**Activity 1:**

**3. Technical explanation of choosing particular algorithm:**

I have used ‘Time Series analysis’ for forecasting algorithm since the given Light rail patronage dataset follows sequential chronological order. Time series data is important when predicting something which is changing over the time using past data. In time series analysis the goal is to estimate the future value using behaviours in the past data. There are many statistical techniques available for time series forecast some of them are

* Autoregressive Integration Moving Average (ARIMA)
* Seasonal Autoregressive Integration Moving Average (SARIMAX)
* Simple Moving Average (SMA)
* Exponential smoothing (SES)
* Neutral network (NN)

**a) Model accuracy**:

Among different statistical techniques I have chosen ARIMA and SARIMAX for forecasting. The reason for choosing ARIMA is ARIMA modeling will take care of trends, seasonality, cycles, errors and non-stationary aspects of a data set when making forecasts. ARIMA is mainly used to project future values using historical time series data.

The reason for using SARIMAX is SARIMAX is an extension of ARIMA that explicitly supports univariate time series data with a seasonal component. Here I have taken seasonality value as m=7. From the two model , RMSE Value of SARIMAX shows more accurate value than RMSE of ARIMA. i.e RMSE of SARIMAX (1499.45) is le low when compared to than RMSE of ARIMA (2069.20), RMSE value of SARIMAX is closer to mean value compare than ARIMA. Hence using SARIMAX I have predicted for next 7 days value of light rail patronage dataset.

**Activity 2:**

**Mathematical opinion on news article:**

The news article “The canberra times” shows 726 accidents reported to police. The no of accidents taken place in northbourne is 87.

= 11.9

Hence northbourne is clear black spot of accident.

=36.5

From the cyclist crashes heat map data the no of accidents happened on Wednesday is 150 which is highest among other days. No of accidents happened between 8am-9am is 163 in this crashes happened on Wednesday is 47. From the dataset most of the accidents occur at intersection(right angle collision) recorded as 265 from 726 total accidents reported and crashes reported as same direction side swipes is 111. 26 rear end collision is happened in 726 reported accidents.