

Mini-Project 1 Checkpoint 1

ECE/CS 498DS

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Chuhao Feng (chuhaof2), Boyang Zhou (boyangz3), Mengxuan Yu (my13)

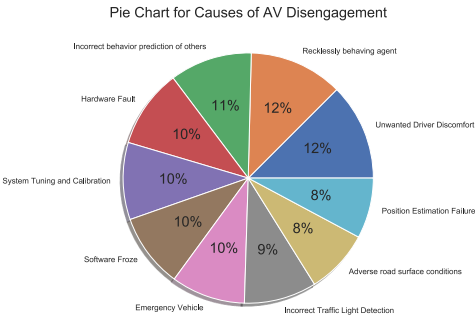
All registered

Task 0

Summarize	Answer
2(a) – Total Disengagements	1024
2(b) - # Unique Months	15
2(c) – Unique Locations	['urban-street' 'highway']
2(d) - # Unique Causes	10
2(e) - # Rows with missing values	532

Qn 3 - Causes of AV Disengagement

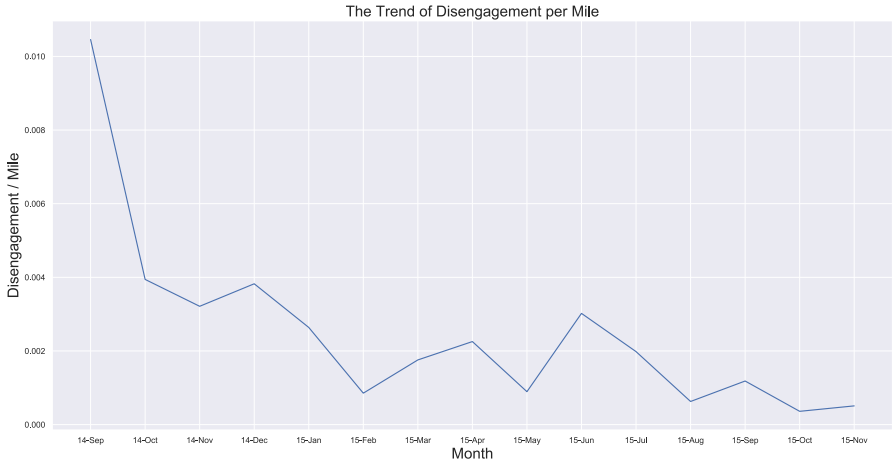
Pie chart:



Top 2 causes of disengagement:
Recklessly behaving agent
Unwanted Driver Discomfort

Qn 4 - Trend of disengagement/mile

Plot:



Task 1

Qn 1 – Interpreting Distributions

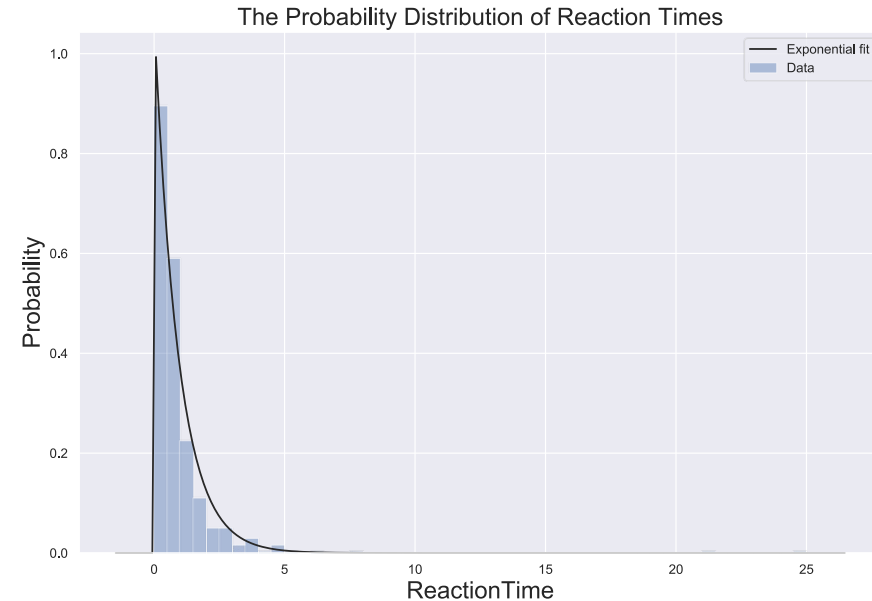
- (a) Gaussian – Gaussian distribution tells us that data near the mean occurs more frequently than data far from the mean.
- (b) Exponential – Exponential distribution tells us that the probability for sample to occur decreases exponentially as time goes by, often used to model the time elapsed between events.
- (c) Weibull – Weibull distribution is often used to model lifetime of components or time to failure, telling us how the probability for failure behaves as time goes by.

Qn 3 – Average Reaction times

- (a) Over entire dataset: 0.929770
- (b) Over entire dataset per location:
 - highway 1.48000
 - urban-street 0.92865

Qn 2 – Probability distribution of reaction times

Plot:



What distribution does it fit and what is the significance?

This distribution fits exponential distribution. The fit distribution signifies that the probability of reaction time decreases exponentially as reaction time goes up. In other words, human driver tends to react immediately.

Task 1

Qn 4 – Hypothesis Testing

State the Null and Alternate Hypothesis

Null hypothesis: The mean reaction time for humans in AV cars is the same as that in non-AV cars, i.e. $\mu = 1.09$.

Alternate hypothesis: The mean reaction time for humans in AV cars is different from that in non-AV cars, i.e. $\mu \neq 1.09$.

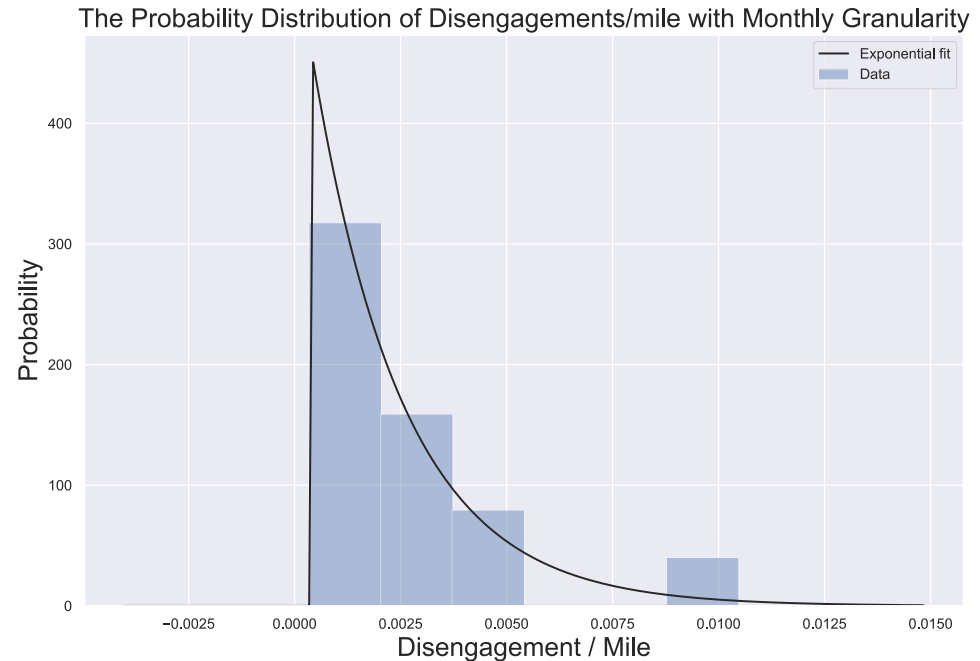
Statistic Value = $-2.098607967964133 < -1.645$

Outcome of the hypothesis test

Reject null hypothesis.

The mean reaction time for humans in AV cars is **different** from that in non-AV cars.

Qn 5 – Probability distribution of disengagements/mile Plot:



What distribution does it fit and what is the significance?

This distribution fits exponential distribution. The distribution tells us that AVs perform relatively good, and disengagement/mile has higher probability to occur when it is smaller. Besides, high disengagement/mile seems impossible to happen, because probability for higher disengagement/mile decreases exponentially, which is good.