Dear Mr. Ericson,

I recently had the opportunity to navigate through an interactive visualization of New York Times titled "Student Debt at Colleges and Universities Across the Nation". This animation summarizes the graduate debt and the cost of tuition and fees of American universities. By the present letter, I want to share some thoughts about this amazing work.

First of all, I find making use of colors and circle sizes an appropriate choice to extend the traditional scatter plot by two additional dimensions. It is also worth mentioning that the navigation between the map and chart views is intuitive. That is, one can easily locate a university in the map, and then switch to the chart to compare it with other universities. The “play mode” is likewise an interesting feature that provides an insight on the trend of debts and tuitions over several years.

This is said, I think there is room to improve some aspects of this visualization. For instance, comparing two universities in time is not possible. In fact, only one university can be selected. If one was interested in comparing how the average debts change over time for two or more universities, multiple selections, as illustrated in Figure 1 would be beneficial.

The tooltip is missing important information, while it is showing redundant details. When hovering on a data point, the exact values of debt and tuition are displayed even if they can be easily estimated from the axes. In contrast, the number of enrolled students is not revealed, while there is no way to guess it just from the circle size. It is indicated that the circles

Figure 1 - Adding a Possibility for Multiple Selections

are sized by the number of enrolled students, but it is unclear whether this is related to the surface or the diameter; and if the relation is linear or logarithmic. It is also imprecise if this size is fixed, or changes over time. I suggest including the enrollment size in the tooltip.

A user cannot apply different filters at the same time. For example, there is no way to visualize universities with 0-25% graduation rate with an enrollment size of 5,001 – 10,000 students. Also, even for a single filter, one cannot combine multiple values. A simple example would be to show schools that have at most 10,000 students. Replacing the current selection mechanism (radio-box-like) with checkboxes should bypass these two limitations.

The zooming buttons are useful, but not sufficient. Leading map providers like Google Maps\(^2\), Bing Maps\(^3\) and Yahoo! Maps\(^4\) imposed the convention of zooming in and out by using the mouse scroll wheel. This convenient procedure helps users to concentrate on the task they are interested in rather than losing their focus by locating the zooming buttons and clicking on them.

A small bug can be avoided by limiting the navigation across the horizontal and vertical axes. In fact, showing negative values for the tuitions and the debts is meaningless (Figure 2).

As an additional feature, I suggest that the first screen highlights one or more universities that are located within a diameter of 20 miles from the user location. A query to an IP-2-Location service provider (e.g. Geolite\(^5\)) can be easily integrated for this purpose. Of course, the user must remain capable of modifying this default selection later.

Thank you again for those great animations. I hope that my letter will help in making them even greater!

Yours sincerely,

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For the class CMSC734: Information Visualization

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\(^2\) [http://maps.google.com](http://maps.google.com)
\(^3\) [http://www.bing.com/maps](http://www.bing.com/maps)
\(^4\) [http://maps.yahoo.com](http://maps.yahoo.com)
\(^5\) [http://www.maxmind.com/app/geolite](http://www.maxmind.com/app/geolite)