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CS-4460-A3
Project 5
Due: December 1, 2017

Aircraft Incidents Visualization Description

List of Analytic Tasks
-See changes in aircraft incidents over a time range (progression with societal/technological changes)
-Visualize aircraft incidents and the effect of damage on human lives
- Zoom and pan towards some regions of the word and analyze individual incidents near a specific region (ie. in your home city/state/country)
- View details of one particular incident on demand (by clicking)

Design Overview (2-3 paragraphs)
As soon as our information visualization has loaded, the first thing the viewer will see is a map of the world. On top of this map are colored dots that indicate aircraft incidents that either occurred at that airport or during the flight at a specific location. Based on this overview visualization, the user is easily able to identify where in the world aircraft incidents have most occurred for the entire set of the data that we have. The colors of the dots represent the severity and therefore the user is easily able to identify where severe incidents occurred. Our design focuses on geographic location and temporal data. The user can look at the data over the course of time by using the slider to adjust the range. For example, they might be interested in viewing the airline incidents of some specific years because they want to see if there were more or less incidents in 1995 when compared to 2016 data.

There might be certain regions where the user is particularly interested in. Using the scrolling function of the mouse, our design uses natural zoom features in order to look at the incidents in a particular region. As you zoom, the dots may change size so that you can clearly see the different dots on the screen rather than them being jumbled up together. Once you zoom in, you can also pan to see nearby regions and the incidents that occurred around the particular region you are interested in. There are situations in which many incidents occur in the same location. This is highly common in places where there is an airport located. These dots are depicted overlapping. The opacity of the dot represents the density which indicates how many incidents may have occurred in that exact spot.

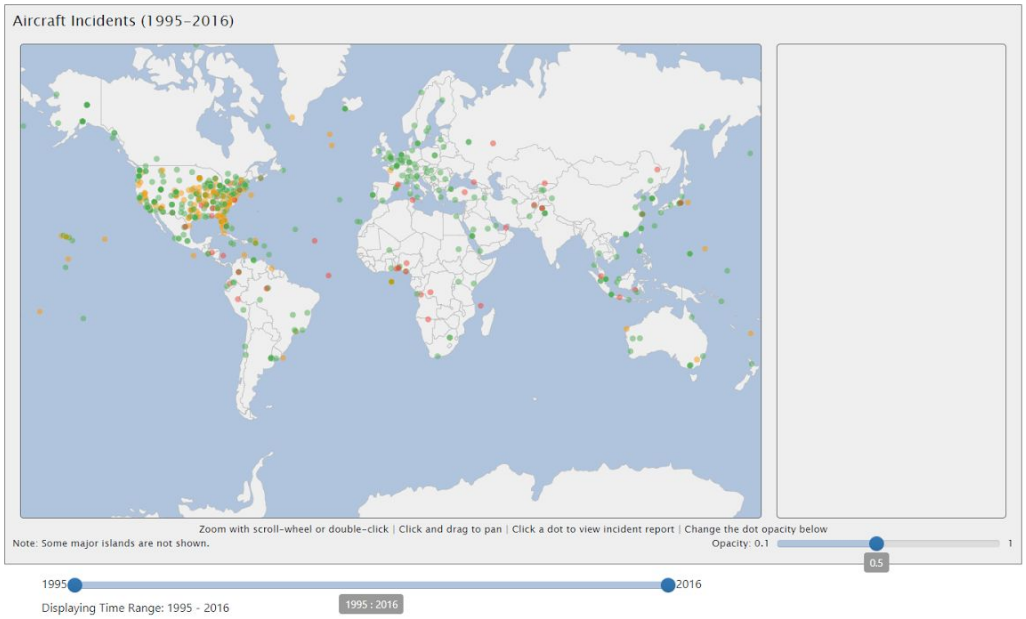
From either the zoomed in screen or the overview screen, when you click on any dot, you can see the details of any specific aircraft incident. This is on the right side of the screen. While the slider only allows you to narrow by year, here, you can see the exact date of the event. Similarly, it is difficult to tell which city the incident occurred in from simply the map, since the map only has country outlines. The details on demand section overcomes this by displaying the exact location. Additionally, the viewer might be interested in the make or model of the plane that was affected in this particular incident as well as how many people were uninjured or had fatal or severe injuries from the incident. A pie chart allows the user to easily grasp that information quickly. There is a description of the phase of flight during which the problem occurred. Since some users may not know that the TAXI phase is similar to descent phase, there

is a picture to aid in the understanding of this attribute. Similarly, it shows the weather condition code for that flight as well as the meaning of the code. For example, IMC means that there is a cloudy sky and it will be hard to see so the pilot will need to rely on instruments due to the inclimate weather.

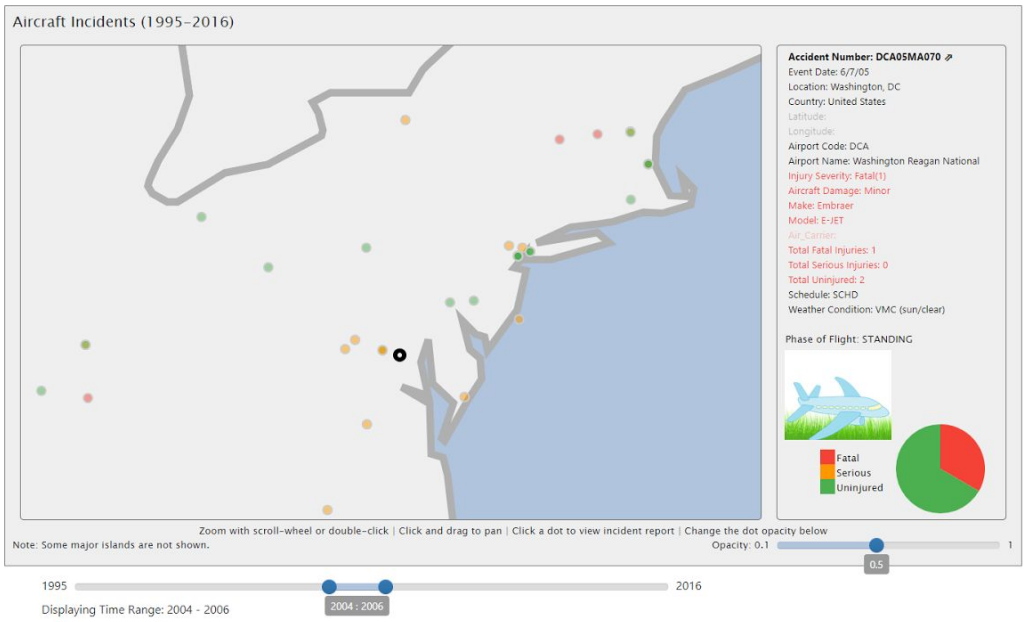
Description of Features (Story Points)

- Map's main geographic features are delimited by country of incidents in order to easily visualize which regions are popular for these incidents
- Map zooms by using scroll wheel or double-clicking to zoom an extra 1x from 1x-20x.
- Map pans by using mouse click and drag.
- One incident dot corresponds to one incident, however incidents could have occurred at the same location (same latitude/longitude or same airport).
- Incident dots represent the latitude/longitude coordinates of the plane incidents the have occurred within the time range specified by a years slider.
- Years slider allows any time range between 1995 and 2016, the earliest and latest years of incidents given in this dataset (aircraft_incidents.csv).
- Years slider hides the display of any incident dots that are not within the specified time range.
- Incident dots are translucent such that overlapping dots are subsequently darker, showing specific locations where incidents have a high density (overlapping dots show trends of incident density).
- An opacity slider lies at the bottom right, and when placed to the left (0.1 opacity) the user can see discrepancies between specific points with up to ten incidents (10*0.1=1). Likewise, at the original 0.5 opacity, the user can visually see discrepancies between specific points with up to five incidents.
- Incident dots are colored according to the severity of the incident: Incidents with mostly fatal injuries are red; incidents with a majority of severe injuries are orange; incidents with no injuries are green.
- At lower opacities, it is also easier to see different color events as they create a different color apart from the color scheme (red, orange, green) when overlapped.
- Incident dots largely overlap one another at 1x zoom and get smaller in radius incrementally until 20x zoom.
- At 1x zoom incident density is higher per square inch of map and lower per square inch at 20x zoom (so at 1x zoom incidents overlap over hundred of miles in radius and at 20x zoom incidents overlap over single latitude/longitude coordinates).
- Upon clicking any shown incident dot, an overview of all available incident information is shown in the right details box, with empty data attributes made more translucent.
- Clicking the account number shown in this details box navigates to a NTSB Google search of the accident number for full cover story of the incident.
- Details contains and image concerning the stage at which the aircraft was in when the incident occurred, as well as a pie chart depicting the percentage of those uninjured, severe injuries, and fatal injuries.

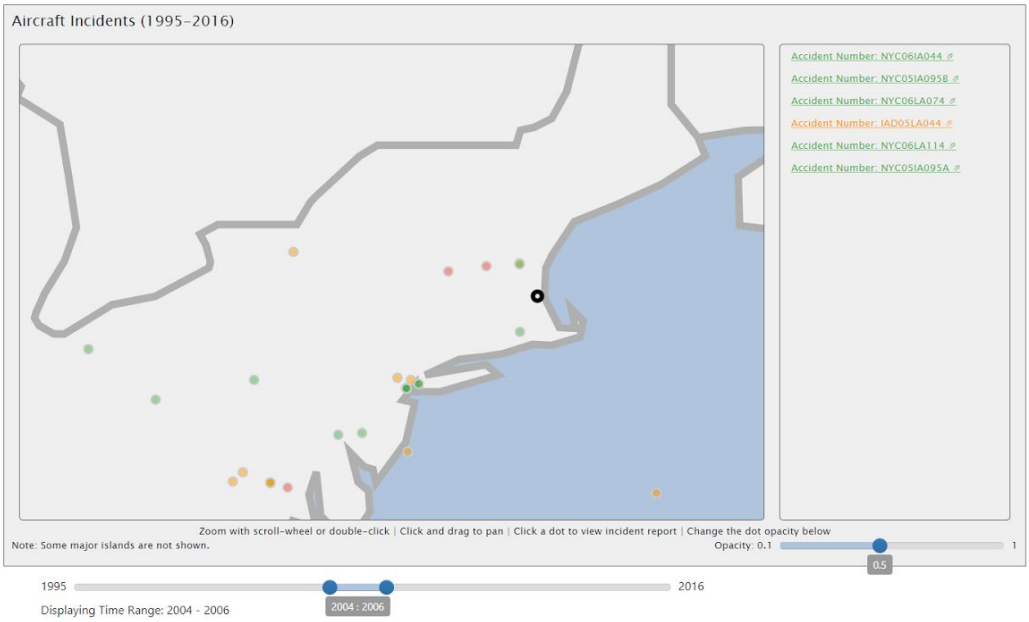
UI Screenshots



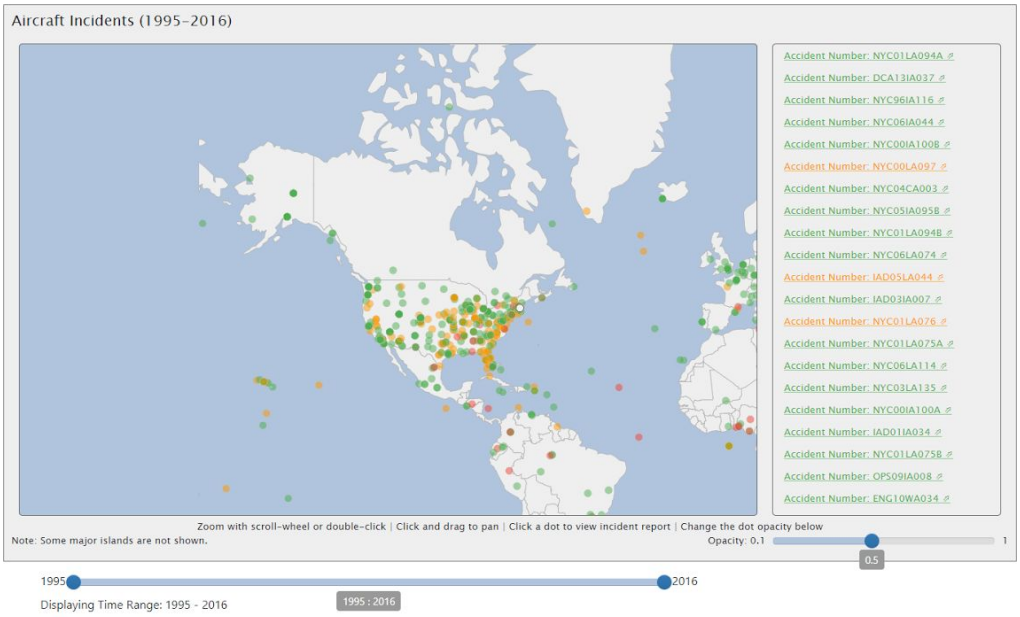
In the screenshot above, the visualization is shown as it looks when first loaded.



In the screenshot above a range was selected, a dot was chosen, and the map zoomed in.



In the above screenshot, a different dot in the same zoomed area is chosen, and shows that there are multiple incidents for that specific area. Clicking any one will retrieve the accident report.



In the above screenshot, the years slider is set to 1995-2016 again, showing that the corresponding entries for those years are reflected in the details box simultaneously.

In terms of interactive functionality, the one additional feature we wanted to add had we the time was to be able to move the entire range of the years slider in unison. It is not shown in the screenshots, but a “Lock” checkbox DOM element exists in the submitted code without working logic behind it.