

Artificial Intelligence based CCTV accident detection and nearby patrol alert system

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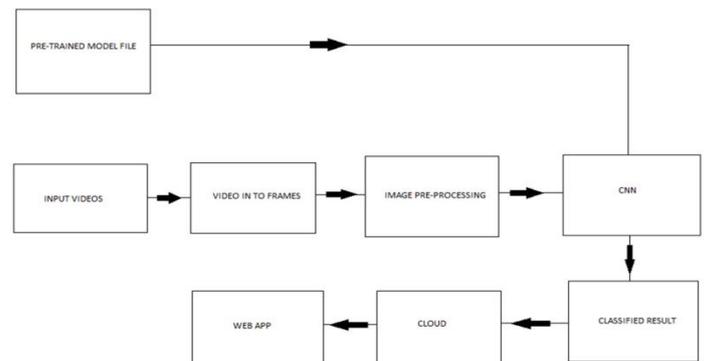
Abstract - India's rate of growth is exponentially getting higher year by year, many new industries are growing and other countries are also investing to a larger extent in India. This situation has given many employments to our country people and the need for transporting is also high which affects our country's growth either directly or indirectly. Over the years, Indian roads have expanded and also the number of people using vehicles for transportation has increased. Even with this scenario India has lowest number of vehicles on road which is 1% to the total number of vehicles all around the world, But the saddening state is that India contributes 6% to the total accidents occurring in all around the world as mentioned by World health organization (WHO) in 2018. Road accidents are one of the main death reasons for people who lose their life in their earliest. The accidents occurring to an individual or a group will directly affect them by injuries and fractures and also these accidents have higher probability of head injuries for them which will have a negative impact even if they come out of them after some time. This shows that the road accidents are something worth giving attention to and have to be on the priority list of the researcher's agenda to provide timely help at the place of accident and save lives, especially in the densely populated areas. In this scenario, steps should be taken so that all these accidents can be avoided or even if the accidents occur death rate must be decreased by immediately reporting accidents at the earliest. In this work, we are trying to build a system which will be processing the live accident feeds obtained from the already installed CCTV's and will identify using CNN algorithm whether things are normal or accident in that particular instant. An alert system which will be linked with the system will alert the patrol or hospitals or ambulance services when an accident occurs while sharing the accident images and also the time and location of the accident which takes place.

government. It is projected that in the upcoming years number of people using vehicles for road transportation will be multiplied to a further extent. So considering this scenario there is a high need for a system which will detect accidents at the earliest and also will report it to concerned authorities so that it will be taken care of at the earliest avoiding losses to a larger extent.

1.1 Motivation

The main driving motivation is caused by the advancement of Artificial Intelligence technologies, , since machine learning is used in various fields because of its wide application and its advantages are very high in the field of computing. These machine learning models are used in various usages such as Search engine results refining, Video Surveillance, Online fraud detection and so on. With these applications as use-case we have tried to apply it for the purpose of prediction using AI for accident detection.

1.2 Proposed Method



As mentioned in the above image, pre trained model file is created after preprocessing, training and testing of the dataset and this file will then be predicted using CNN which is Convolutional neural network, On the whole a system will be generated. Now the live footage will be cut into frames and undergo same pre processing steps and go through CNN prediction and the result is sent to web application which is connected with cloud.

2. MODELLING

The whole system will be modelled based on one deep learning algorithm, which is CNN and it stands for

Key Words: Accident detection, CNN

1. INTRODUCTION

In the recent years due to technological advancements each field are growing at a higher rate, be it Information technology or Textile or even agriculture. This overall growth in the various fields have directly or indirectly influenced in the rise of transportations which stands as the cause for increased count of vehicles using our country roads. Increase in the number of vehicles has also increased the probability of accident occurrence which causes huge loss to the person who is involved in the accident, his/her family and also to the infrastructure created by the

Convolutional Neural Networks. This CNN algorithm is highly capable of processing image or video based information and it has high accuracy while yielding outputs in this too. The dataset will be pre-processed and then they will be trained and tested and after that the accuracy graph will be attained with which we can find the training accuracy. After all these steps when we implement the CNN algorithm into our system then we will get the desired output where the footage will be played and when things are under control it will show normal in top left corner and whenever a commotion takes place it will show as accident and the alert system which is done using a web application will be alerted.

2.1 Applied Algorithm

In deep learning, a convolutional neural network (CNN) is a sort of profound deep networks, which manages the arrangement of information to remove data about that information. Like pictures, sounds or recordings and so forth can be utilized in the CNN for the information extraction. There are fundamentally three things in CNN. Initial one is nearby responsive field and afterward shared weight and inclinations and the last one is enactment and pooling. In CNN, first the neural networks are prepared utilizing a heavy of information so the CNN can separate the component of given input. Whenever the information is given, first picture preprocessing is done then the component extraction happens based on set of information put away and afterward the grouping of information is done and yield is displayed as the outcome.

3. METHODOLOGY

The dataset for the three categories is collected from data science website called kaggle. These data's are collected and placed in a different folders with respective for pre-processing. : In data pre-processing the enhancing and resizing of images is done this is because the dataset images is individually varied from their size so to train the data image resizing is mandatory enhancing techniques: gray scale conversion and histogram equalization.

After data pre-processing the CNN training model is created using VGG-16 architecture. The accuracy of the model is optimized using hyper parameter adjustment. After training the dataset the model file is created and during classification test image is imported and pre-processed and CNN prediction is done using the model file and the result is classified. On the whole when the code is executed after adding the footage, that particular footage will be reviewed and when things are going on fine it will show up as NORMAL but when a commotion takes place, it shows ACCIDENT and the system is alerted.

4. Result Analysis

Initially when the required video is loaded into the code and when the main text is executed, the footage dialogue box opens and the live video is played and when things are normal. But while in surveillance if the two vehicles collide or if accident takes place, then the tag on the top turns into ACCIDENT as like in the below image



Fig -1: Name of the figure



And in the alert system which is a web application displays the exact date time and occurrence of the accident which is linked with a database that contain accident images based on date and months.



5. CONCLUSION

With the growing advancements in technology, There should be development in infrastructure in each and ever place where people lead their life. In our case the designed accident system will be very much helpful in improving the betterment of the people living in the respective places. This system will cause major negative impacts caused by the accidents and thus reduce the risk of people losing their lives at young ages. If this system is linked after training and testing with each existing CCTV cameras along the roads accidents can be predicted and alerted without human intervention within any part of city or town.

REFERENCES

[1]“A communications-oriented perspective on traffic management systems for smart cities” - Soufiene djahel, Ronan doolan, Gabriel-miro muntean and John murphy.

[2]“Detecting and positioning of traffic incidents via video-based analysis of traffic states in a road segment” - Baotang li, Yinan liu ,Beijing university of technology.

[3]“Traffic in the smart city exploring city-wide sensing for traffic control center augmentation” - Vassilis kostakos; Timo ojala; Tomi juntunen

[4]“Motion interaction field for accident detection in traffic surveillance video” - Kimin yun; Hawook jeong; Kwang moo yi; Soo wan kim; Jin young choi