Khulna University of Engineering & Technology, Khulna

Department of Electronics & Communication Engineering

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Project on: **Accident Detection, Severity Prediction, and Developing an Alert System using Deep Learning and Computer Vision**

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Accident Detection, Severity Prediction, and Developing an Alert System using Deep Learning and Computer Vision

Introduction:

Each year, 1.35 million people are killed on roadways around the world. Every day, almost 3,700 people are killed globally in crashes involving cars, buses, motorcycles, bicycles, trucks, or pedestrians. More than half of those killed are pedestrians, motorcyclists, or cyclists. The recent trends show that there has been an increase in the global number of road accidents even in developed countries. However, under-developed and developing countries suffer a more significant impact due to life and economic losses. These accidents occur due to violation of traffic safety rules, careless rash driving, driver drowsiness, and lack of good quality roads. The problem becomes more adverse for highways and hilly areas where accidents are unavoidable. Road accidents are characterized by high death rates due to delays in the arrival of help and inefficient systems of mitigation to alert the concerned authorities. Road accidents on the highways are typically caused by natural reasons such as extreme weather conditions such as fog and consecutive collisions of vehicles are common on highways due to lack of visibility. The problem can be handled by making use of computer vision. The current solutions involved heavy dependency on sensor networks and area coverage. This can be substantially replaced by making use of object detection and image segmentation for accident classification.

The proposed system detects accidents using a camera as the primary hardware component, measures the severity of the accidents, and alerts authorities and SOS with the necessary information about the location and the severity of the accidents to prioritize comparatively more serious accidents with more concern and reduce casualties.

Objectives:

1. Accident detection from the video footage of a camera
2. Predict the severity of any accident
3. Developing an alert system to inform related authorities about the location of accidents and the type of severities.

Specification:

- We will train the system with CCTV video footage of accidents as the dataset so that the model can be later deployed with the CCTV cameras as input data providers for accident detection.
- We will be using Canny Edge Detection to preprocess the data, remove noise from the images, and smooth the segmentation of object detection.
- Masked R-CNN is used to detect accidents, classify vehicles, and conditions of vehicles after accidents to predict the severity level.
- Random Forest Classifier is used to predict the severity level of accidents as low, intermediate, and high to determine the priorities of attention.
- An alert system is developed with an alarm that will automatically ring in the event of an accident instantly and necessary information like, location and level of severity will be notified to local authorities and SOS services automatically.

The proposed system is as follows,