Phase 1: What to visualize (do this before you start to sketch)

1.  What actions/decisions are you trying to enable?   a. What questions are you trying to answer? b. What specifically do you need to show?

I’m interested in the topic of air traffic combined with the environment. I want to guide readers to pay attention to the efficiency use of energy in air traffics. There are many energy expenses in the aviation industry such as fuel, man force, food, cleaning, aircraft maintenance, and etc. Here I mainly focus on the consumption of fuel from the perspective of each individual. People will gain the awareness of how much fuel they cost approximately in average of each domestic flight in the USA. They can further choose an airline, which consumes fuel more efficiently.

Therefore, I need to present the data of how much fuel each person consumes, and put all airlines together to compare between each other to find out the most efficient one.

2. Who is consuming this data? a. What are their needs? b. What are their priorities? c. What are their limitations? d. What are their biases? e. What do you not know about them?

Passengers who care about environmental saving issues are the main target viewers. They need to know more about their flights in term of the impact on the environment. They first need to know the average consumption of fuel across all airlines based on the same standard. Then they need to the airline, which they use most frequently, and the average efficiency of that airline. After that, they should make a judgment whether they need to change their choice of airlines, and if so, which to change to. The information presented should be easy to understand without many jargon and professional knowledge in the airline industry. People don’t concern about the cost of employees, aircrafts, fuels, and etc. They pay more attention to the effect to the environment.

3. What data do you have? a. Categorical? (grouped) b. Ordinal? (ranked/time/…) c. Quantitative? d. Relational? (hierarchy/network/influence/etc.) e. Location?

a. Airline companies, domestic flights

b. Years, months

c. Fuel consumption in thousand gallons, cost of fuel, cost per gallon, number of passengers

4. What are the key relationships/comparisons you want to show?

The main purpose is to compare the fuel consumption efficiency among each airline to help viewers to make decisions. People are allowed to focus on those airlines they are interested in to compare with. The secondary purpose is to see the trend of fuel consumption efficiency in each airline through months and years.

5. State your goal(s) in a succinct statement(s):  (e.g., I want to show the relationship between A

and B [and C…] across X [and Y] from m to n  is the generic form and a specific example might

be:  I want to show the relationship between widget production and time across all plants from

1990 to 2005)

I want to show the relationship between the fuel consumption efficiency and all airline companies that serve domestic flights from 2002 to 2013.

6. What data will you use given the goal?

The ratio of consumed fuel in gallon per passenger

Phase 2:How to visualize:

1. How does your encoding (without the interactions) support your stated goal? Refer to the literature as appropriate to justify your decisions.

Each block represents an airline. Humans’ eyes will aggregate the colors of small plots in each airline, and by viewing the colors distributed in each airline viewers can compare between each company and get the sense of which airline is greener. Also, abstracting the numbers into colors will help people to get the idea of the influence to the environment. Further, presenting these plots with months as x-axis and years as y-axis easily presents the distribution along with time and seasons in each airline.

2. What interactions are important for your visualization? How will they support your stated goals?

The interaction of moving airline blocks into inactive area and moves back to active area allows users to easily compare those airlines that they care about. Also when focusing on these selected airlines, the color-coding will tailor to current data range and can present a more clear comparison of the fuel consumption efficiency data. Too far the distance between two airline blocks will make it harder for viewers to distinguish the difference.

The interaction of highlighting the year and month of hovered data is important in this visualization to map the information. Also showing details by clicking each data plot helps viewers to know what contribute to the efficiency number.

Phase 3: Limitations 1. What are the limitations of your choices?  What will possibly fail?

The gradient for color-coding is hard to choose. Too granular a gradient will fail. Also if the size of the plot is too small will cause users hard to tell the colors.

The reason why the fuel consumption efficiency is lower or higher is beyond this scope. The reasons may be shorter flight distances, different aircraft models, and etc.

Phase 4:

Simply decompress the zip file and open the index.html in the folder. Remain everything else as it is.

You many also go to <http://chinjuic.people.si.umich.edu/> to see the work.





