



Cummins LeaperX Project



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Introduction

CityBus Lafayette has mainly provided free transportation to Purdue students for many years. During the Fall 2019 semester, Purdue and Cummins introduced LeaperX, a free service for Purdue students that provides transportation on the spot. LeaperX mainly supports the existing Black and Gold/Aviation Tech Loops. Ultimately, Cummins and Purdue want to determine how to better the existing transit system to fit students' needs. With an expanding student population and campus, Purdue would like to provide more options to their students to move around campus more efficiently and more safely.

The Cummins Corporate Partnership is focused on analyzing the intricacies of the existing CityBus transit system and the new LeaperX transit system. For the Student Volume team of the Cummins LeaperX Project, we investigated on how students move throughout campus and how this affect both transit systems. Specifically, we statistically analyzed the volume of students who go to class and who take either CityBus or LeaperX transportation.

Figure 1: Regression of Average Number of People on Bus versus Average Number of Students in Class (7:00 A.M. to 1:00 P.M.)

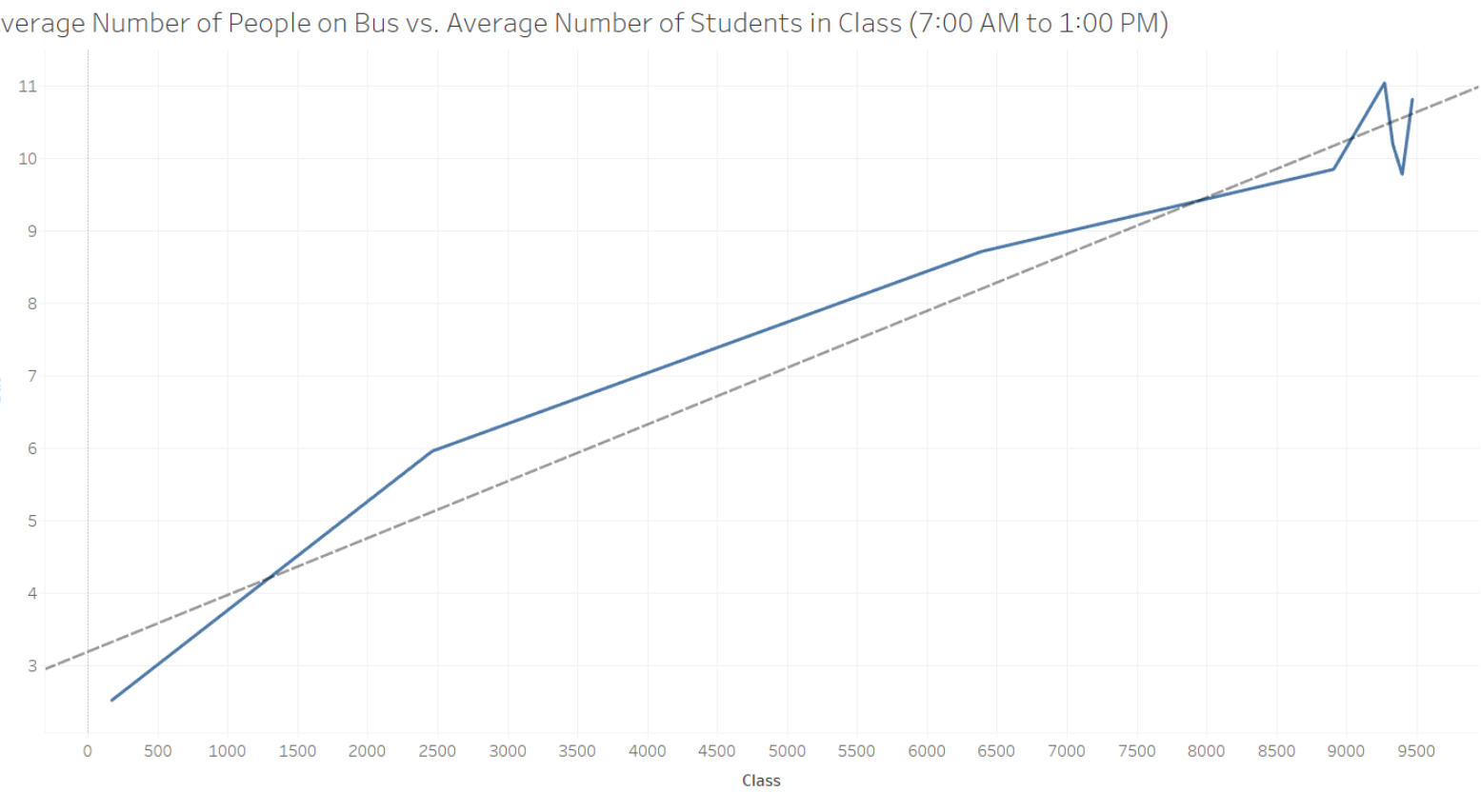
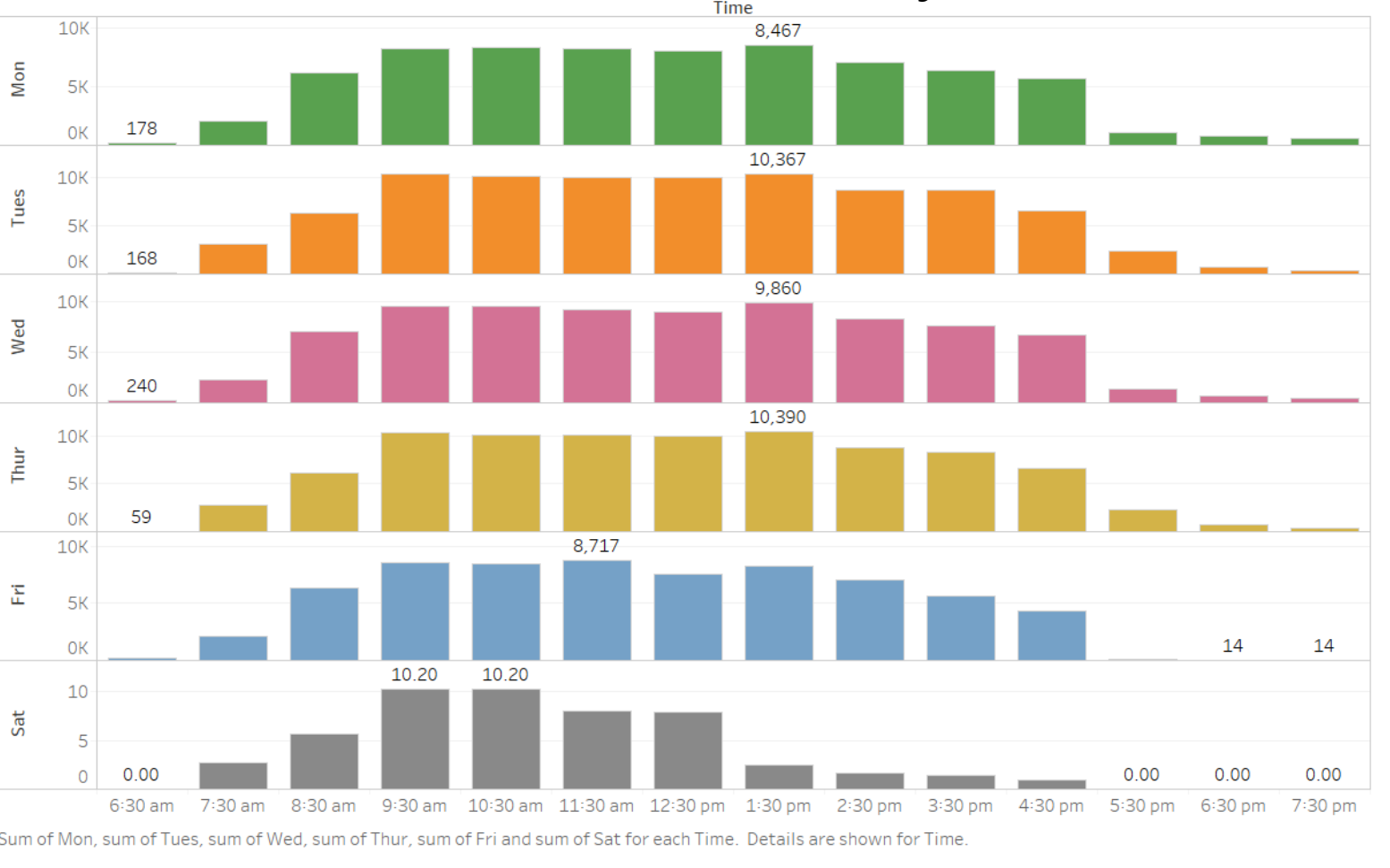


Figure 2: Distribution of Purdue Students in Class for Each Hour and Each Day



CityBus

- Investigation:
- Is there a specific time of the day where the transit system is used the most?
 - Is there a relationship between the average total count per loop and the number of students in class?
 - Is there a relationship between the average board/load/alight counts and the hour of the day?

- Methodology:
- Basic Statistical Analysis on R
 - Linear Regression Analysis on Tableau

- Insights:
- From 1:00 to 1:30 P.M., the CityBus transit system is used the most. We believe that since the number of students in class peaks at around 1:00 P.M., CityBus is used the most (see Figure 2).
 - There appears to be a strong, positive relationship between the average total count per loop and the number of students in class from 7:00 A.M. to 1:00 P.M. (see Figure 1).
 - There is a relationship between the average board/load/alight counts and the hour of the day (see Figure 5).

Figure 3: LeaperX Transit/Wait Times

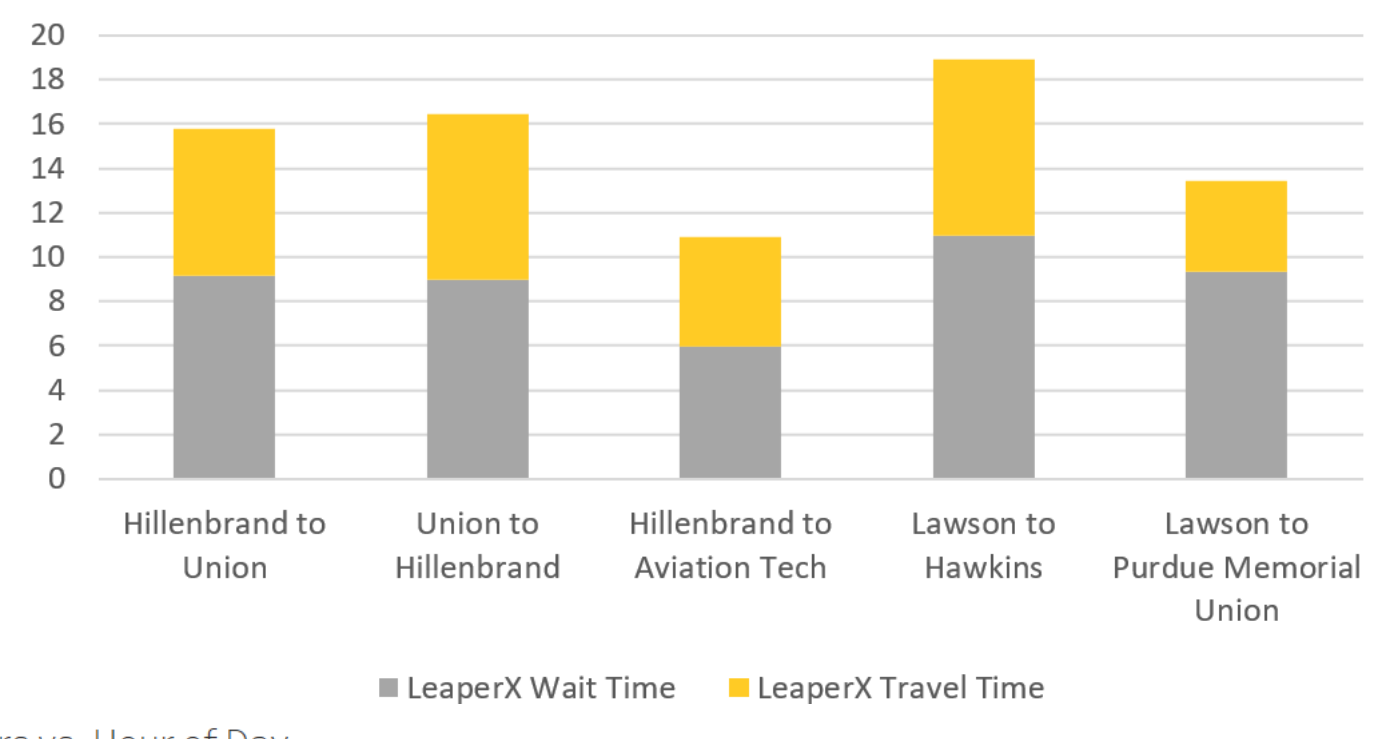


Figure 4: Regression of Average Number of Passengers on LeaperX versus Hour of the Day

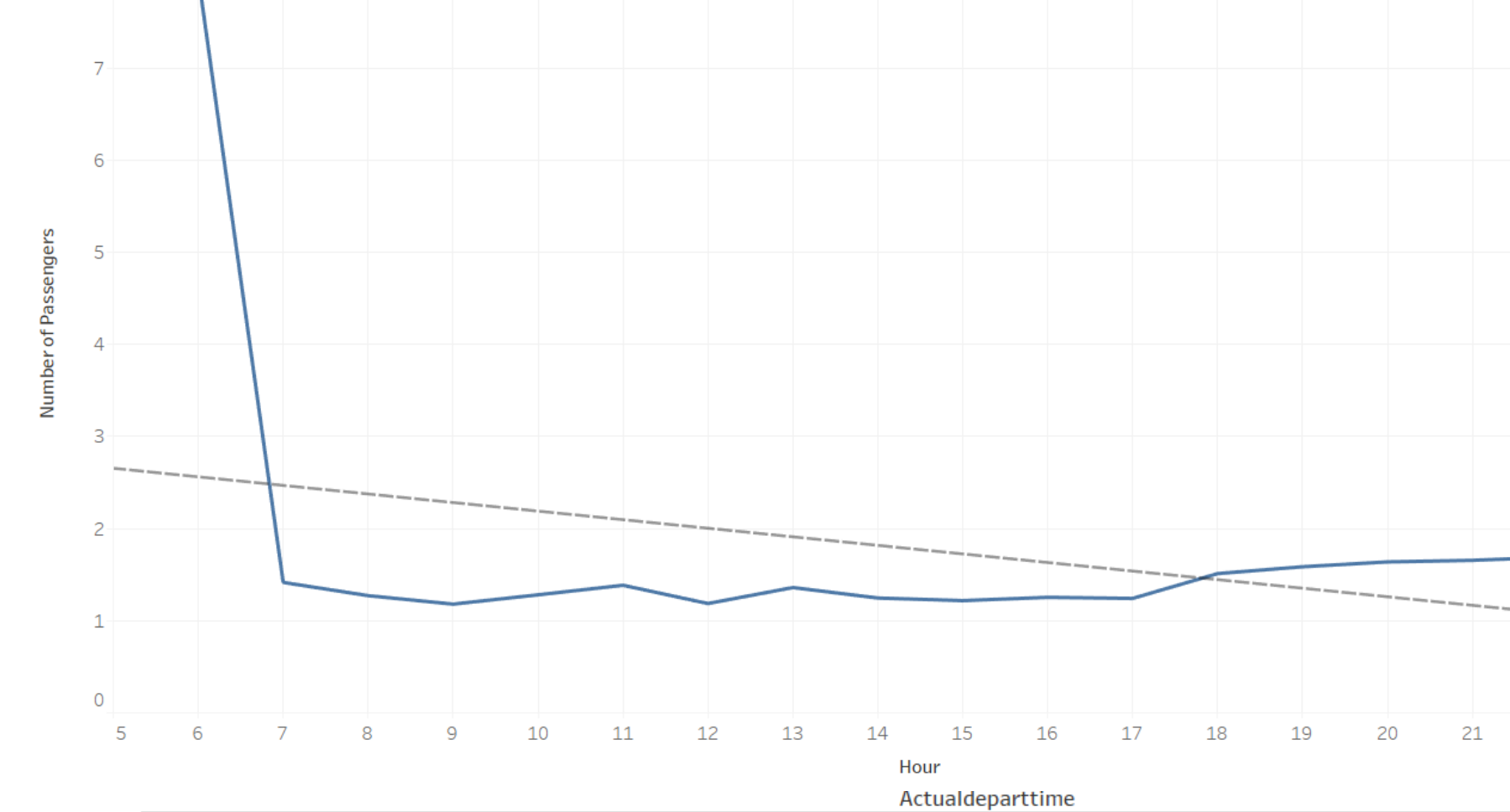


Figure 5: Regression of Average Board/Load/Alight Counts versus Hour of the Day

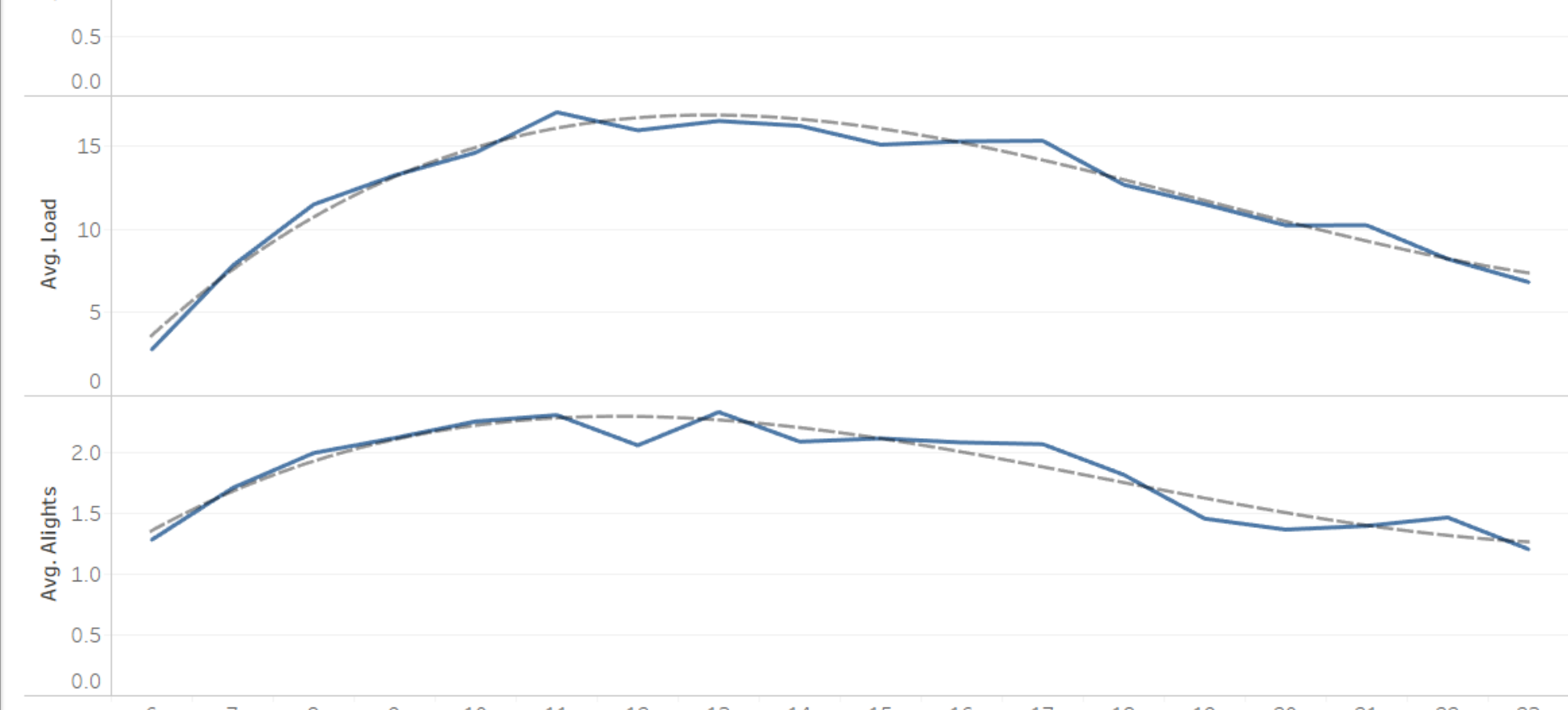
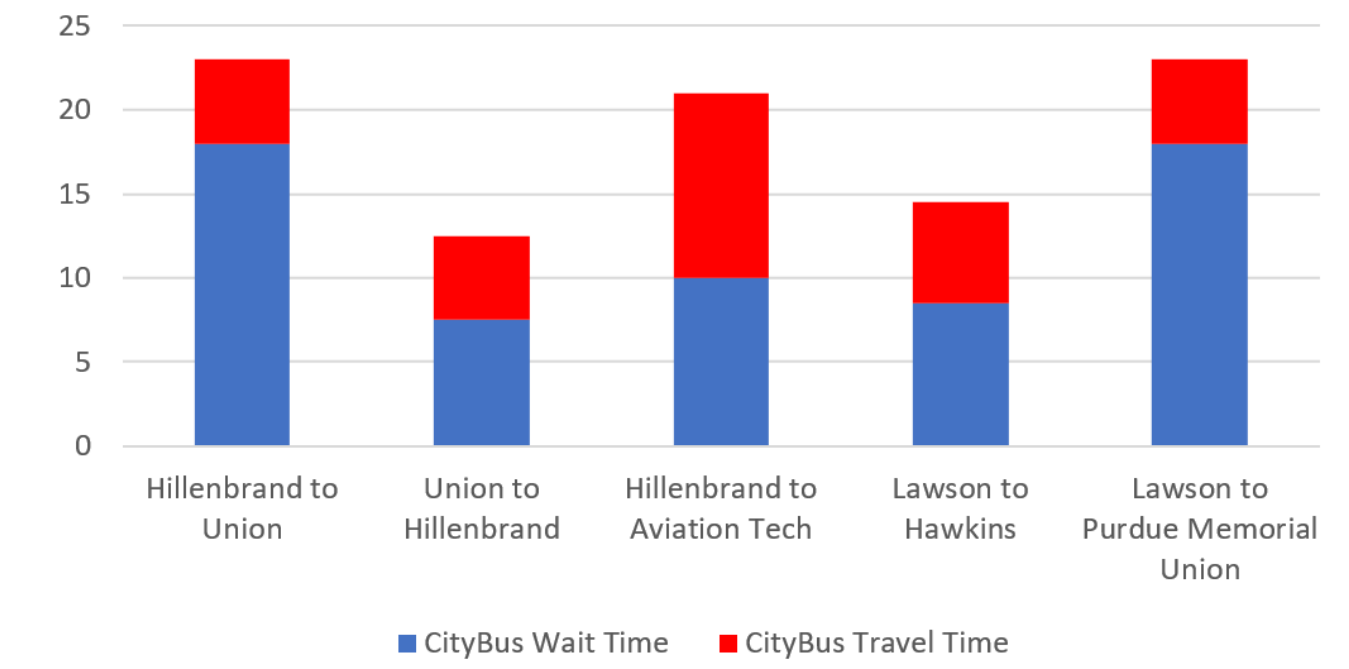


Figure 6: CityBus Transit/Wait Times



LeaperX

- Investigation:
- How different are the transit/wait times for LeaperX and CityBus?
 - Is there a relationship between the average number of passengers and the hour of the day?
 - Is there a specific time of the day where the transit system is used the most?

- Methodology:
- Basic Statistical Analysis on R/Python
 - Linear Regression Analysis on Tableau

- Insights:
- CityBus has longer transit/wait times on average than LeaperX (see Figures 3 and 6).
 - There is no strong, linear relationship between the average number of passengers and the hour of the day (see Figure 4).
 - From 6:00 to 7:00 A.M., the LeaperX transit system is used the most. We believe that Aviation majors take LeaperX early in the morning to the Aviation Tech building for flying and classes (see Figure 4).

Conclusion

- Based on our findings and the findings from the Route Optimization team, the LeaperX program is best served as a complement to the main CityBus transit system.
- From our findings, LeaperX best serves Aviation students who have to go to the Aviation Tech building early in the morning for classes and flying.

Acknowledgements

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