# Accident Detection and Developing An Alarm System using Deep Learning

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## Introduction

Nowadays accidents are a widespread phenomenon all over the world. Using computer vision as a tool for detecting accidents can be a milestone to take action immediately. Our project detects accidents using a camera as the primary hardware component and alerts authorities and SOS services with the necessary information about the location of the accidents to reduce casualties and save valuable lives. This can be implemented very easily with CCTV cameras monitoring roads and streets.

## Objectives

1. Accident detection from the video footage of a camera
2. Developing an alert system to inform related authorities about the location of accidents

## Components

- Camera of Laptop
- Arduino Uno
- Buzzer
- Ublox Neo 6m GPS Tracker

## Applications

Implementing with CCTV cameras along roads, streets and Flyovers.

## Dataset and Model

we have used total 64665 images to train our model. For accident scenarios 39002 images and for no accident scenarios 25663 images. We have used Convolutional Neural Network as our model here.
Dataset link:
https://drive.google.com/drive/folders/1W9P1w_7ZAgheZoaJP3cUeFnnX6PAqIU3

## Working Principle

The images we have used as dataset are collected from CCTV footages of different roads and streets. The basic concept of the image orientation in our dataset is when an accident takes place two or more cars collide and shapes of the cars are deformed. But in a no accident scenario cars simply pass by one another and no collision happens among them.
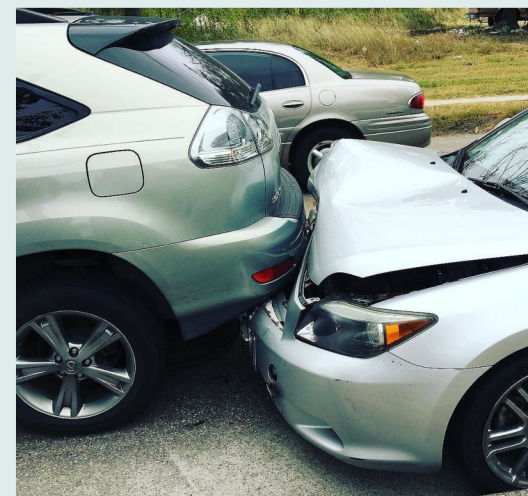


Accident                          No Accident

The system can be incorporated with a CCTV camera that will load video from the camera as a block of time(Ex. 15seconds) thus detect accidents from video frames as well as real time from a camera and activate the alarm system accordingly

## Alarm System

We have developed an alarm system with the help of an Arduino Uno to control a buzzer and a Ublox Neo 6m GPS Tracker to alert nearby and track the location accordingly. We have used Twilio to notify with an alert message that contains the coordinates of the location to the provided phone number.

## Limitations and Future Upgradations

The model sometimes fail to predict no accident scenarios of heavily trafficked roads or cars halted in a traffic jam. To solve this problem we will need more images of different scenarios, time as well as powerful GPU to train the model. For exact location of the accident powerful GPS Tracker system can be used.

*Reference* https://www.researchgate.net/publication/360620242_ACCIDENT_DETECTION_AND_ALERT_SYSTEM