Project Title: Road Accident Detection System

Vodafone Idea Foundation

Connecting Dreams Foundation

_VOIS

TEAM NO.: 186

NAMES OF THE STUDENTS PARTICIPATED IN THE TEAM:

KRISHNA SAI G
CHANDRA SEKHAR V
HEMANTH MANIKANTA B
SRICHARAN T
HARI PRASAD CH

COLLEGE: SRM UNIVERSITY
SEMESTER: 5
DEPARTMENT: CSE
CITY: GUNTUR
STATE: ANDHRA PRADESH
PROJECT MENTOR NAME: ARPITA ROY

Project Details:

- Project Name- Road Accident Detection System
- Project Lead- Krishna Sai G

Project Deliverables are

- A deep learning model that can detect road accidents from CCTV footage.
- A flash message delivered to the nearby emergency authorities, in case an accident is detected.

Problem Statement:

A significant number of people are ignored or forgotten following road accidents in order to avoid unwanted inquiries that may prove fatal to several people. As a result of the delay in response time to these accidents, the ambulance or police department is delayed in arriving at the scene.. In these critical situations every second counts for life. There is not any concrete step to stop the loss of lives due to such road accidents.

Need of Project:

The Road Accident Detection System is needed because it will help to save lives. By providing alerts to the authorities, they can respond quickly and provide the necessary assistance.The project is an important one because road accidents are a leading cause of death and injury worldwide. According to the World Health Organization, road traffic accidents killed an estimated 1.35 million people in the year 2015 alone. That is an average of 3,700 deaths every day. In addition, road traffic accidents are the leading cause of death for people aged 15-29 years.

The project is therefore a potentially life-saving one and is deserving of support.

Proposed Solution:

A Model that takes in CCTV camera footage and detects whether an accident has happened or not. In case it detects an accident it sends alerts to the concerned authorities via flash message. These alerts have location link to the area where accident was detected The purpose of the Road Accident Detection System is to provide citizens with accident alerts as they travel on the highway based on their location. If an accident occurs, it also provides a help feature that will notify the concerned authorities.

Technology Used:

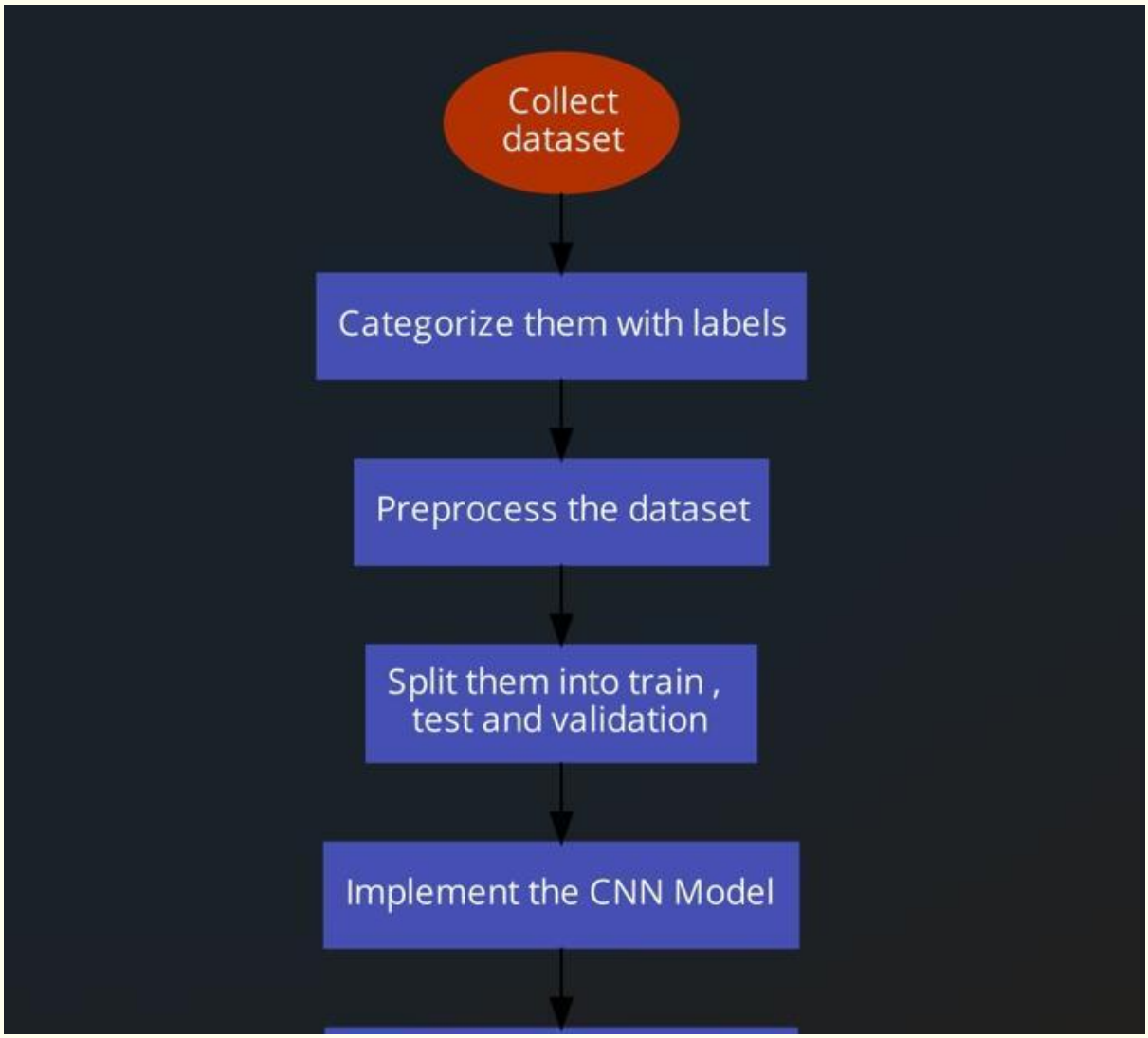
- TensorFlow
- Keras
- OpenCv
- matplotlib
- twilio
- numpy
- Ipython.display

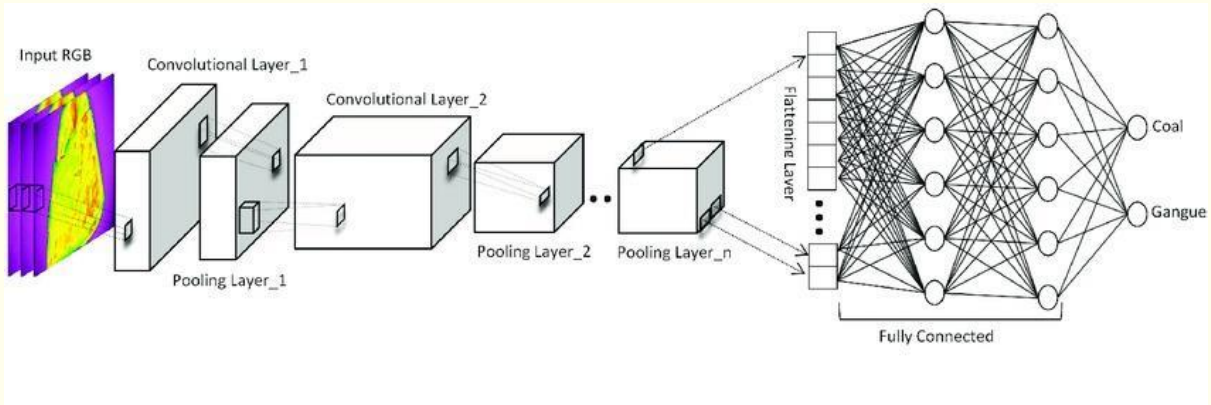
Project Outcomes:

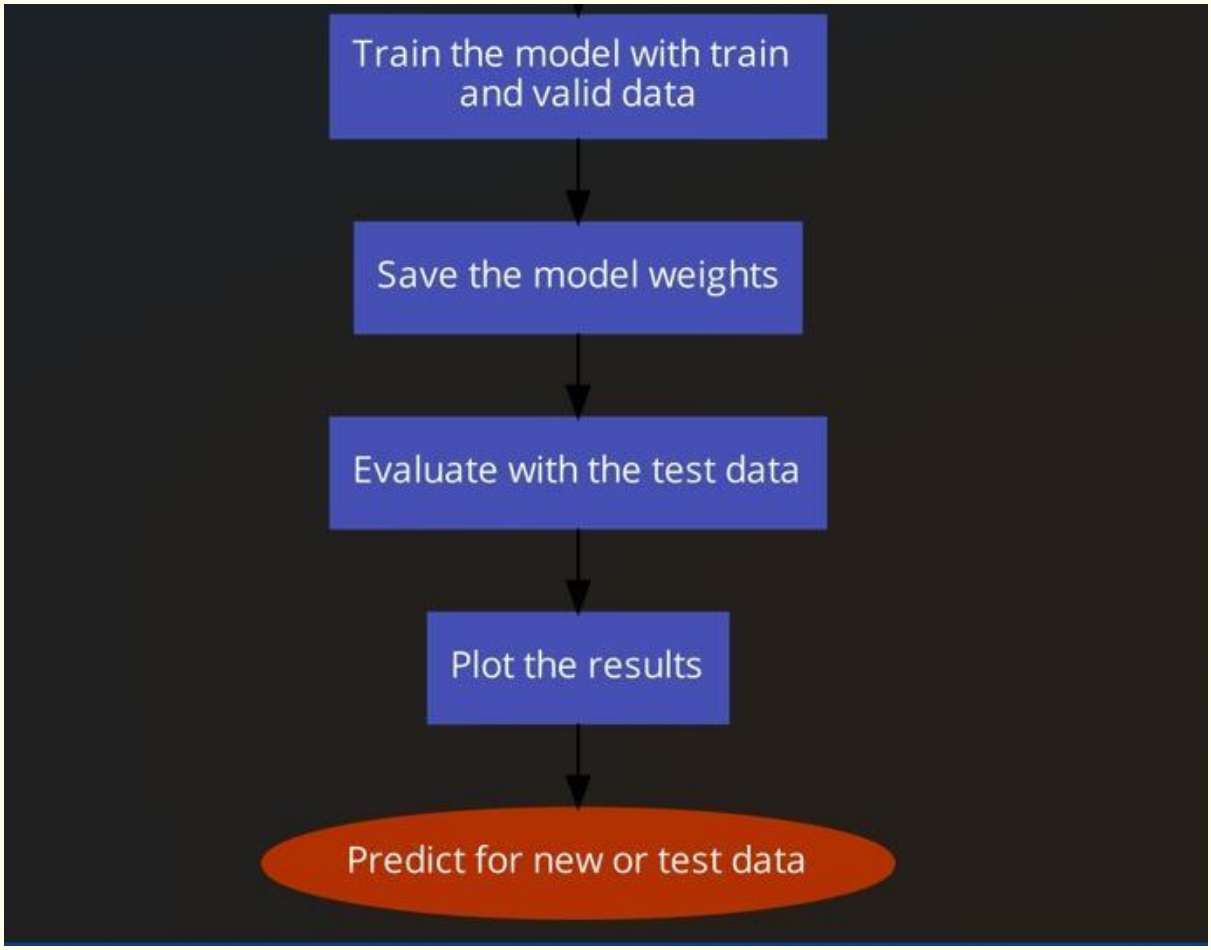
This project would lead to a decrease in the number of road fatalities that occur due to the lack of a prompt response to the accident site. This project would have a few different components. One would be to develop a better way to quickly and accurately locate where an accident has occurred. This could be done through a combination of GPS tracking and real-time traffic data. Once the accident has been located, the second component would be to dispatch emergency services to the scene as quickly as possible. This could be done through a variety of means, such as pre-programming emergency response routes into the GPS system, or by using drones to drop first-aid kits or other supplies at the accident site.

Modelling:

1. We begin by importing the necessary libraries for our project. This includes libraries for data manipulation, numerical computation, data visualisation, and machine learning.
2. We then load the data into our environment. We have provided the data for you in the form of a zip file.
3. Once the data is loaded, we pre-process it to ensure that it is in the correct format for our machine learning algorithm. This includes converting the images to grayscale and resizing them to a standard size.
4. We then define our machine learning model. We will be using a convolutional neural network (CNN) for this task.
5. We then train our model on the data. This is the process of fitting the model to the data.
6. Finally, we evaluate our model on a test set of data. This allows us to see how well the model performs on data it has not seen before.
7. And then we implemented flash message delivering to the nearby emergency authorities , in case accident is detected , using twilio software.


Collect dataset
Categorize them with labels
Preprocess the dataset
Split them into train , test and validation
Implement the CNN Model


Input RGB
Convolutional Layer_1
Convolutional Layer_2
Pooling Layer_1
Pooling Layer_2
Pooling Layer_n
Flattening Layer
Coal
Gangue
Fully Connected

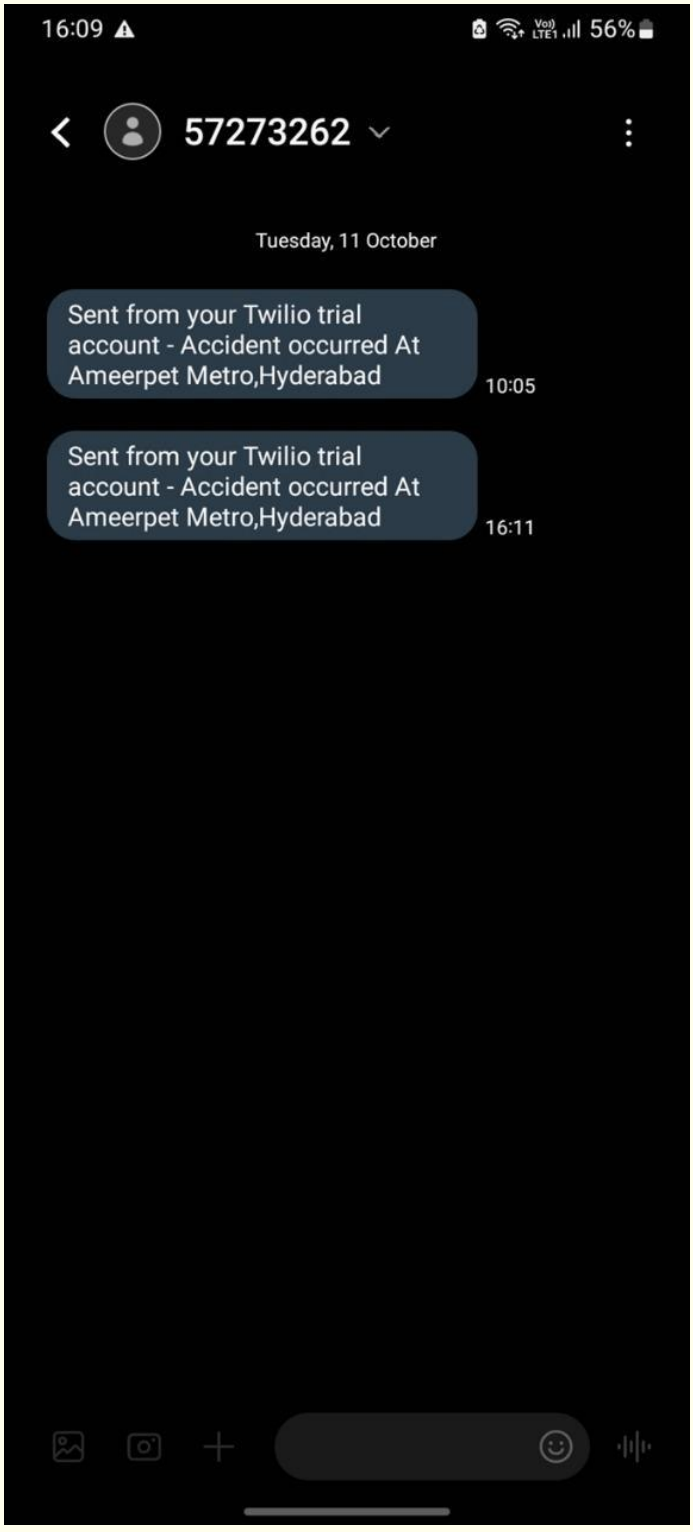


Results:

We obtained 88% accuracy for our model.

```
Epoch 1/10
8/8 [==============================] - 119s 13s/step - loss: 5.2122 - accuracy: 0.4791 - val_loss: 0.6921 - val_accuracy: 0.5306
Epoch 2/10
8/8 [==============================] - 100s 13s/step - loss: 0.6759 - accuracy: 0.5992 - val_loss: 0.8030 - val_accuracy: 0.5408
Epoch 3/10
8/8 [==============================] - 101s 13s/step - loss: 0.6548 - accuracy: 0.6131 - val_loss: 0.6480 - val_accuracy: 0.7347
Epoch 4/10
8/8 [==============================] - 102s 13s/step - loss: 0.6122 - accuracy: 0.7307 - val_loss: 0.5765 - val_accuracy: 0.6429
Epoch 5/10
8/8 [==============================] - 102s 13s/step - loss: 0.5750 - accuracy: 0.7029 - val_loss: 0.7894 - val_accuracy: 0.5000
Epoch 6/10
8/8 [==============================] - 106s 13s/step - loss: 0.5153 - accuracy: 0.7472 - val_loss: 0.5068 - val_accuracy: 0.7857
Epoch 7/10
8/8 [==============================] - 99s 12s/step - loss: 0.4690 - accuracy: 0.7674 - val_loss: 0.4009 - val_accuracy: 0.8163
Epoch 8/10
8/8 [==============================] - ETA: 0s - loss: 0.3881 - accuracy: 0.8180 Epoch 9/10
8/8 [==============================] - 100s 13s/step - loss: 0.3101 - accuracy: 0.8736 - val_loss: 0.3163 - val_accuracy: 0.8265
Epoch 10/10
8/8 [==============================] - 103s 13s/step - loss: 0.2569 - accuracy: 0.8887 - val_loss: 0.3540 - val_accuracy: 0.7959
```

The results of this system would be that it would send alerts to the concerned authorities in case of an accident and would provide a help feature if an accident occurs.



Demo link :
https://drive.google.com/file/d/1mBjbsi2iuQNWOAt7GPbL7hFocrGvxh1D/view?usp=sharing

Future scope for project enhancement:

This project can be enhanced by adding more features like:

1. Adding a license plate detection feature that can identify the vehicles involved in the accident.
2. Adding a weather detection feature that can warn drivers of adverse weather conditions.
3. Adding a traffic congestion detection feature that can warn drivers of impending traffic jams.