Efficient Vehicle Accident Detection System using CNN

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ABSTRACT: In India, accidents have been a leading cause of death. The cause of more than 80% of accident-related fatalities is not the accident itself but rather the delay in providing assistance to accident victims. An accident victim might be left unattended for a very long time on highways where traffic is extremely light and moving quickly. The goal is to develop a system that can recognise an accident based on a live video feed from a CCTV camera that has been mounted on a highway. Each frame of a video should be run through a deep learning convolution neural network model that has been trained to distinguish between accident- and non-accident-related video frames. It has been demonstrated that Convolutional Neural Networks are a quick and reliable method for classifying images. For comparatively smaller datasets, CNN-based image classifiers have achieved accuracy levels of over 95% and require less pre-processing than other image classifying algorithms.

1. INTRODUCTION

The main goal is to incorporate a system that can recognize an accident from video footage captured by a camera. By promptly detecting an accident and immediately notifying the authorities, the system is intended to assist accident victims in need. Utilizing cutting-edge Deep Learning Algorithms that make use of Convolutional Neural Networks (CNNs) to analyze frames taken from the camera's video, the goal is to identify an accident within seconds of its occurrence. We have concentrated on establishing this system on highways where there is less traffic and assistance rarely reaches accident victims in a timely manner. On parkways we can arrangement CCTV camera's put at distance of around 500 meters which go about as a vehicle for observation, on this camera we can set up the proposed framework which takes the recording from the CCTV camera's and runs it on the proposed mishap recognition model to recognize mishaps.

2. LITERATURE SURVEY

2.1 An enhanced accident detection and victim status indicating system: Prototype

Authors: Prabakar, S, et al.

In the speedy moving world, nobody is ready to look what's happening around them. Even when there take place an accident nobody cares about it. This is an intention to implement an innovative solution for this problem by developing an Enhanced Accident detection System for Indicating Victim Status from the accident zone. This system has been developed and implemented using the biomedical smart sensors and microcontroller based mobile technology integrated with the evolving LabVIEW platform. The system will automatically identify the accident, then immediately transmit the location of the accident and the status of the physiological parameters of the victims to the emergency care centre phone number through Short Message Service (SMS). The victim's physiological parameters such as body temperature, Heartbeat, Coma stage recovery status have been transmitted in the SMS. So the proposed system ensures that to reduce the human death ratio by accidents. When the accident occurs and realizes that there is no severe collision, then the person involved in accident has to press the switch provision which has been made to indicate that the accident is diminutive and no communication will be established i.e. no further alarming SMS has been transmitted.

2.2 Car Accident Detection and Notification System Using Smartphone

Every day around the world, a large percentage of people die from traffic accident injuries. An effective approach for reducing traffic fatalities is: first building automatic traffic accident detection system, second, reducing the time between when an accident occurs and when first emergency responders are dispatched to the scene of the accident. Recent approaches are using built-in vehicle automatic accident detection and notification system. While these approaches work fine, they are expensive, maintenance complex task, and are not available in all cars. On the other hand, the ability to detect traffic accidents using smartphones has only recently become possible because of the advances in the processing power and sensors deployed on smartphones. Most of the smartphone based accident detection systems rely on the high speed of the vehicle (extracted from the smartphone GPS receiver) and the G-Force value (extracted from smartphone accelerometer sensor) to detect an accident. As many references assure that 90% of road-traffic accidents occur at low speed of the vehicle. Hence, in addition to the high speed accident detection, this paper concentrated on low speed car accident detection. The main obstacle that encounters the low speed accident is how to differentiate whether the user is inside the vehicle or outside the vehicle, walking or slowly running. The effect of this obstacle is minimized, in this work, by a proposed mechanism that distinguishes between the speed variation of low speed vehicle and walking or slowly running

person. The proposed system consists of two phases; the detection phase which is used to detect car accident in low and high speeds. The notification phase, and immediately after an accident is indicated, is used to send detailed information such as images, video, accident location, etc. to the emergency responder for fast recovery. The system was practically tested in real simulated environment and achieved quite very good performance results

3. PROPOSED SYSTEM

We proposed accident detection using CNN Algorithm. The intent is to create a system which would detect an accident based on the live feed of video from a CCTV camera installed on a highway. The idea is to take each frame of a video and run it through a deep learning convolution neural network model which has been trained to classify frames of a video into accident or non-accident. Convolutional Neural Networks has proven to be a fast and accurate approach to classify images. CNN based image classifiers have given accuracy's of more than 95% for comparatively smaller datasets and require less pre-processing as compared to other image classifying algorithms.

3.1 IMPLEMENTATION

- **Data Collection:** Collect sufficient data samples and legitimate software samples.
- **Feature Extraction**: For each video's extract the features using image processing.
- **Train and Test Modelling:** Split the data into train and test data Train will be used for training the model and Test data to check the performance.
- **Modelling:** CNN. Combine the training deep learning algorithms and establish a classification model.
- **Detection:** in this module we will detect accident by uploading video

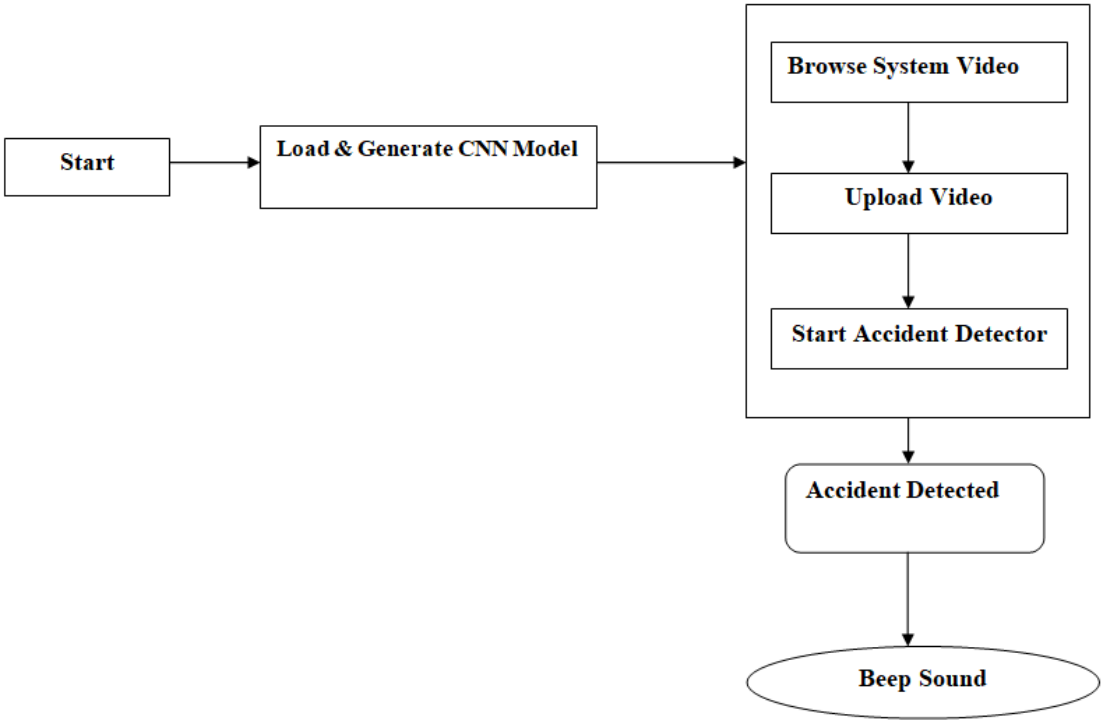
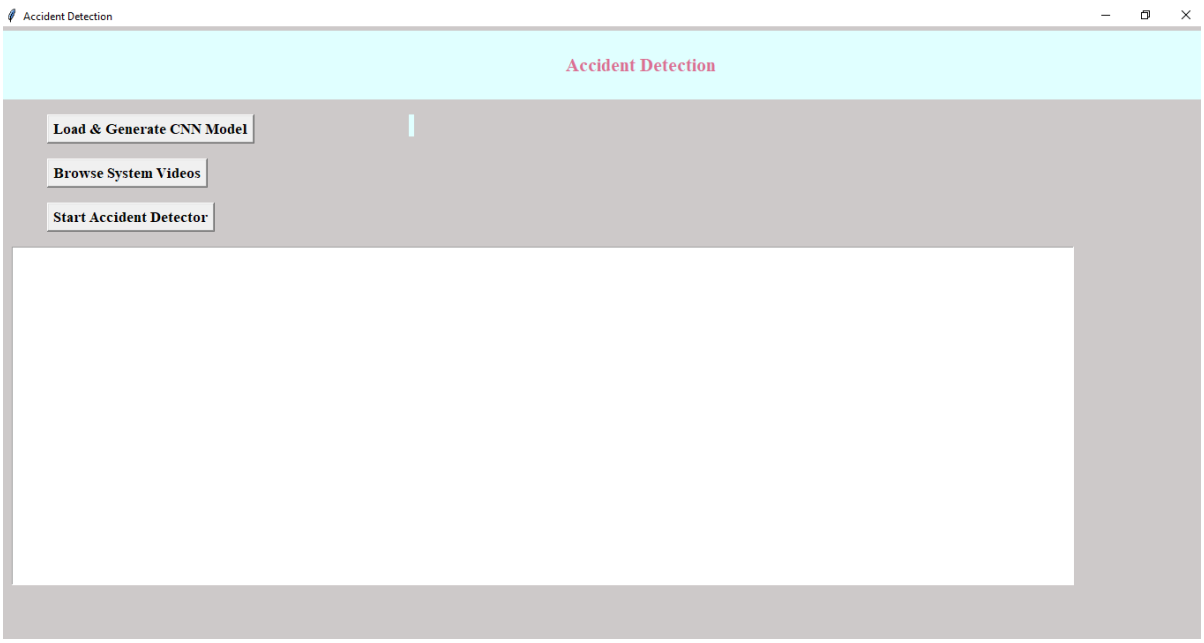


Fig 1: Architecture

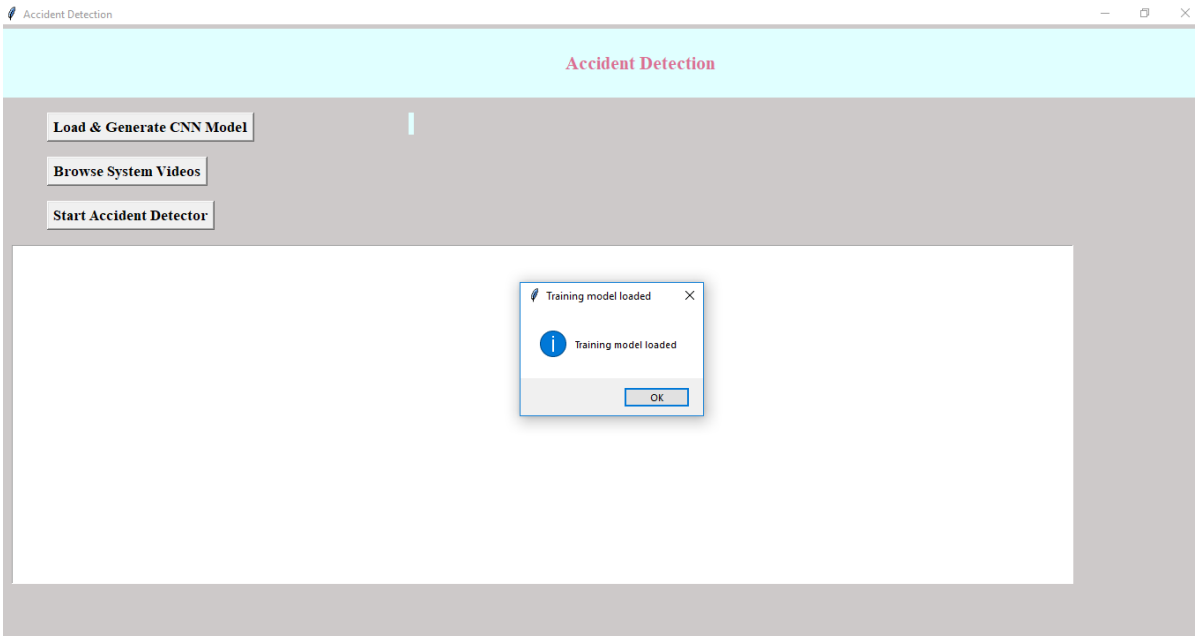
4. RESULTS AND DISCUSSION

This project is trained with images where vehicles collided and accident occurred and in test video if anything such collision happens between vehicles then application detect as accident. Training is done with tensorflow and CNN Algorithm.

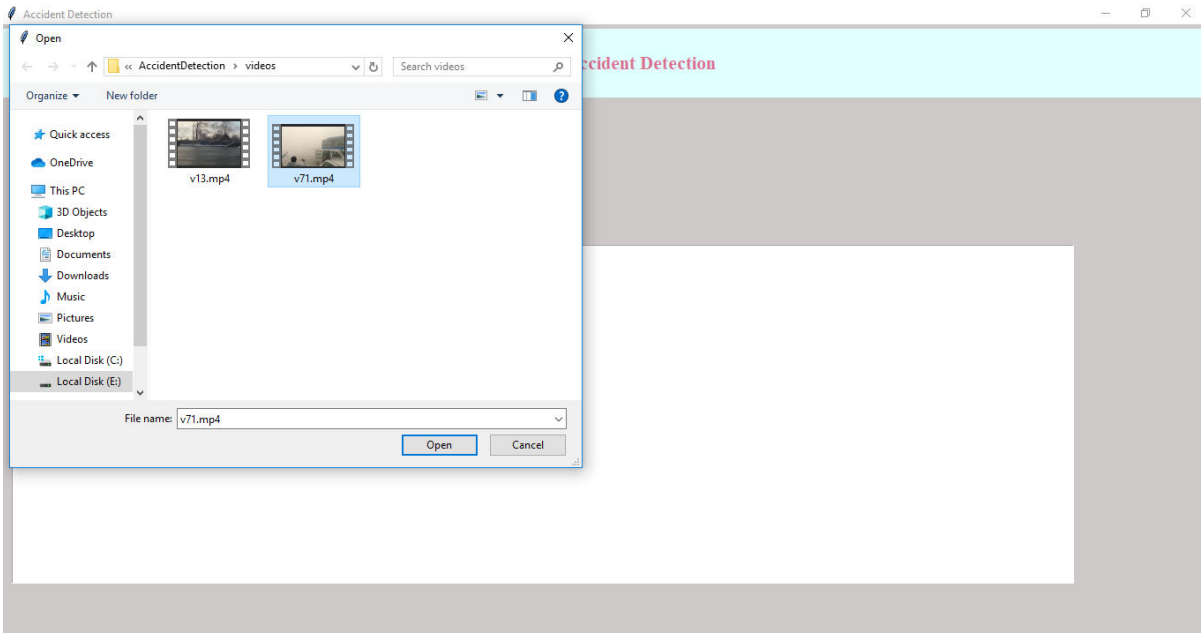
To run project double click on run.bat file to get below screen



In above screen click on 'Load & Generate CNN Model' button to trained CNN with dataset and to load CNN model using tensorflow



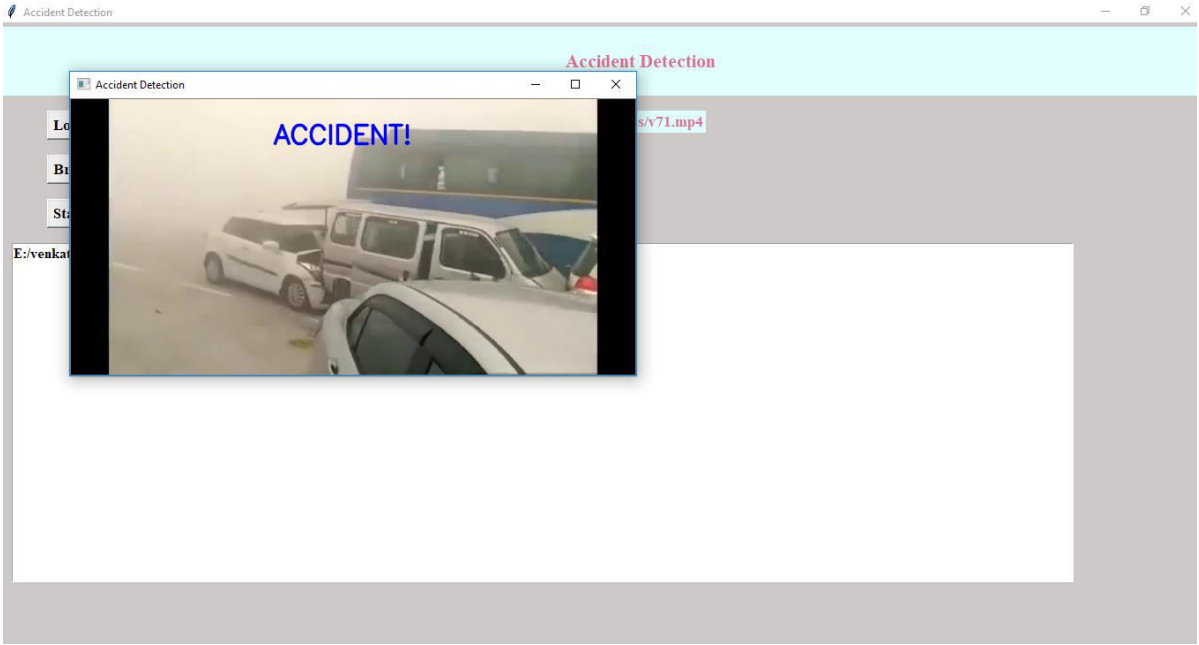
In above screen tensorflow model is loaded and then click on 'Browse System Video' button to upload video



In above screen selecting and uploading video and then click on 'Open' button to load video

In above screen video is loaded and now click on 'Start Accident Detector' button to play video and detect accident

In above screen video start playing and upon accident detection will get below screen with beep sound



In below screen playing another video without message if normal driving appear

5. CONCLUSION

One of the most frequent issues that humanity encounters on a daily basis is accidents, which result in the loss of both life and property. The suggested system offers a very practical and efficient solution to this issue. The proposed vehicle accident detection system has the ability to monitor accidents as they happen. The proposed system is significantly more cost-effective, foolproof, and accurate than its competitor thanks in large part to a model-based approach, unlike other systems in

use that comprise expensive sensors and unnecessary hardware. Images have been used in the experimentation, testing and validation, and the results demonstrate that this method does indeed achieve higher sensitivity and accuracy; as a result, it is a viable option for implementing this system on the majority of the state and national highways in the country.

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