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Road Accident Predictor using CNN Algorithm

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ABSTRACT: Accidents have been the biggest cause of mortality in India. More than 80% of accident-related fatalities are caused not by the incident itself, but by a failure to give timely assistance to accident victims. On highways where traffic is low and moving swiftly, an accident victim might be left alone for an extended period of time. The objective is to create a system that can detect an accident based on a live video feed from a CCTV camera positioned on a roadway. The idea is to run a deep learning convolution neural network model trained to detect certain patterns over each frame of a video. Recognize accident- and non-accident-containing frames in a video. Convolutional Neural Networks have been shown to give a rapid and reliable way for identifying pictures. CNN-based image classifiers have reached accuracy levels of greater than 95% for comparably smaller datasets and need less preparation than other image classifier

I. INTRODUCTION

Road accidents are become fairly commonplace. Road accidents are more likely to occur as people purchase cars at an increasing rate. Additionally, people nowadays are more careless than they were in the past. There is a lack of adherence to traffic regulations in larger cities, where there are numerous transportation options, the roads are getting smaller, and the population is increasing. Road accidents will therefore inevitably occur. Along with monetary loss, they also result in human loss. Therefore, regardless of the form of transportation used to travel, people need to be considerably more mindful when doing so. The rise in these incidents makes it unsafe for anyone to walk on foot. Every day, we read about incidents in the press, hear from family members, and occasionally even witness them firsthand. Over 1.35 million people die in traffic accidents each year, and an additional 20 to 50 million sustain moderate to severe non-fatal injuries, which often result in long-term impairments.

According to a World Health Organization (WHO) study on road accidents and deaths that are based on a country's financial situation, poor and middle-class persons in developing countries account for the majority of deaths from vehicle accidents. When compared to the 11.3 per million persons in developed or higher-income countries, the death rate in poor countries is substantially higher at roughly 21.5 per million people. According to statistics, developing nations account for only 50% of the world's autos, however they account for over 90% of road traffic fatalities. According to statistics, 13 persons in India lose their lives in traffic accidents every hour.

However, if we consider the worst-case scenario, things could end up being far worse because the majority of accident instances are simply not recorded. Because of its low average record of 13 fatalities per hour, which leads in approximately 140,000 deaths per year, India is on the approach of supplanting the United States as the leading country in terms of traffic fatalities in the present. A victim can typically be found within the first three stages of an accident. Because approximately 10% of accident fatalities occur during this phase, the first phase of an accident is described as when the accident victim dies within a few minutes or seconds after the incident. When an accident has been in its second phase for around an hour, it has achieved its highest death rate (75% of all fatalities). preventing it by getting the victims timely assistance.

II. RELATED WORK

Accidents on roads pose a significant threat to human life and property. As a result, there is a growing need for efficient accident detection systems that can promptly alert emergency services and minimize response times. In recent years, Python has emerged as a popular programming language for developing such systems due to its simplicity and

versatility. This article provides a comprehensive review of related work on accident detection systems implemented using Python, highlighting the key methodologies, algorithms, and techniques employed.

Data Collection and Sensors: The first step in building an accident detection system involves data collection from various sources. Many studies have utilized sensors, such as accelerometers, gyroscopes, GPS modules, and cameras, to capture relevant information. These sensors enable the system to gather real-time data on vehicle speed, location, orientation, and video footage. Python libraries, such as OpenCV and Pygame, have been extensively employed for sensor integration and data retrieval.

Data Processing and Feature Extraction: Once the data is collected, it undergoes preprocessing and feature extraction to identify relevant patterns and characteristics. Researchers have employed signal processing techniques, such as Fourier transforms and wavelet analysis, to extract valuable features from the collected data. Python libraries like SciPy and NumPy offer comprehensive tools for efficient data processing and analysis, enabling researchers to derive meaningful insights from the collected sensor data.

III. METHODOLOGY

A. Temporal Video Segmentation

Temporal video segmentation is a problem that has been studied for many years by the scientific community since it is the first step towards the development of more general solutions, such as scene understanding of videos [65]. A video is a sequence of consecutive images with a particular order. When these images are viewed in the correct order and at a specific speed, it is possible to observe the animated event represented by the recorded video.

B. Video Capture

A video camera can capture, with the help of a mechanism, an event that is happening at the moment, in order to store, observe, and process it in the future. Using the same concept of a digital camera, a video camera makes it possible to capture a number of photographs per second, thus allowing the event that is occurring to be digitally recorded. These images, which represent the video, are known as frames. Video cameras allow recording at different numbers of frames per second (FPS).

C. Model Development

Once the model is developed it needs to be hosted in an environment which can be easily available for everyone access there are many techniques available for hosting propose in this project we have selected Django and flask frameworks for predicting the final values. The model output will be created as API and the API will be used for the predicting the accident happening events and non-happening events. We have trained the models with hundreds of images and the hundreds of images re used for predicting the labelled data into the process of the predicting for the new variables.

IV. EXPERIMENTAL RESULTS

Double-click the run button to start the project.to get the screen displayed below, run the bat file To test this application, I am using below images to store the data in decentralized form. Fig1 displays the home page of Road accidents predictor Fig2 displays the Tensor flow. Fig3 displays the Upload video. Fig4 displays Starting video. Fig 5 displays the Accident Video.

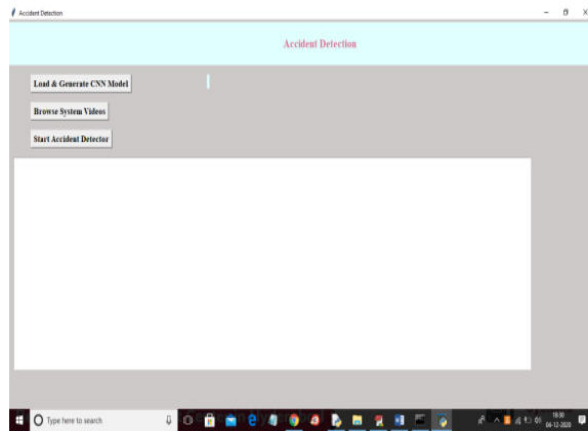


Fig 1: First Screen

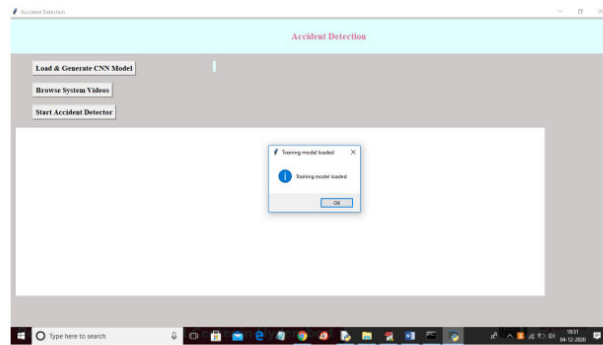


Fig 2: Tensor flow

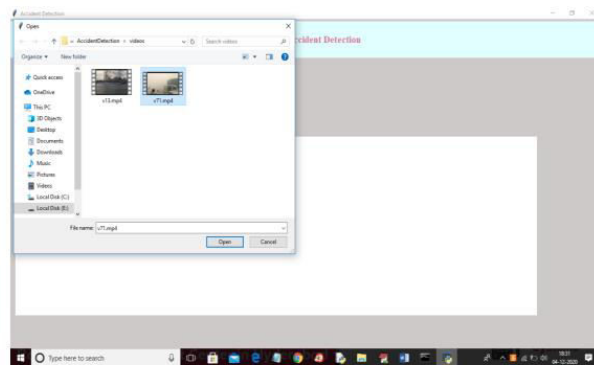


Fig 3: Upload Video

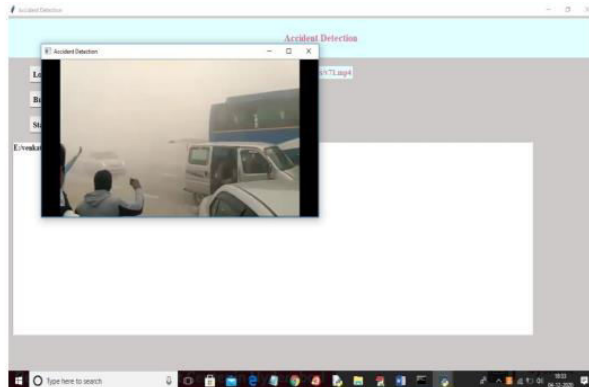


Fig 4: Starting Video

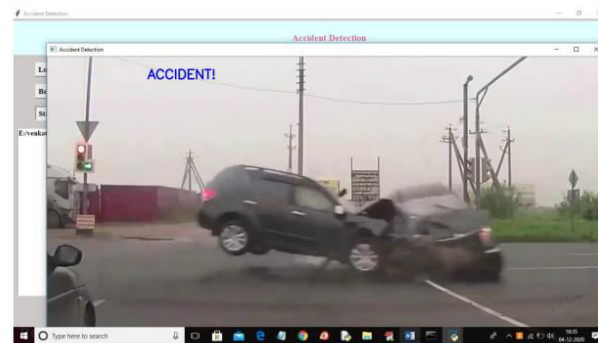


Fig 5: Accident video

V. CONCLUSION

Accidents are one of the most common difficulties that humanity experiences on a daily basis, resulting in both life and material damage. The proposed approach addresses this issue in a highly practical and effective manner. The suggested automobile accident detection system can follow an accident as it occurs and delivers an instantaneous alarm SMS to local hospitals and police stations, including details such as timestamp and geographical location. Unlike existing systems in use, which require expensive sensors and unnecessary hardware, the suggested system is far more cost effective and failsafe, with a much higher accuracy rate than its competitors, owing to a model-based approach. Experimentation, testing, and validation were carried out using images, and the results show that higher sensitivity and accuracy are indeed achieved using this method, making it a viable option for implementing this system on most of the country's state and national highways.

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