Human Recognition and Counting using Single Shot Detector

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Article Info

ABSTRACT

Human counting system is very easy and convenient to count people in real time. Human recognition and counting system consists of facilities to detect and count pedestrians, those who are moving in and out in shopping malls/banks/apartment which helps us to analyze the present pandemic situation of covid-19 in order to maintain social distance. The system is complete in the sense that it is operational and it is tested by providing data and getting the footer count moving in and out. The system is a machine learning and deep learning project which uses CNN(convolutional neural network) for detecting objects in a video stream.

1. INTRODUCTION

The project, we build the Human Recognition and Counting System using a Single shot detector algorithm that process images fetched from connected camera or video source:webcam,USB cam or a video file played in a loop to simulate a camera stream thereby detecting people and tracking them in each frame and assigning them with unique Ids.This method is able to locate and count no of humans in real time and is robust to changes of background. This is a deep learning project on computer vision and image processing.

EXISTING SYSTEM

The existing system is a manual system in which a video surveillance is used for capturing individuals publicly. Previously many techniques and methods were proposed to spot humans that don't turn out accurate and high performance for different abnormal situations. largely the scenes seized by a static camera are with minimal change of background and objects in outdoor surveillance are often detected to just observe certain activities. The whereabouts obtained from a surveillance video that were used to only detect humans and don't incorporate people count.These are different object detection techniques like histogram of gradient which is not highly accurate in all situations as the system detects humans slower than the proposed system, so the proposed system comes in use to improve accuracy and consistency.

2. PROPOSE SYSTEM

The Human Recognition and Counting System build is based on object detection, with an objective of locating people and counting them using neural networks. In this project we use a caffe model which has a mobilenet - SSD architecture to extract features and apply convolutional filters to detect humans.
Convolution neural network layers are built and

implemented using a caffe model. Caffe in python is a deep learning framework used mostly for image classification applications.

The recognition system uses object detection based on image classification followed by object tracking to get the coordinates of the detected object and the counting system counts tracked objects that cross the predefined crossing line and updates the status of the count as humans move above or below the line, simulating the entrance of a store, as an example.

## SYSTEM ARCHITECTURE
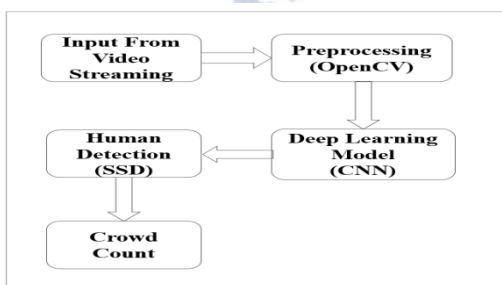
3. IMPLEMENTATION

The Human Recognition and Counting System will perform a specific task to accomplish the final application.

1. Input: Our camera source will be a video file or image uploaded for the testing purposes. The video input is used to implement a real-world setting and is available for free via the internet. For frame width, height and FPS, the original video settings which are 1920 x 1080px at 30 frames per second.

2. Defining Regions: In this step we divide the image into various regions and then take each region as a separate image for the application to decide where in the image the algorithm should be applied for counting.

3. Object Detection: Now from all the image frames we must detect people so we have to shoot those images to CNN classifier which is a trained AI model and get them classified into separate classes (human and others) and locate the human by combining all those frames the application will be implemented using python with libraries installed .

4. Object Tracking: In this step, we take the detected persons. The centroid tracking algorithm lets us define the detected objects (people) moving across the predefined line and a tracker is used to track those

detected objects in each frame and assign them with private ids.

5. Output: In this step the system will display the total elapsed time , FPS in the command prompt and the status count in real-time .

SAMPLE OUTPUT SCREENS
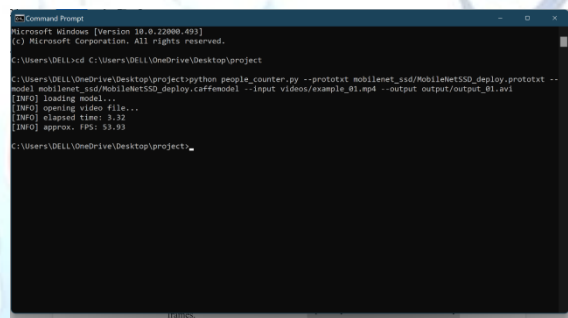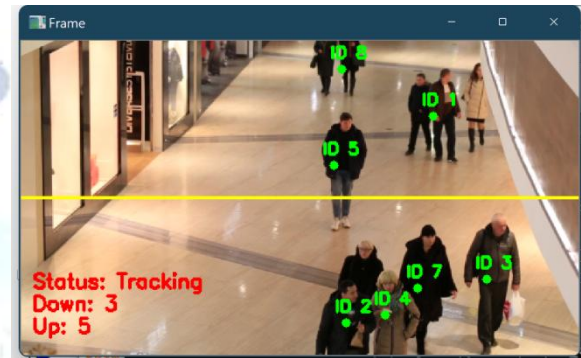
4. CONCLUSION

The person moving in front of the camera is necessary to identify humans and their behavior. Today, we are at the age of modernization, and we should be prepared. Having the right approach to detect humans is very important, especially considering real time business applications. This project is to show the detection and counting of humans. In modern real time situations to maintain social norms in public places by setting the people limit. So that we can easily monitor the people and limit them in different situations. There are various applications for human detection. This system uses Convolutional Neural Network and other modules of python. Libraries like numpy and OpenCv are used to implement deep learning and MobilnetSSD is the model used to detect humans.

Thereby we conclude the project helps us to count humans passing in or out in a video stream and incrementing the status count when the person crosses the axial line.

5. FUTURE SCOPE FOR FURTHER DEVELOPMENT

The Human Recognition and Counting project is used to count and track humans but in future there are different possibilities to upgrade the project. There can be few modifications like to alert staff members in a shopping mall or area to limit humans and also with extra features to be added to the project like face recognition to identify that particular and other applications and methodologies could improve accuracy and consistency.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

REFERENCES

[1] www.wikipedia.com

[2] https://medium.com/acm-juit/ssd-object-detection-in-real-time-deep-learning-and-caffe-f41e40eea968

[3] https://morioh.com/p/f7343c9642c3

[4] https://viso.ai/applications/people-counting-system/

[5] https://www.irjet.net/archives/V8/i4/IRJET-V8I4158.pdf

[6] https://asp-eurasipjournals.springeropen.com/articles/10.1186/1687-6180-2013-176

[7] https://thedatafrog.com/en/articles/human-detection-video/

[8] https://data-flair.training/blogs/python-project-real-time-human-detection-counting/

[9] https://asp-eurasipjournals.springeropen.com/articles/10.1186/1687-6180-2013-176

[10] https://caffe.berkeleyvision.org/

[11] Yu-Chen Chiu, Chi-Yi Tsai, Mind-Da Ruan, Guan-Yu Shen and Tsu- Tian Lee, Mobilenet-SSDv2: An Improved Object Detection Model for Embedded Systems, Â©2020 IEEE.

[12] Andres Heredia and Gabriel Barros-Gavilanes, Video processing inside embedded devices using SSD-Mobilenet to count mobility actors, 978- 1-7281-1614-3/19 Â©2019 IEEE.

[13] R. Huang, J. Pedoeem, and C. Chen, YOLO-LITE: A Real-Time Object Detection Algorithm Optimized for Non-GPU Computers, in Proceedings – 2018 IEEE International Conference on Big Data, Big Data 2018.

[14] Ibai Gorordo Fernandez and Chikamune Wada, Shoe Detection Using SSD-MobileNet Architecture,2020 IEEE 2nd Global Conference on Life Sciences and Technologies (LifeTech 2020).