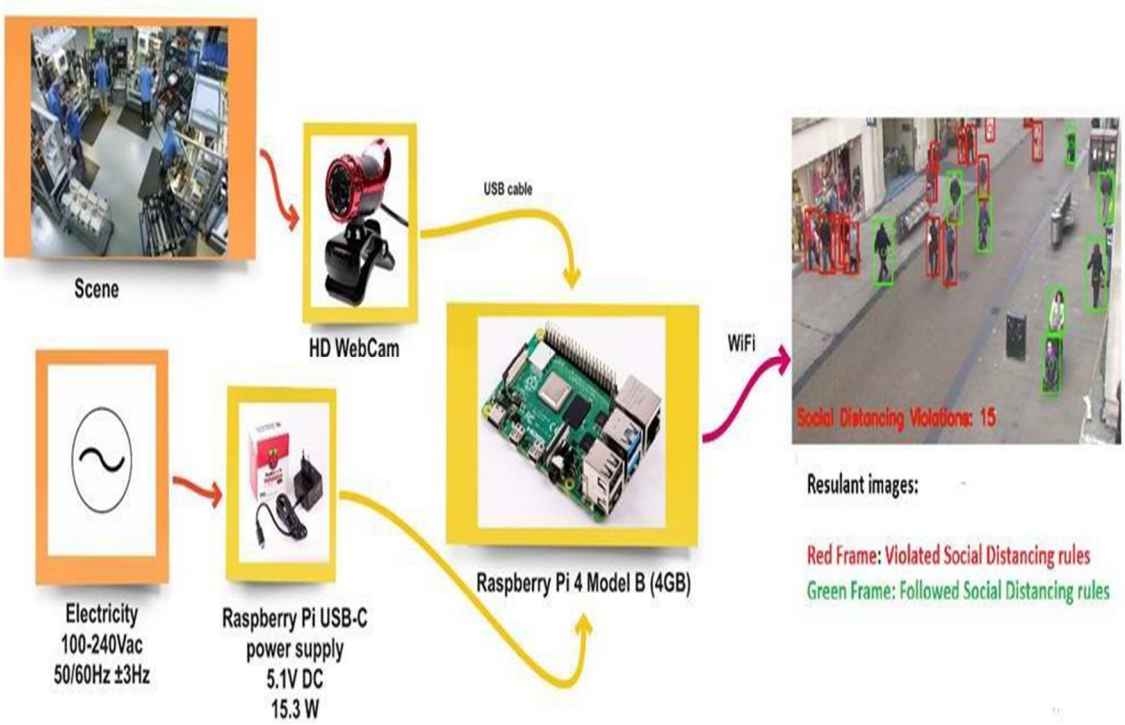

Fig 1: Conceptual Design

A. First get camera or video feed.
B. Detect the people in the frame.
C. Localize people in frame.
D. Project the people position in algorithm used.
E. Calculate the distance between people who are close.
F. Display lines between people who are close.
G. Calculate and display social distancing parameter.

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IV. HARDWARE

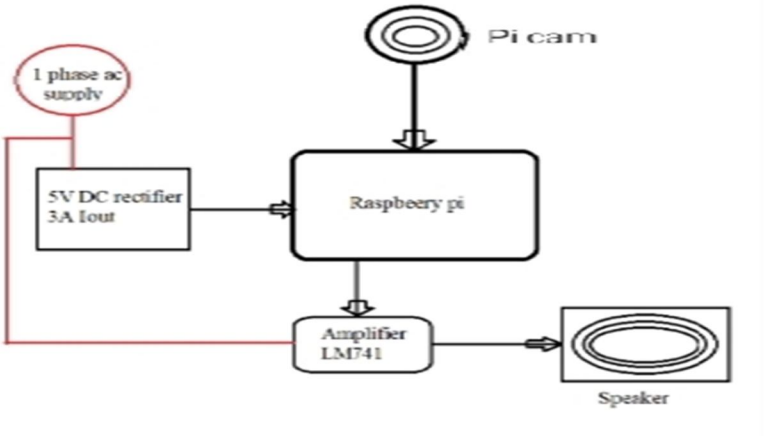


Fig 2: Block Diagram of Project

1) *Raspberry Pi:* It is a small single Board computer. By connecting peripherals like key to the raspberry pi, it will act as a mini personal computer. Raspberry pi is used for real time image/ video processing applications.

Parts of the Raspberry Pi:

a) GPIO: GPIO is arguably the most important feature of the raspberry pi and is the equivalent of GPIO pins on the Arduino.
b) DSI Display Port.
c) CSI camera Port.
d) Micro SD Slot.
e) HDMI/ USB/ NETWORK.
f) Micro USB Power.

2) *Pi- Cam:* The Pi camera module is a portable light weight camera that supports Raspberry Pi. It communicates with Pi using MINI camera serial interface protocol. It is used in image processing and in surveillance system.
3) *Raspberry Pi USB-C Power Supply:* Raspberry Pi required USB-C power supply of 5V and 3A for their working. A rectifier is an electrical device that converts alternating a rectifier is an electrical device that converts alternating current, which periodically reverses direction, to direct current. The primary application of rectifiers is to device DC power from an AC supply (AC to DC converter).
4) *Amplifier:* An amplifier is an electronic device that increases the voltage, current and power of the signal coming from Raspberry Pi. It is used to amplify weak signal without changing input information or any information.
5) *Speaker:* The function of speaker is to receive audio input from computer and produce audio output that gives information about crowd to the peoples.

V. WORKING

Computer Vision Crowd Detection System is based on Artificial Intelligence (AI) that interprets and understand visual world. When two or more than two peoples/objects come less than the specified or set distance in such scenario's it is hard to detect individual's behaviour, hence we have monitoring peoples and their behaviour. Raspberry Pi is a main component of the system. It requires 5V/3A standard power supply for its working. Using PI cam we are monitoring peoples. It continuously captures frames and then these frames will be processed to detect objects in the image.

Here open CV library is used to detect the crowd. Open CV python is a python library designed to solve computer vision problems. A python code required for this crowd counting open CV project is launch after reviewing the PI camera is working or not, Python script includes all the required libraries and values. The captured frame from PI cam is compared with python script. If distance between the centroid of human body's which is in the frame is less than the specified or set distance then it displayed on the screen. If it detects the people, you will find a box around it like red and green. (Red- Peoples two or more than two, Green- Peoples less than two). Then audio script is running and signal goes to amplifier.

Amplifier amplifies these signals and gives it to the speaker from which we will get audio signals which give information about people crowd density. This is the working of the Computer Vision Detection System.

VI. RESULT AND OBSERVATION

The system is highly reliable, fair and safe. It effectiveness of raspberry pi system combined with a highly reliable image processing comparison technique using open CV. The system is also energy efficient. The decision making processes are done by itself when crowd is detected. And give the instructions to people to keep social distancing and stay safe. Hence no special person is required to control the crowd and social distancing at all the time. Also when we connected to LED screen the camera frame is displayed on it continuously by which people show themselves by the red and green box around them and they aware about it and then immediate action by which they keep social distancing and stay safe.

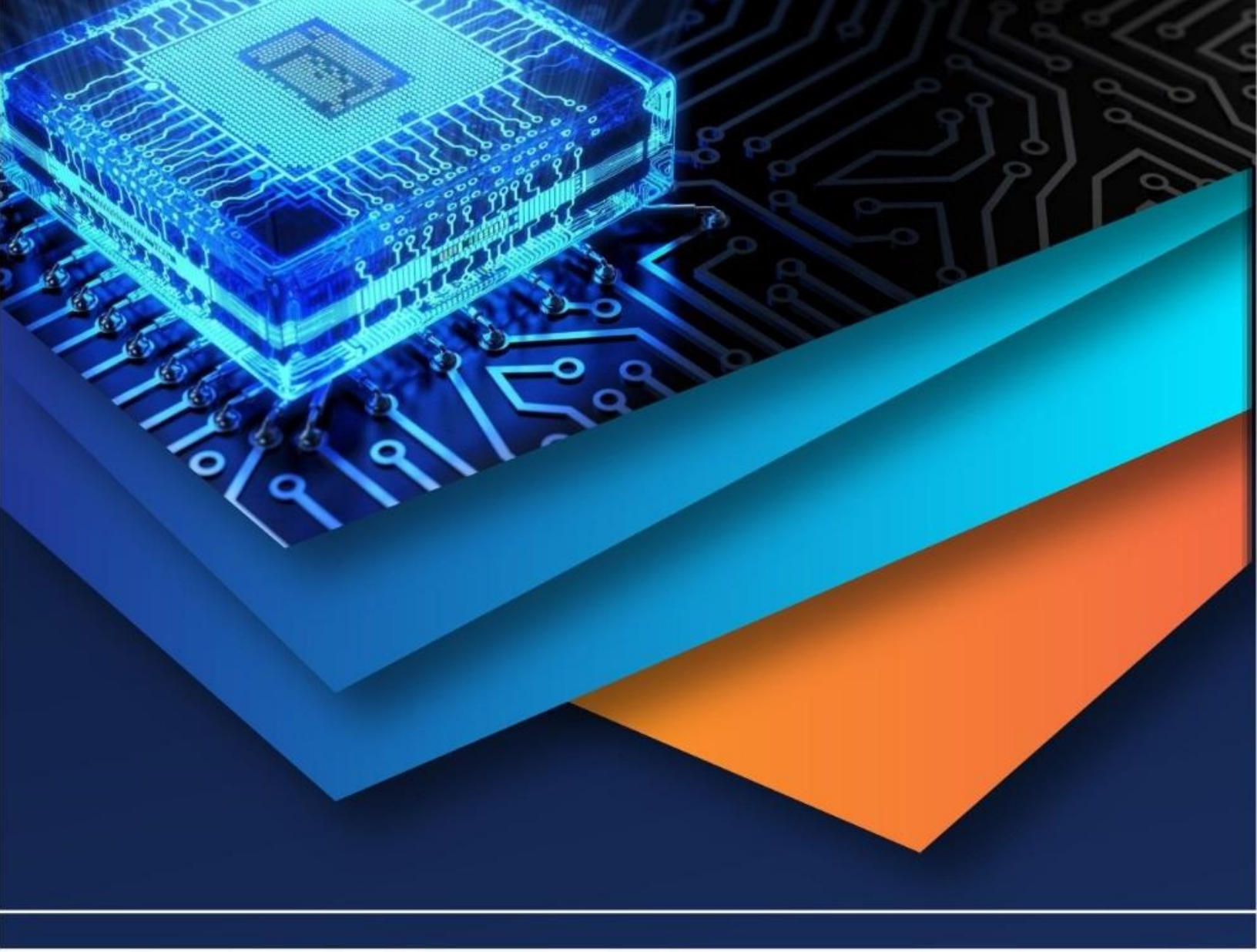
Fig: Result

VII. CONCLUSION

Crowd analysis involves the interpretation of data gained by monitoring the people and its behaviour. The surveillance system is used for crowd detection using AI technology and provide comparative analysis of the obtained results so far for crowd image analysis. In the current crowd situation of COVID-19 social distancing becomes major factor so, using this technology we can monitoring people and provide audio signals to do not crack the rules and keep distance which is an effective application of this system.

REFERENCES

[1] Julio Cezar Silveira Jacques Junior, “Crowd Analysis Using Computer Vision Techniques”, article in IEEE Signal Processing Magazine. October 2010.
[2] Archana Ghotkar, “A Study on Crowd Detection and Density Analysis for Safety Control”, article in International Journal of Computer Sciences and Engineering. April 2018.
[3] Mayur D chaudhari, Archana S. Ghotkar, “A Study on Crowd Detection and Density Analysis for Safety Control”, Survey Paper Volum-6, Issue-4 E-ISSN: 2347-2693, 30 April 2018.
[4] David Rayan, Denman, Simon Denman, Clinton Fookes, & Sridha Sridharan, “Crowd counting using multiple local features”. In Shi, H, Zhang, Y, Digital Image Computing: Techniques and Applications DICTA 2009. 1-3 December 2009.
[5] DI Kang, Zheng Ma, Member, “Beyond Counting: Comparisons of Density Maps for Crowd Analysis Tasks- Counting Detection and Tracking”, Antoni B. Chan Senior member, IEEE. 13 June 2018.
[6] Vishakha L. Bansod, Asha Ambhaikar, “Crowd Analysis System for Images of CCTV Camera” International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volumr-8 Issue-5, January 2020.
[7] Shivashree G, Dr Anuradha S G Dept of Computer Science, RYMEC Ballari, India Associate Professor, Dept of Computer Science RYMEC Ballari, India, “Crowd Analysis Using Computer Vision Techniques” International Journal of Engineering Research in Computer Science and Engineering (IJERCSE) Vol 5, Isssue 4, April 2018.
[8] Ramin Mehran, Alexis Oyama, Mubarak Shah, “Abnormal Crowd Behavior Detection using Social Force Model”. IEEE 2009.
[9] Rabaud, V., Belongei, S., 2006. “Counting crowded moving objects”. In: 2006 IEEE Computer Society Conference on Computer Vision and Pattern Recognition, vol. 1. IEEE, pp. 705-711, http://dx.doi.o/10.1109/CVPR.2006.92.
[10] Antoni B. Chan Zhang-Sheng John Liang Nuno Vasconcelos Electrical and Computer Engineering Department University of California, San Diego, “Privacy Preserving Crowd Monitoring: Counting People without People Models or Tr*-+ng” Appears in IEEE Conf. on 2008.



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