Sources and Sinks of Life Time in U.S. Air Travel

Motivation:

Some airline flights arrive early. Others arrive late. Sometimes, only minutes are gained or lost. In other cases, flights arrive hours or even days later than planned. Where do people gain life time and where do they lose it? Why do some airports act as sources of life time while others act as sinks?

Data:

This work is funded by a National Institutes of Health R21DA024259 award and a National Science Foundation subcontract from the Data Science Center at Indiana University with the University of Michigan. The visualization toolkit GUESS (http://graphexploration.cond.org) was used for the early visual exploration of the data. Network layout is visualized using the Sci2 Tool (http://sci2.cns.iu.edu) and the graph visualization toolkit Tulip (http://graphdrawing.org/tulip).

The data used here covers 123,534,969 flights operated by large air carriers between October 1987 and April 2008 within the United States. Of the 123 million flights, 2,303,324 (1.9%) flights were canceled; 770,888 (0.6%) flights arrived thirty or more minutes early; and 5,633,421 (4.6%) flights arrived sixty or more minutes late. The focus here is on the latter two sets of flights. The data was aggregated by origin and by direction.

The four network maps summarize more than six million flights that arrived either thirty or more minutes early (top two maps) or sixty or more minutes late. The focus here is on the latter two sets of flights. The data was aggregated by origin and by direction. Edges were omitted where no flights traveled between the two airports. Directed networks were constructed from airport-to-airport flight data.

Visualization:

Nodes are area circle coded to indicate early or late. Edges were omitted where no flights traveled between the two airports. Directed networks were constructed from airport-to-airport flight data.

The comparatively few flights to and from the associated states of the U.S. in the far Pacific were also omitted.

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This map was created for the Viszards session organized by Vladimir Batagelj at the INSNA International Network Conference Sunbelt 2011. The datasets were taken from the Data Science Center at Indiana University.

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Statistical Meetings of 2009. Data manipulation using SQLite. Geographic data was provided by the Federal Aviation Administration.

Networks by Proportion of Early and Late Arrivals

Sources

Airports by Proportion of Early and Late Arrivals

Sinks

Sources

San Juan (SJU)

Boston (BOS)

Seattle (SEA)

Los Angeles (LAX)

San Francisco (SFO)

Chicago (ORD)

Atlanta (ATL)

Miami (MIA)

Washington (DCA)

New York (JFK)

Pittsburgh (PIT)

Cincinnati (CVG)

Seattle (SEA)

Los Angeles (LAX)

San Francisco (SFO)

Chicago (ORD)

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Washington (DCA)

New York (JFK)

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Early Westward Flights

Early Eastward Flights

Late Westward Flights

Late Eastward Flights

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