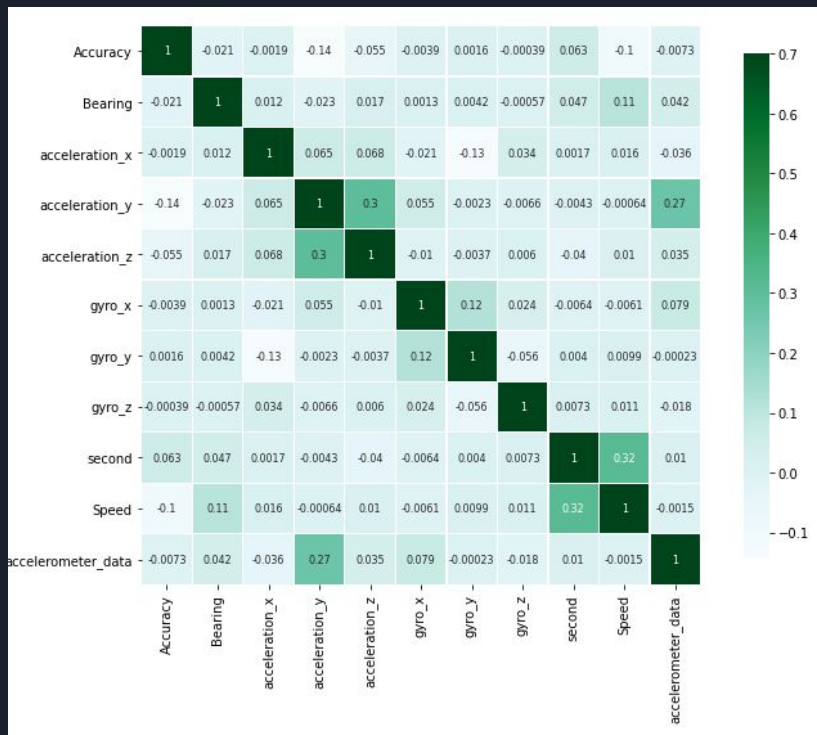


Grab x Microsoft Safety Challenge (Team 8)

Done by:

- Hwang Jihun
- Dannon Choo Jian Hao
- Zheng Mian

Which feature has a high impact on indicating dangerous trips?



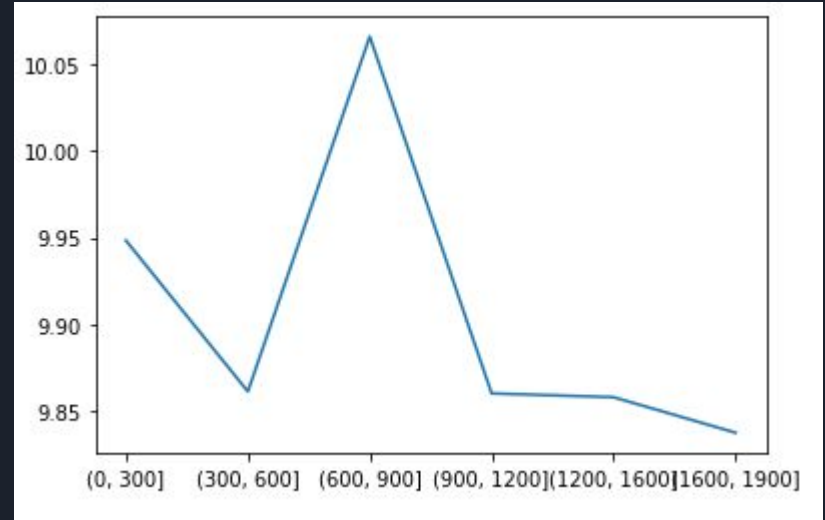
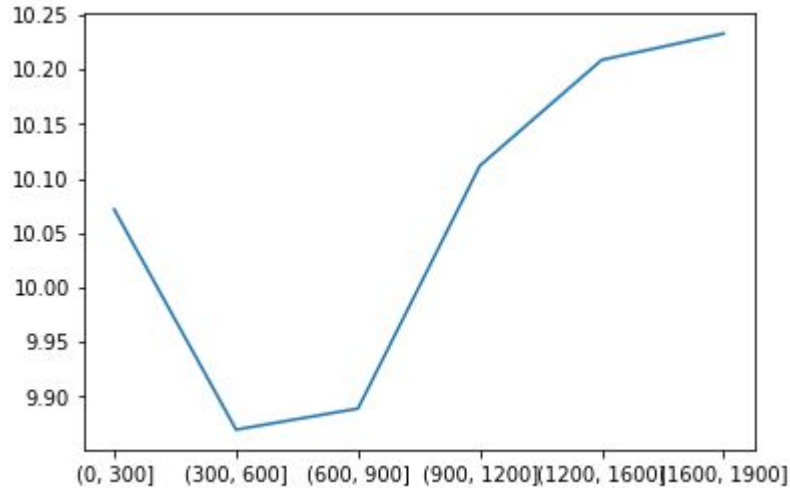
After filtering out rows with label 1, indicating dangerous trips:

Second and Speed has the highest impact as they have the highest correlation of 0.32 among all the features.

Followed by acceleration_y and acceleration_z with a high correlation of 0.3.

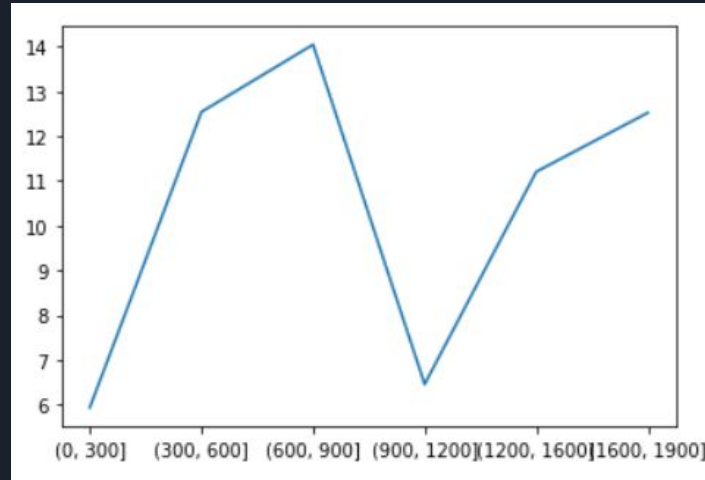
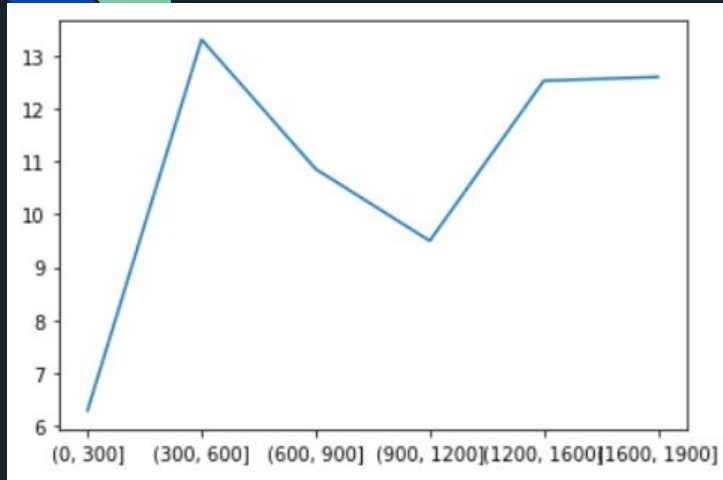
Therefore, Second (time of the record by number of seconds) and Speed (speed measured by GPS in m/s) have high impact on indicating dangerous trips.

How does the driving behaviour change over time (second) for normal trips and dangerous trips? What are the behaviour difference?



- After summarising the 3 axes of acceleration data into a new column and binning the 'second' column, the binned data was grouped by the mean of the magnitude of acceleration.
- For the first graph, the acceleration decreases from 10.07 m/s^2 to 9.87 m/s^2 before increasing after the 600 second from 9.90 m/s^2 to 10.23 m/s^2 for normal driving.
- For the second graph, the acceleration increases from 9.85 m/s^2 to 10.07 m/s^2 after 300 seconds before decreasing to 9.85 m/s^2 after 600 seconds for dangerous driving.

How does the driving behaviour change over time (second) for normal trips and dangerous trips? What are the behaviour difference?



- For the above graphs, the binned second column was grouped by the mean of the 'Speed' column.
- For the first graph, the speed of the normal driver increases from around 6m/s to 13m/s from 0 to 300 seconds before decreasing to 9.5m/s at 900 seconds and increasing to 12.5m/s at 1200 seconds.
- For the second graph, the speed of the dangerous driver increases from around 6m/s to 14/s from 0 to 600 seconds before decreasing to 6m/s at 900 seconds and increasing to 12m/s at 1900 seconds.
- The dangerous trips reaches a higher mean speed of 14m/s compared to the 13m/s for normal trips.

Given the telematics data for new trips, derive a model to detect if the trip is a dangerous trip.

Model: "sequential"

Layer (type)	Output Shape	Param #
dense (Dense)	(None, 100)	800
dense_1 (Dense)	(None, 20)	2020
dense_2 (Dense)	(None, 20)	420
dense_3 (Dense)	(None, 20)	420
dense_4 (Dense)	(None, 1)	21

Total params: 3,681

Trainable params: 3,681

Non-trainable params: 0

A multi-layer perceptron (deep learning) model has been created to detect if the trip is a dangerous one. We got an accuracy of 51.56% overall.

CNN Error: 48.44%



END