A Survey on Singaporean Traffic and Roadwork Data

Introduction:

When you're driving around in the Business Hub of the world, you would obviously expect things to be a bit on the congested side. As of the Tom Tom world traffic index in 2016, it has been observed that singapore has witnessed a rise in congestion levels due to traffic. This comes as no good news, as the existing traffic condition in the country adds about 34 minutes of extra travel time on an average. Combine that with the pre-existing traffic situation in Singapore and you're staring at a big logistical problem.

However, many efforts are being taken on the travel optimization front in the city. The introduction of the Electronic Road Pricing or ERP systems that reduced the time wasted on manual parking fee collections. Further efforts to reduce traffic congestion and improve quality of transport across the country need sufficient backing by meaningful data and statistics. This is the inspiration behind surveying the country's traffic and incident data.

Data Acquisition and Pre-Processing:

Data for the survey was pulled from Data.gov.sg as well as the Land Transport Authority Data Mall. We extracted the following fields from the available APIs for the use of our survey models.

Label	Description
Incident Type	Road incident type. Example: Roadwork, Accident, Vehicle Breakdown.
Geographical Location	Geographical data consisting of Latitude and Longitude.
Road Name	Name of the road where the incident has occurred
Time	Time details about the incident, consisting of start and end time of the same.
Temperature	Average Temperature recorded in singapore for the corresponding time stamp.

Pressure	Pressure recorded in Singapore for the corresponding timestamp.
Humidity	Average Humidity recorded in Singapore for the corresponding timestamp.

Data Sources:

GQM Analysis:

Goal:

The broad goals of this analysis is to devise methods that will aid in a reduction of congestion due to traffic while simultaneously reducing the effect of roadway incidents on the traffic.

Questions:

To provide solutions that help us achieve our goals, we have to answer some basic questions first. Here are the main questions whose answers we feel are imperative in order to achieve solutions leading to our goals. We have grouped them into the 4 main types of questions we need.

1. Where?

   Where is traffic concentrated across the city?
   To understand how we must tackle the problem of overcrowding the roads, we must first understand what the most affected areas are.

2. When?

   When is the Traffic at its peak?
   To develop a sustainable planning model, we will also require the times at which traffic it at its peak. For example, if one were to schedule a roadwork activity, they would have to make sure it doesn't clash with peak traffic timings so as to minimize its effect on the congestion.

   When do majority of incidents occur?
   By understanding the distribution of incidents across times, we would be able to estimate and predict the likelihood of its occurrence and correspondingly take action.

3. How?

How is the distribution of major roadwork incidents across the country?
To allocate resources for different tasks, we must know the different kinds of incidents occurring across the country, along with their individual frequencies of the same.

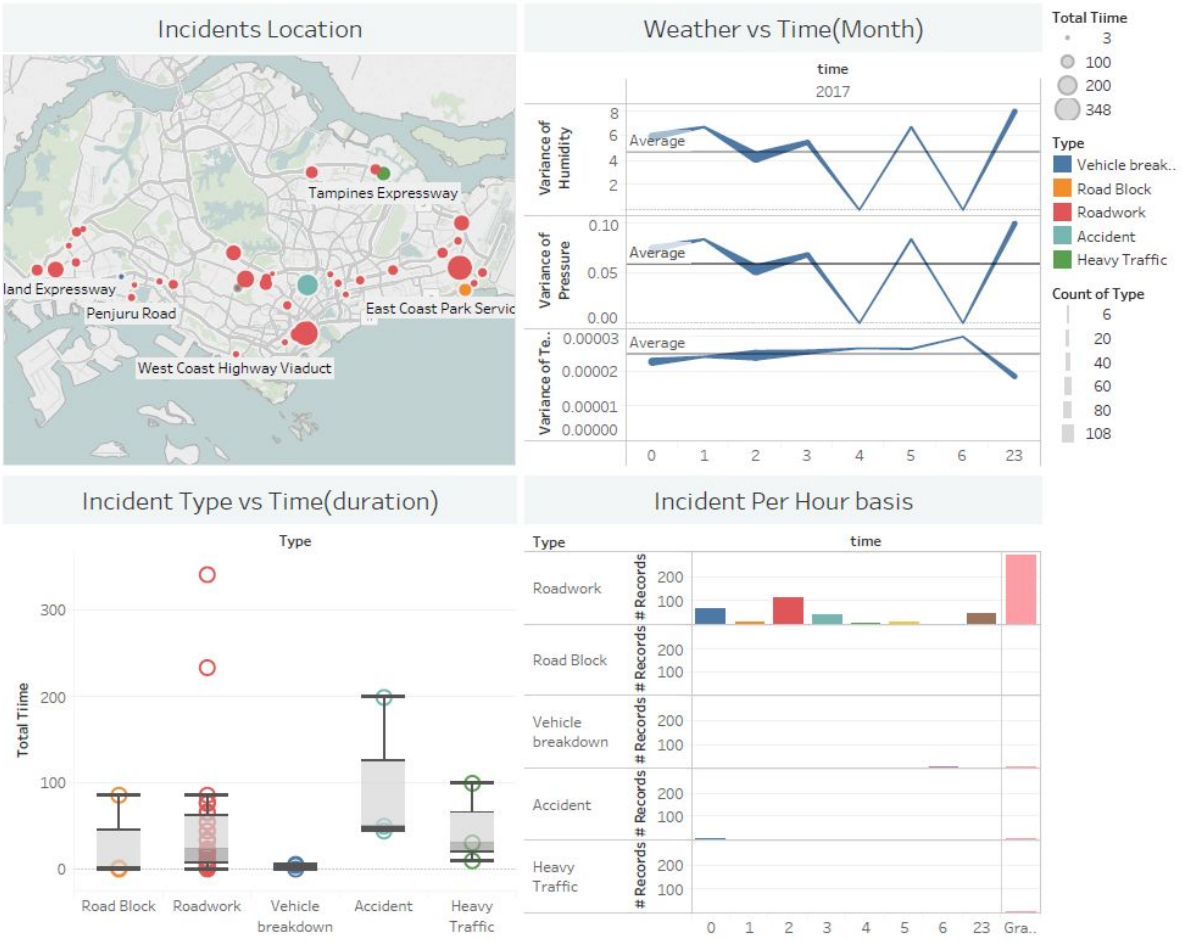
4. What?

What are some factors that affect traffic conditions?
Do factors such as weather influence the traffic incidents in Singapore? If so, is it possible to predict the likelihood of certain incidents based on weather? And if there weather affects the traffic conditions by a lot, we could focus planning activities on mitigating the effects of the same.

Metrics:

1. Geospatial Traffic Data- *Incident Flag, Latitude, Longitude.*
2. Time Data- *Start Time, End Time, Total Time.*
3. Weather Data- *Temperature, Humidity, Pressure.*
4. Incident Frequency Rate.

Data Dashboard:



Insights and Conclusions:

- We observe that most incidents take place during the day and that there are very few recorded cases of traffic related incidents during the night.

- Roadwork incidents seem to take the longest amount of time, and hence must be planned carefully so as to not disrupt normal traffic.

- The effect of Temperature, Humidity and Pressure upon Singapore traffic is minimal, and that traffic is weather-independent.

- A majority of the traffic related incidents seem to occur around the Central Business District in Singapore, thus indicating where most resources must be pumped.

- A more in-depth analysis can be done over a longer period of time and can yield better insights