Title Page:

After the implementation of the first national shutdown in the United States on April 2020, all aspects of American life came to a halt, particularly airline travel. Using air traffic and airline data, we sought to explore how air traffic and the airline industry in the United States was impacted by the coronavirus pandemic. We address this inquiry by breaking down our findings into three main sub-topics:

1. Passenger volume across airlines and airport cities

We first tackle this exploration by looking at the raw passenger volumes across airlines and airport cities. We investigate whether travel across airlines were affected throughout 2020 and whether the most popular airlines retain their popularity throughout the year. In addition, we allow the reader to explore the historical trends of average monthly air travel taking place between cities from 2015 to 2020.

1. Changes in the Air Travel Network

We next consider whether changes in air passenger volume throughout the continental United States is felt uniformly across the country in the first half of 2020. Under this sub-topic, we examine the homogeneity and heterogeneity in monthly changes of air passenger volume across routes of varying length throughout the United States. In addition, we look into correlation networks to isolate airport cities that saw highly similar patterns in monthly changes in airline passenger volume.

1. Airline Sentiment

Lastly, we employ text analysis to examine the reputation of airlines during 2020. Not only was the coronavirus pandemic a concern for airlines, but some airlines found themselves in the middle of political scandals. We look into Twitter to evaluate the sentiment of tweets toward the top U.S. airlines, as well as the words that are the most associated with airlines.

Add to Spatial Networks:

We also examined patterns in monthly changes in air passenger traffic across the top U.S. airport cities. To do this, networks were constructed from a correlation matrix of airport cities and their monthly changes in passengers traveling through the city’s airports. Throughout all configurations of the networks, monthly changes for the majority of airports are highly correlated, regardless of geographic region. In fact, there is often a central cluster in the network which highlights how airline traffic is felt almost uniformly across all airports. However, there are some time periods where airport cities in the same economic region often experienced the same patterns in monthly changes of air passenger volume.