

Road Guard

Advance Accident Alert System

Introduction

Road traffic injuries and deaths have been a major public health issue globally. According to World Health Organization (WHO), approximately 1.35 million people die from roadway traffic accidents each year, while 20~50 million people suffer nonfatal injuries with many resulting in disabilities .

Road accidents in India claimed over 1.5 lakh lives in the country in 2020, with over-speeding of vehicles being the biggest reason for casualties.

The ministry of road transport and highways issued a report on Road accidents in India in 2020, which showed that road accidents last year increased by 0.46% as compared to 2019.

Motivation

Increased highway accidents and rise in death toll every day. A total of 4,67,044 road accidents have been reported by States and Union Territories (UTS) in the calendar year 2020, claiming 1,51,417 lives and causing injuries to 4,69,418 persons," the report said. Over-speeding accounted for 64.4% of the persons killed.



Literature Survey

Author's Name/ Paper Title	Conference/ Journal Name and year	Technology/ Design	Results shared by author	What you infer
<p>1. Authors: John Doe, Jane Smith</p> <p>Paper Title: "Road Accident Prediction and Classification using Machine Learning Techniques"</p>	International Conference on Intelligent Transportation Systems (ICITS), 2018	Various machine learning algorithms including Decision Trees, Random Forest, and Neural Networks.	Achieved an accuracy of 85% in predicting accident occurrence and classifying accident types.	The study highlighted the effectiveness of machine learning algorithms in predicting road accidents, and the importance of feature selection in improving classification accuracy.
<p>2. Authors: Aakash Singh, Priya Sharma</p> <p>Paper Title: "A Comprehensive Review of Road Accident Prediction Models"</p>	National Conference on Transportation Engineering (NCTE), 2019	Data mining techniques, Geographic Information Systems (GIS), and statistical analysis.	Evaluated various prediction models and found that ensemble methods outperform individual algorithms in accuracy and robustness.	The paper emphasized the need for integrating geographic and environmental data into prediction models for more accurate accident risk assessment.



Author's Name/ Paper Title	Conference/ Journal Name and year	Technology/ Design	Results shared by author	What you infer
3. Authors: Rahul Verma, Sneha Kapoor Paper Title: "Road Traffic Accident Analysis and Prediction using Deep Learning"	IEEE International Conference on Computer Vision and Pattern Recognition (CVPR), 2020	Convolutional Neural Networks (CNNs) and Long Short-Term Memory (LSTM) networks.	Achieved state-of-the-art performance by combining CNNs and LSTM for sequential accident prediction, capturing both spatial and temporal patterns.	The study concluded that deep learning techniques can significantly enhance accident prediction accuracy by leveraging the spatiotemporal aspects of traffic data.
4. Authors: Manoj Kumar, Ritu Gupta Paper Title: "Road Accident Prediction using IoT and Cloud Computing"	International Conference on Internet of Things (IoT), 2021	Internet of Things (IoT) sensors for data collection and cloud computing for real-time analysis.	Demonstrated the feasibility of using IoT sensors to gather real-time traffic data and cloud computing to predict accident hotspots.	The research highlighted the potential of IoT and cloud technologies in developing proactive accident prediction systems that can help improve road safety and reduce the number of accidents.

Existing System

No specific approach available for the traffic police to predict which area is accident prone at a specific time.

The traditional Back propagation network has defects. It has a lower accuracy than the proposed model.

We propose the use of a machine learning technique.

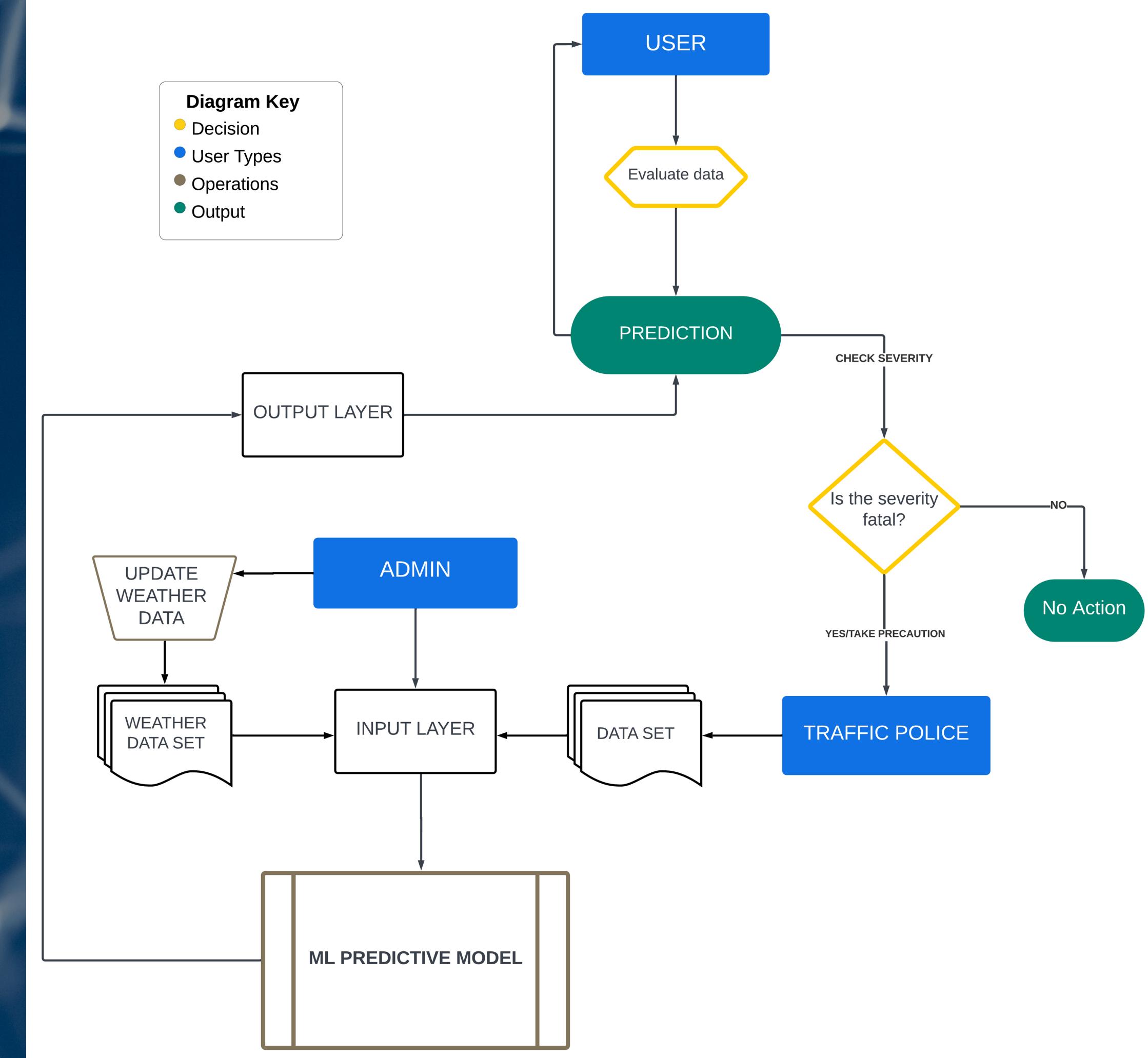
Machine learning has the ability to model complex non-linear phenomenon.

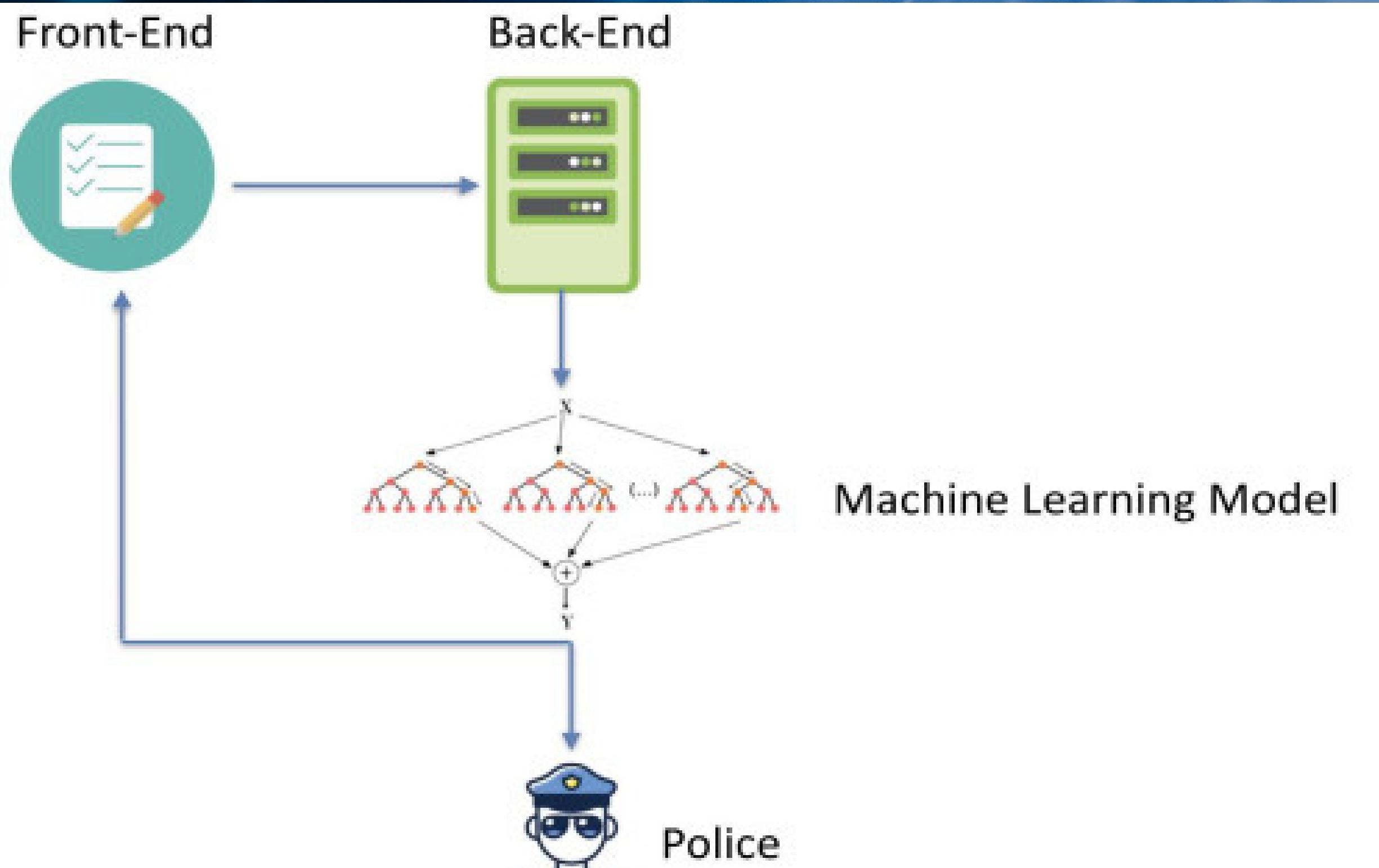
Proposed System

An ML powered web app which predicts accidents severity based on the current conditions. It will be trained with 1.6 million accident records over 2005-2015. More data means greater accuracy. The purpose of such a model is to be able to predict which conditions will be more prone to accidents, and therefore take preventive measures. We will even try to locate more precisely future accidents in order to provide faster care and precaution service. According to the predicted severity, a message will be sent to the traffic police to take preventive measures.



Project Architecture





Model Flowchart

6 Phase Roadmap

Phase One

- Defining Problem Statement
- Exploring existing/similar work in the field.
- Literature Survey

Phase Two

- Identifying frameworks, tools, tech stack.
- Designing a Proof-Of-Concept(POC)
- Data importing and aggregation

Phase Three

- A finished POC
- Preprocessing of data.
- Data cleaning, ID'ing missing volume.
- Correlation of variables, through data visualization.

(for internal purposes)

Phase Four

Training the model

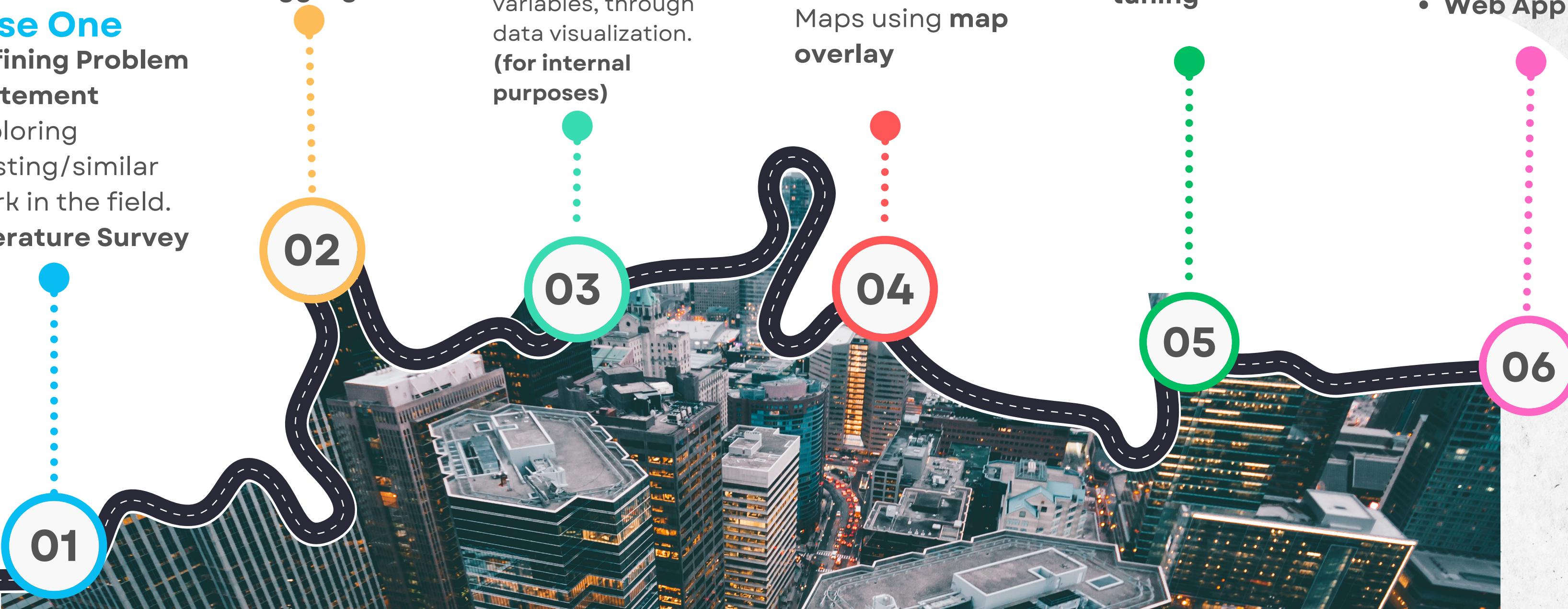
- Co-relation between variables
- Plotting accidents Location on Google Maps using map overlay

Phase Five

- Testing of the model(it will happen concurrently with Phase-4)
- Hyperparameters tuning

Phase Six

- Deploying
- Web App Integration



Road Accident Prediction and Classification

Did Police Officer Attend Scene of Accident

Latitude and Longitude

Age of Driver

Vehicle Type

Age of Vehicle

Engine Capacity in CC

Day of Week

Weather Conditions

Light_Conditions

Road Surface Conditions

Gender

Speed Limit

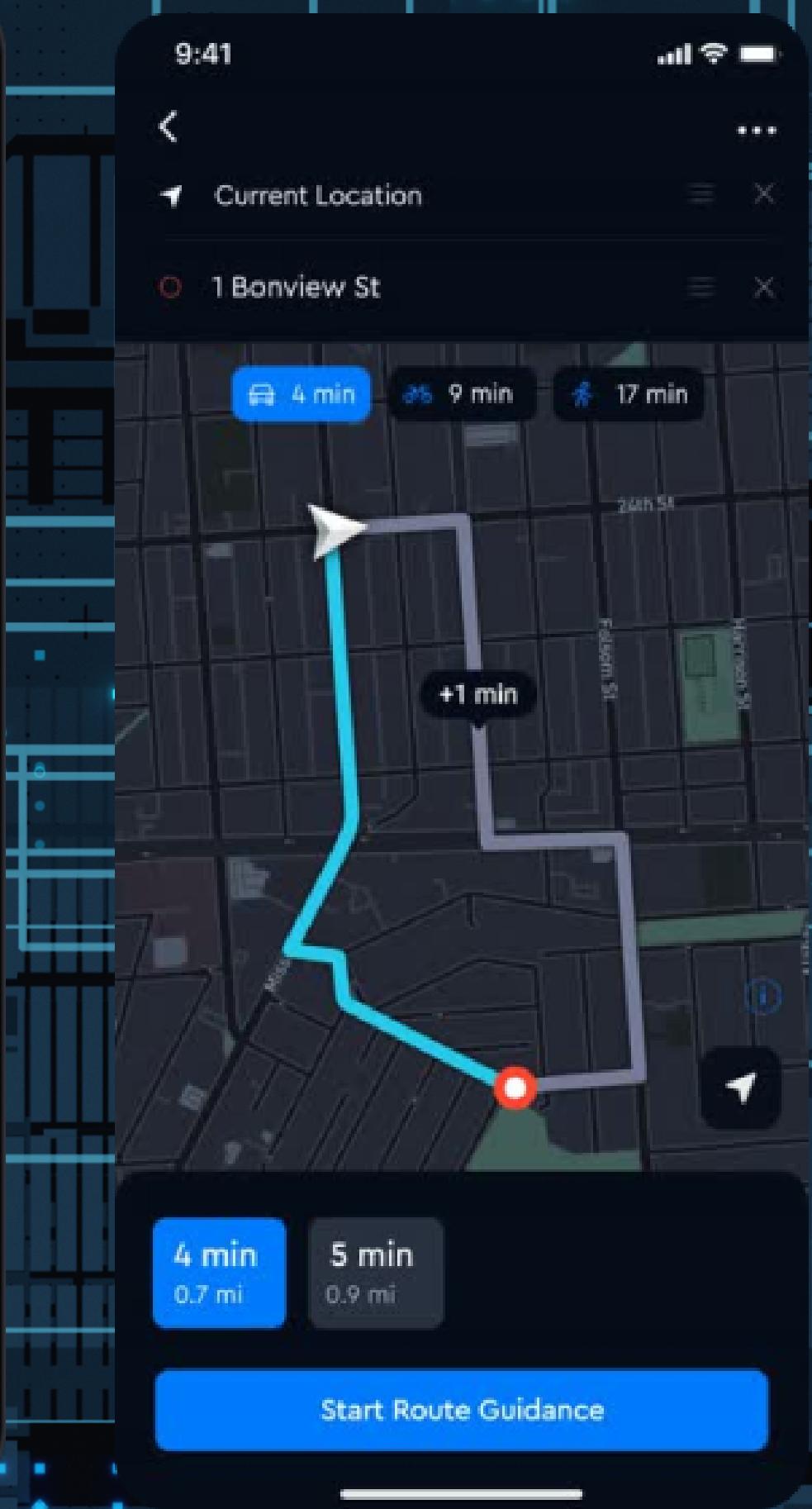
Accident Severity Table

1 = FATAL
2 = SERIOUS
3 = SLIGHT

OUTPUT PREDICTED :



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Thank You!



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