REAL-TIME VIOLENCE ALERT SYSTEM

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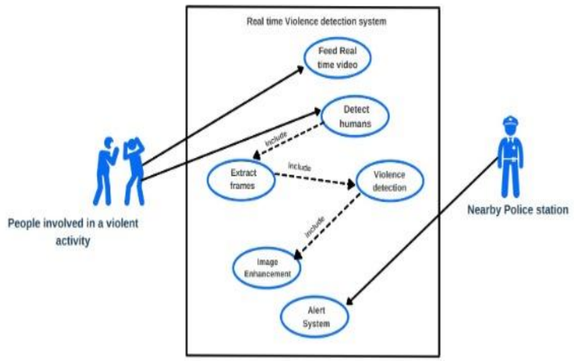
INTRODUCTION

Violent behavior in public places is an issue that has to be addressed. In this work we will be discussing about the implementation of a Real-Time violence alert system using MobileNetv2. The frames obtained as output from the model is enhanced. Then these frames along with time and location of the recorded incident are send to the nearby police station as an alert via the alert module of the proposed system.

USE CASE DIAGRAM



OPERATING ENVIRONMENT

PYTHON GOOGLE COLAB FIREBASE

METHODOLOGY

Footage from the surveillance camera is broken down into frames. The frames are given as input to MobileNet v2 classifier for detecting violent activities in the given sequence of input frames. If no violent activity is recognized the respective frames are discarded. The violence detected frame is obtained and it is enhanced for better clarity. That frame, along with the location are sent to the nearest authorities using Telegram bot. The enhanced images are stored in the Firestore database using Firebase. Face detection is performed on these images using MTCNN and Pyplot. The detected faces will also be saved in the firebase as separate pictures along with place, date and time fields.

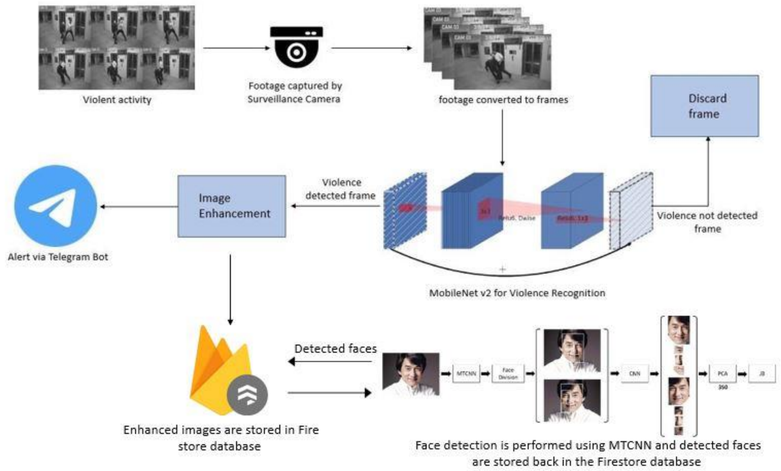
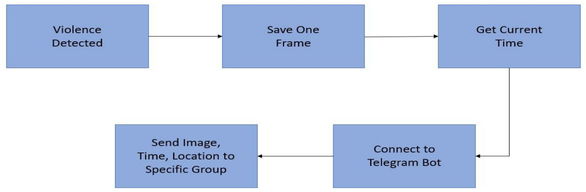


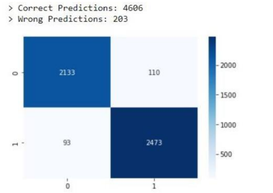
Image Enhancement - It is performed using the inbuilt functions provided by the Python Imaging Library(PIL). PIL offers extensive file format support, efficient presentation, and fairly powerful image processing capabilities. The brightness and colour of the obtained output frames is increased by a factor of 2.

Alert Module - When a frame is detected true for violence, the system initializes a counter variable to one. If the violence is detected true for the 30 consecutive frames, the current time is obtained using an inbuilt python function and an alert is sent to a Telegram group that consists officials of higher authorities. The Alert message comprises of an image of the detected violent activity, current timestamp and the location where the camera is placed.



RESULTS

A dataset containing 1000 videos of average duration 7 seconds is given as input. For each epoch 350 videos from the violence class and 350 videos from the non-violence are trained. 96% accuracy was obtained on training and a respective accuracy of 95% was obtained when a CCTV footage that was not included in the dataset was given for testing.



	precision	recall	f1-score	support
NonViolence	0.96	0.95	0.95	2243
Violence	0.96	0.96	0.96	2566
accuracy			0.96	4809
macro avg	0.96	0.96	0.96	4809
weighted avg	0.96	0.96	0.96	4809

A video with violence is given as input to the system. Figure below shows one frame in the video that was labeled to have violent activity

CONCLUSIONS

The proposed network has a good recognition accuracy in typical benchmark datasets, indicating that it can learn discriminative motion saliency maps successfully. It's also computationally efficient, making it ideal for use in time-critical applications and low-end devices. Here, we had also shown the working of an Alert system that is integrated with the pretrained model.