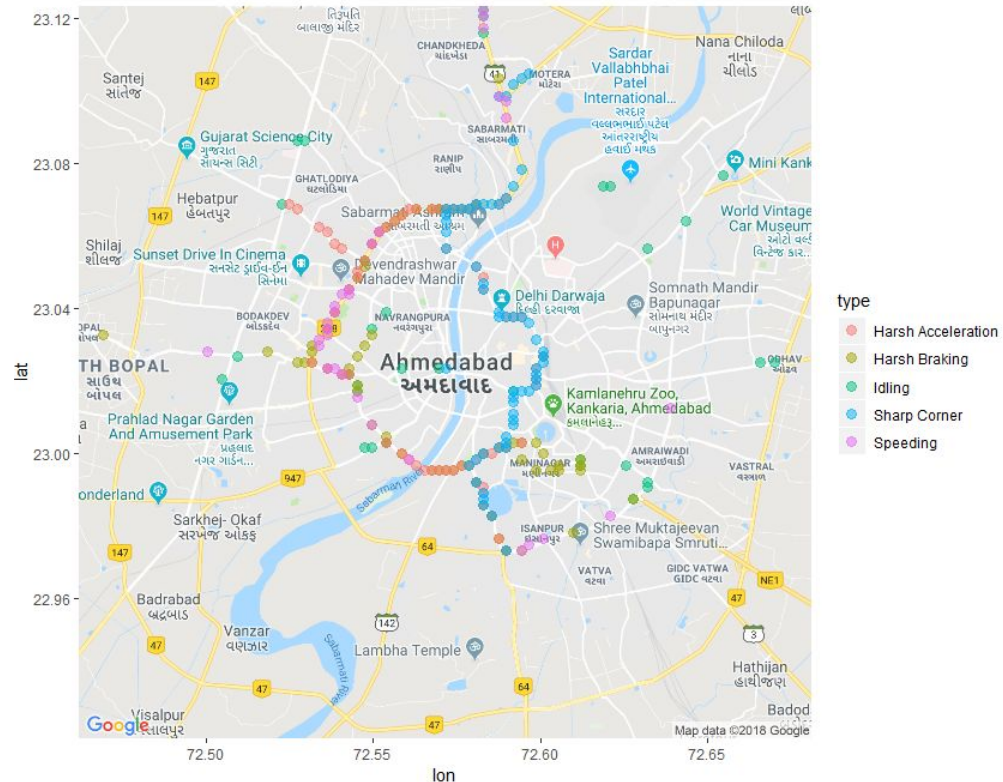


Just Code 2018

Problem 4

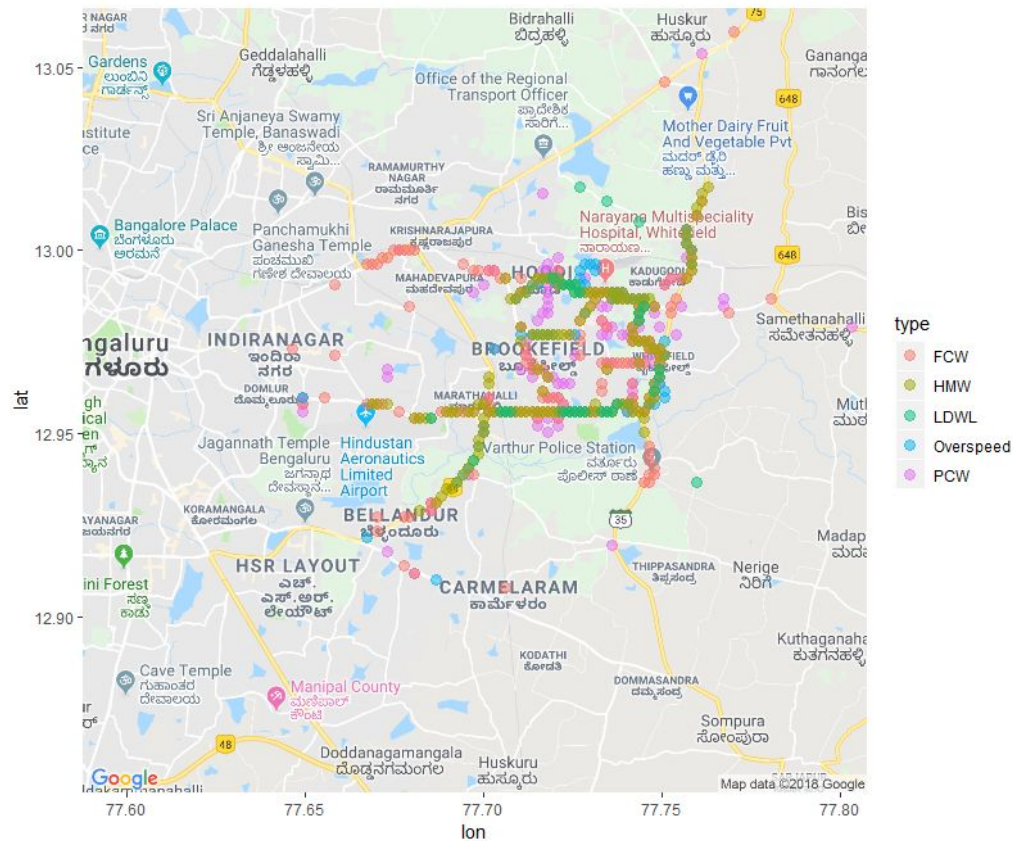
Ahmedabad OBU Events : Top Incidents Map

- Remarkable clustering in sharp corners (eastern part of the town) vs. speeding/ acceleration (western part)
- Interpreting idling as congestion, top spots are scattered but clearly identifiable
- Problem areas are concentrated around the city centre apart from a few congestion areas

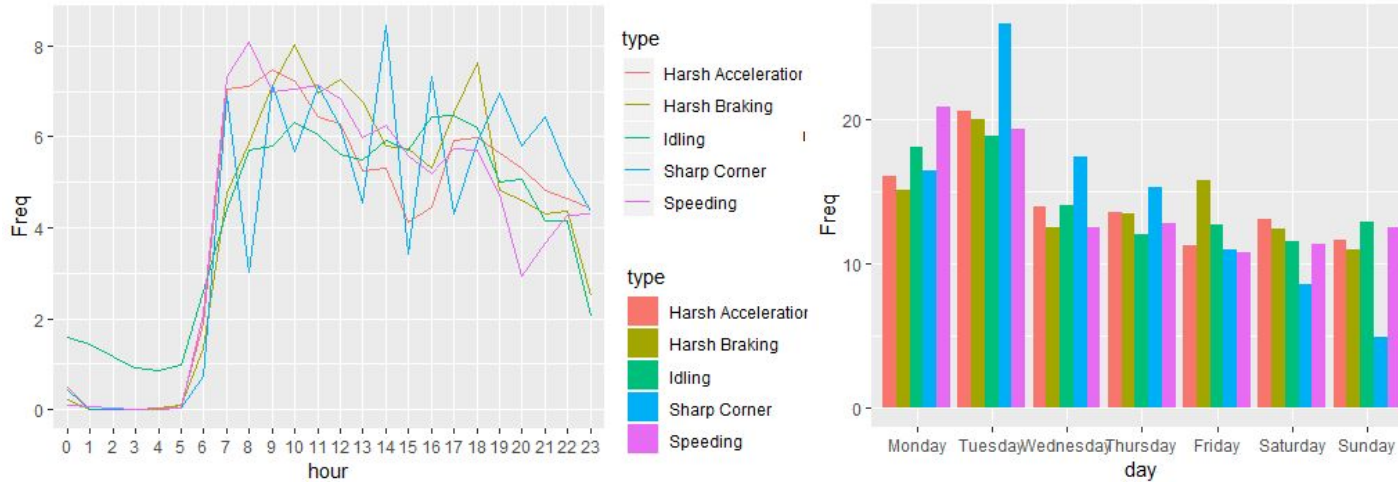


Bangalore CAS Events : Top Incidents Map

- Lane change right and left is clubbed under LDWL and urban forward collision warning (UFCW) is clubbed with FCW
- There is no noticeable clustering of different types of events
- Roads off the main grid also have a high rate of incidents, unlike Ahmedabad

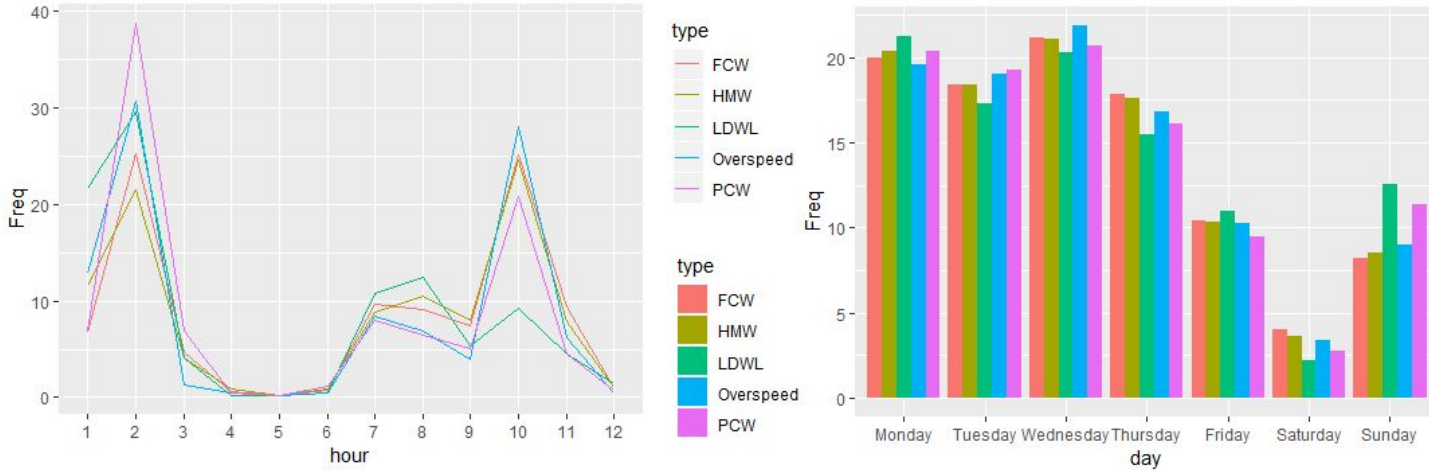


Ahmedabad OBU Events : Time and Day



- The worst time of day peak around 9 AM and goes down from there. This true for all event types (esp. for idling/harsh braking), except sharp corners.
- Worst day of weeks are Tuesday and Monday. However, the improvement in speeding is less, suggesting it may be partly behavioural

Bangalore CAS Events : Time and Day

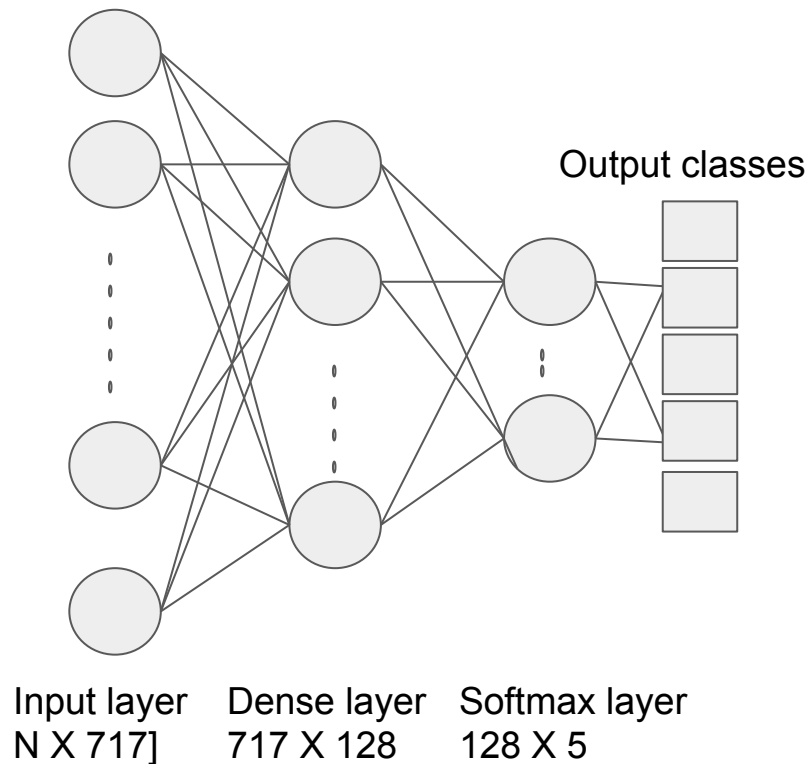


- The worst time of day bi-modal with peaks around 2 and 10 (in 12-hour format) and goes down from there.
- Worst day of weeks are Monday to Wednesday. Saturday shows a remarkable drop in all incidents

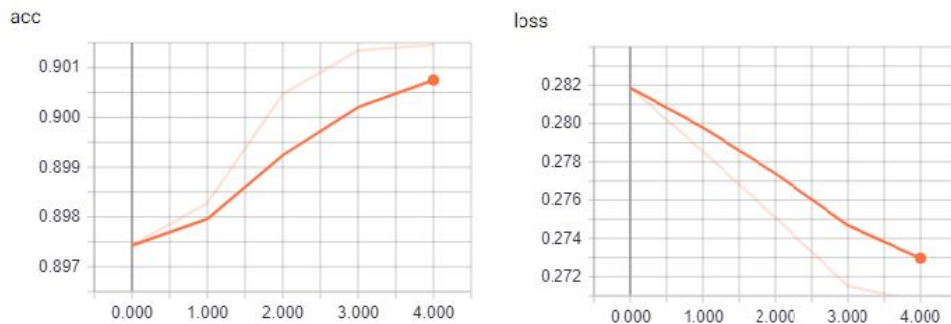
Ahmedabad OBU Events : Predictive Model

Inputs: 1) value (number) and units (one-hot), time of day, past events (one-hot), location (one-hot). Location modelled as 100X100 grid of Ahmedabad. Past events looks for any incidents in the current grid and its immediate neighbours for within last 5 minutes

Modelled as sequential two-layer network. First layer has ReLU with a 40% drop-out and final layer as soft-max. Trained on categorical cross-entropy with 10% validation split



Ahmedabad OBU Events : Predictive Model



Model test data-set (35% of total) accuracy: 90.818%

Possible Improvement: 1) Data-set: negative cases missing (data points where there were no incidents). This is required to balance false positives 2) Location modelling: instead of 2D grids, model as 1D along-the-road coordinates (possible using Google map api) 3) Competing models and hyper-parameters tuning

Software: R with google map apis and Keras+TensorFlow. Code and model at https://github.com/prodipta/road_safety.

Data Description: Ahmedabad and Bangalore

Ahmedabad

Events Report for Buses Dataset contains data points captured by On Board Units (OBU) in public buses capturing - speed, location, and route of different buses for the period of 16th July - 31st July, for the city of Ahmedabad. Download here - [link](#)

Bangalore

Grey Spot Dataset by Intel contains JSON files on monthly data collected by Collision Avoidance System installed in buses and has mapping of data on imminent collisions in areas in the city of Bangalore. Download here - [link](#)

Forward Collision Warning (FCW)

Headway/Following Time Monitoring & Warning (HMW)

Lane Departure Warning Left (LDWL)

Lane Departure Warning Right (LDWR)

Speed Limit Indicator (Overspeed)

Pedestrian & Cyclist Collision Warning (PCW)

Urban Forward Collision Warning (FCW)