



December 9th, 2013

Dear Fan Du, Joshua Brul, Peter Enns, Varun Manjunatha and Yoav Segev:

I am writing in regards to your course project MetroViz. From my perspective, it is indeed a significant project for bus managers as well as bus riders. Not only did you provide a vivid illustration that how bus adherence changed during the year, but also you offered an overview-to-details interface to explore for a particular bus or date. The visualization on the map is incredibly impressive. If I were a bus manager, after watching your visualization, I would collaborate with you ☺

Being fond of this work, I would like to offer some suggestions based on the **prototype and the report**. I sincerely hope both visualization and interaction of this project could be improved by taking the following factors into account:

Prototype

1. Calendar View



Fig.1 Existing calendar view and original inspiration by Rick Wicklin and Robert Allison

- Related work: The calendar view is actually inspired by Rick Wicklin and Robert Allison in Data Expo 2009's poster [1] and derived from the D3 Calendar View [2] in a vertical layout, both displayed in **Fig. 1**. I suggest you to cite the papers and website in your reports.
- As for the calendar view itself, I provide some suggestions in **Fig. 2**

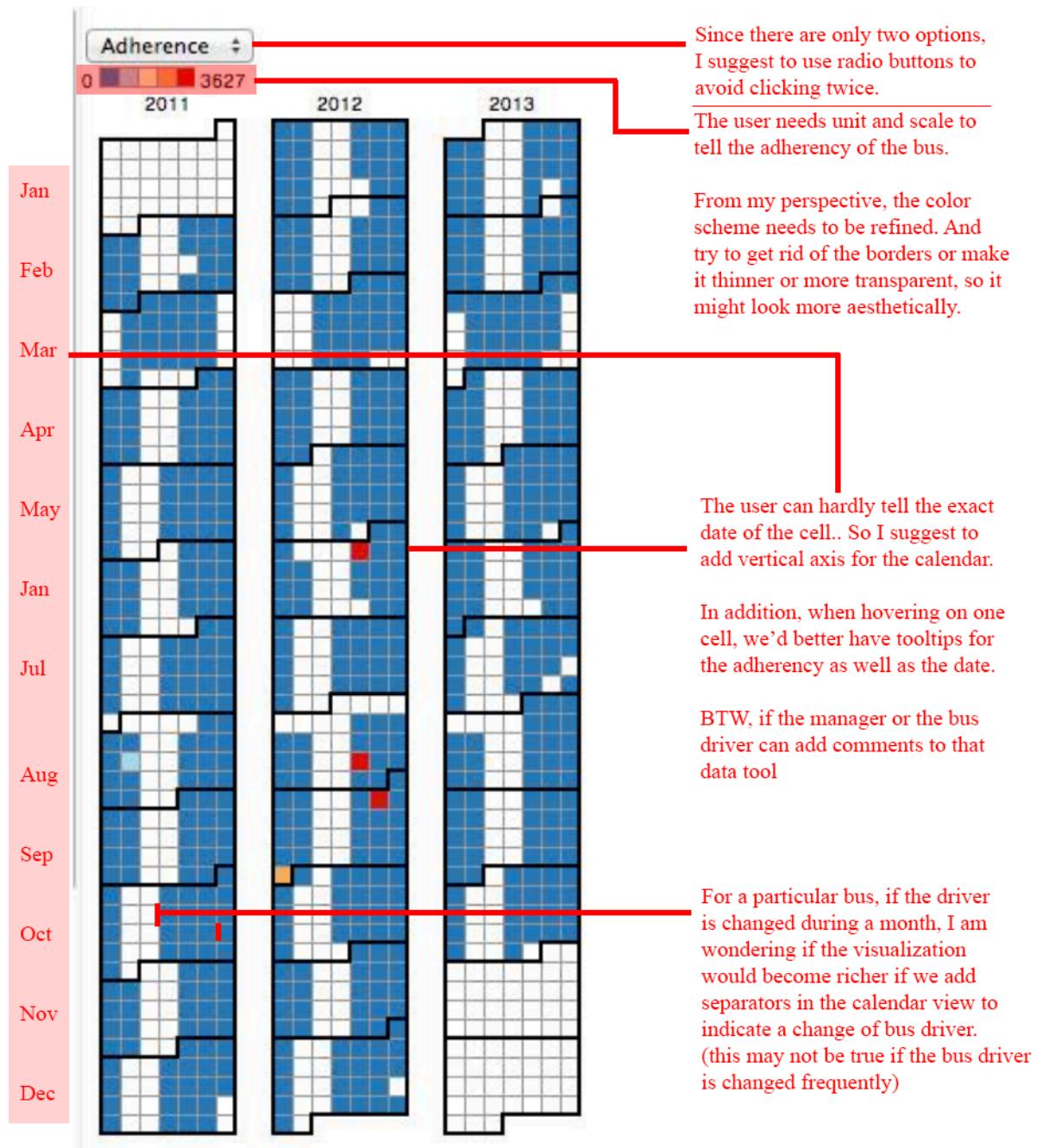


Fig.2 Cursor above the text is a “Hand”, which should change to “I”.

A brief summary of my suggestion:

- 1) Change the selector to radio buttons since there are only two options (adherence and ridership)
- 2) Mark the unit and scale to each color in the legend
- 3) Add vertical axis to the calendar to label the month
- 4) Add tooltip for the calendar cell; it could be interactive so manager and rider could insert comments on it

- 5) If the bus driver is changed during the year, add separators to indicate that information since the adherence is largely dependent on different bus drivers.
- 6) In your draft paper, the legend has a value of “9.4444444” where “9.44” is more appealing.

2. Map View

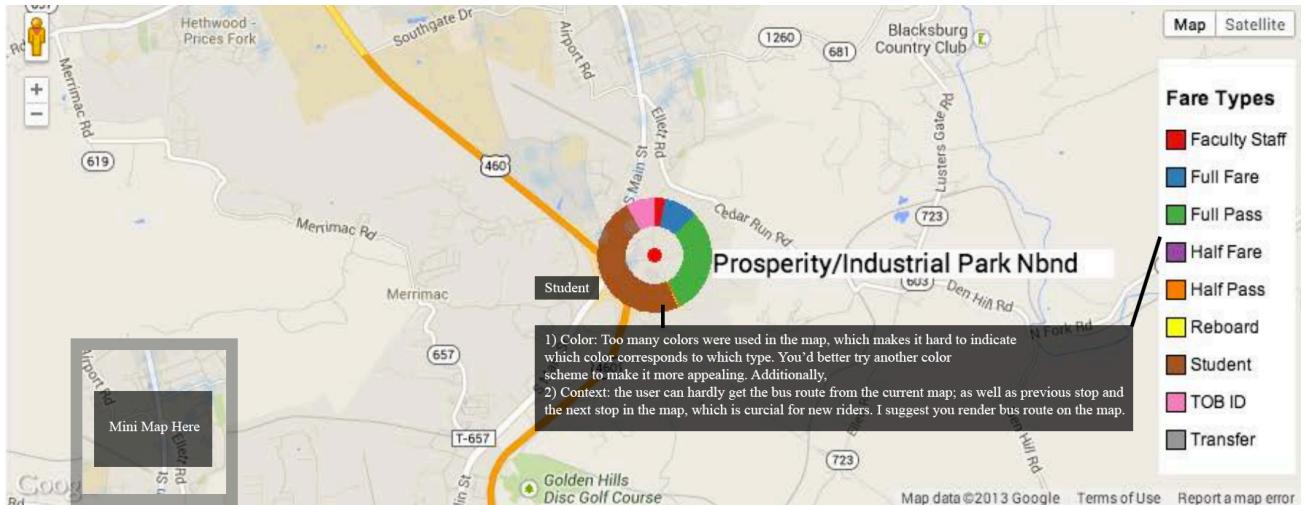


Fig.3 It would be better if we have a different color scheme and bus route on the map

- (a) Color: As far as I am concerned, there are too many colors used in the graph, which makes it hard to indicate which color corresponds to which type. Two solutions might be helpful: 1) aggregate some of the types to others so they won't disturb the main information 2) When hovering on the graph, a figure or text is displayed aside to indicate the corresponding fare type.
- (b) Context: As a bus rider, it's important for me to get the previous stop and next stop information from a bus route map. Nevertheless, in the existing visualization, the user can hardly get the bus route, let alone the bus route. So I greatly suggest you render bus route on the map.
- (c) Mini Map: A mini map might be a great help to navigate between different areas. Additionally, it could also be used for getting the knowledge of bus route in an overall view of the map.

Finally, I think your time length could be improved by [4] in **Fig.4**, where a zoomed-in feature is utilized.

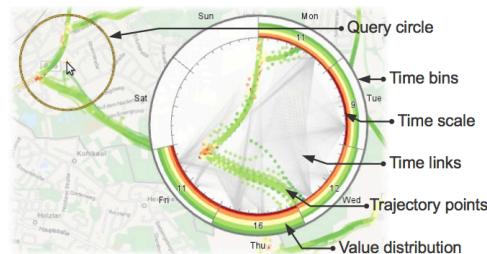


Fig.4 A zoom-in time length in [4] by Christian Tominski, et.al.

3. Route View

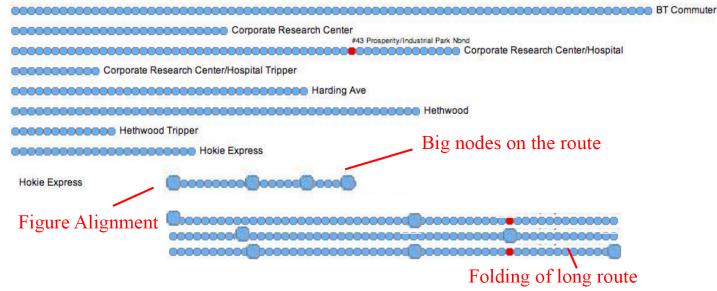


Fig.5 Reorganization of the route view.

- (a) Major information: As a bus rider, I don't remember every bus stop in my route. Instead, I remember some crucial station in my map such as A.V. Williams, Giant, Greenway Center, and My Home. Another comment is that the big nodes are automatically categorized by the passengers up and down in each station ☺
- (b) Figure Alignment: It would look more appealing by align the bus route and text.
- (c) Folding of long route: For long route, try to break it into multiple lines to adapt explorer with a small resolution.

4. Stop Component Figure

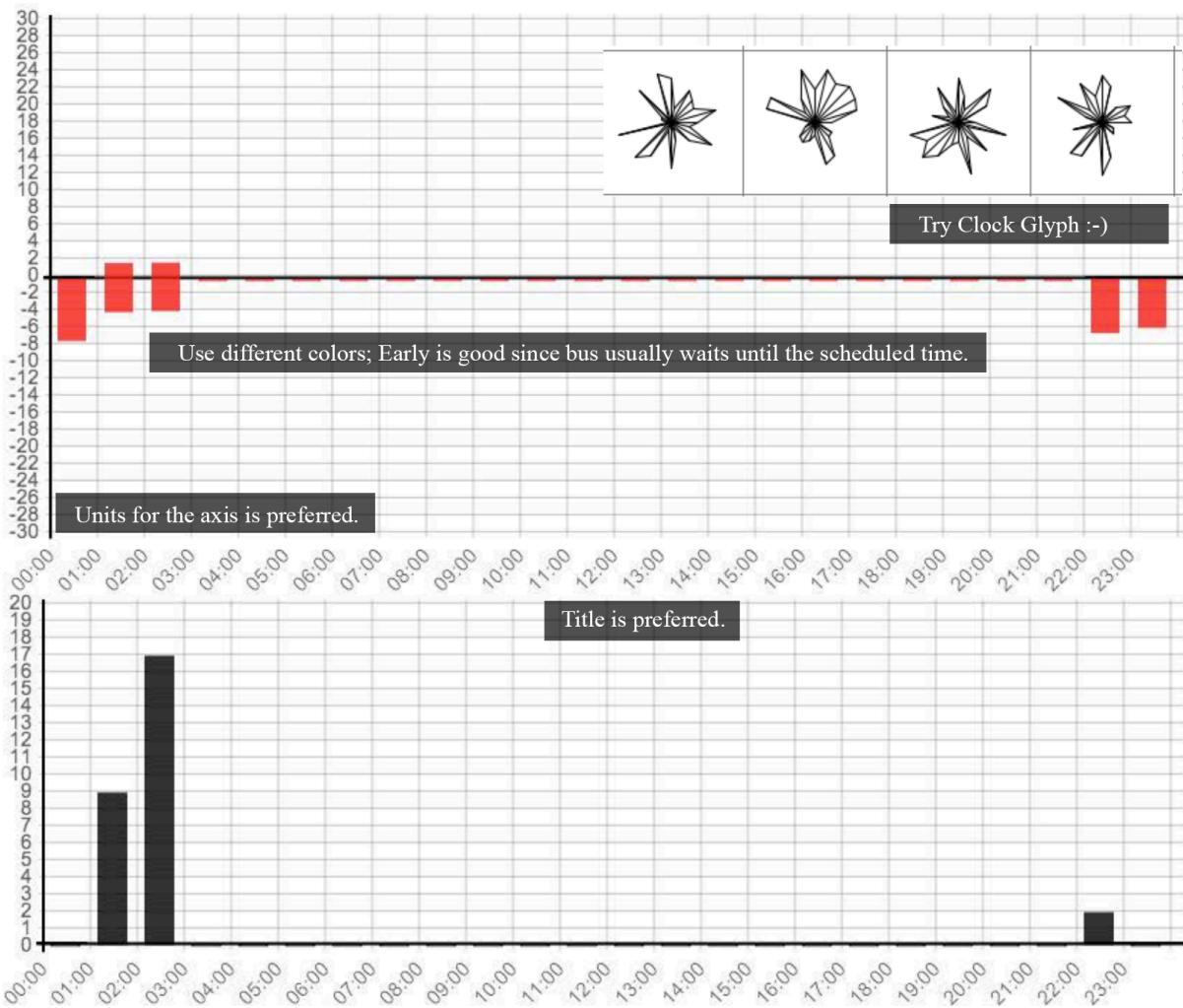


Fig.4 Recommendation for the stop component figure.

- (a) Clock Glyph: Try clock glyph for the visualization. According to [3], it's easier for users to get the peak value from clock glyph.
- (b) Early VS Late: Generally speaking, I would say bus arriving early is a good signal since the driver is asked to wait until the scheduled time to start to the next station. So I suggest using different color for early and late.
- (c) Title: there are two graphs, so each graph should be assigned with a proper title.
- (d) Units along the axis. There should be a label to indicate the units of the numbers in the vertical axis.

Paper

Generally speaking, the paper is well-organized and is very comfortable to read. The challenges are listed clearly. Congratulations to your accomplishment to the solutions!

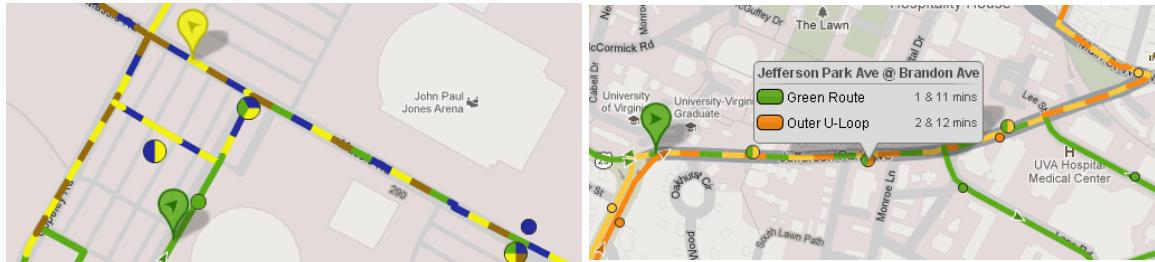
1. Presentation of problem & solution

The presentation of problem and solution is generally clear to me.

2. Description of related work

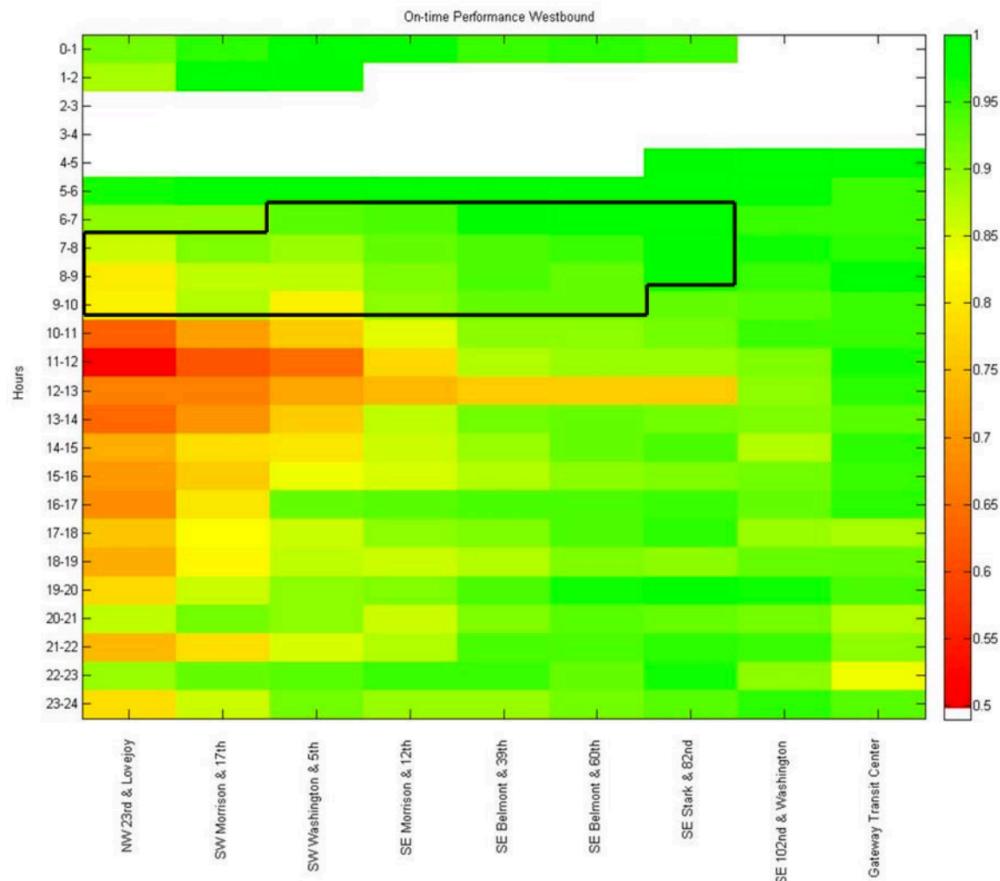
You have done a good job on related works. Nevertheless, I also find some related visualization on bus route:

1. <http://www.virginia.edu/parking/uts/GPS/> ; <http://ncsu.transloc.com/>



All the bus are dynamically moving; but no fare types nor adherence data displayed; similar time lens; arrival predictions; selecting routes; search and filter;

2. Another paper on bus adherence in [5] could be helpful with a different color scheme. Then both routes and temporal data can be visualized at the same time:



3. References

I'm wondering if the references are cited directly from Google scholar in BibTeX, but we should take care of the reference format from the Google scholar. E.G.

- a) Some of the titles are in capital letters while some others are not.
- b) Some of the references have ACM Press while some others are not.
- c) Some of the references have page format like “pages xxx-xxx” while some others use “:xxx-yyy” format.
- d) Some of them begin with “IEEE Transactions on...” while some others put “, IEEE Transactions on” in the end.

4. Figures

Personally, I suggest using the same font in the figure as the paper. Fig.5 leaves too much blank in the paper. Try to find another one with rich contents.

5. Evaluation

An overview graph with usability test result is preferred.

6. Future Work

- 1) Use a database such as MySQL to deal with the 3GB data. It won't be that large to deal with if stored in MySQL.
- 2) Fit for different screen sizes.
- 3) Use regression on the adherence data. Try to offer a prediction or average minutes to wait.

7. Spelling Fixes & Grammar

- 1) “Chen [2] introduces a model to simulate bus operation and passenger demand based on AVL and APC data.” Should be “Chen et.al. [2] introduce a model to simulate bus operation and passenger demand based on AVL and APC data.”
- 2) . “Calender view with stop component.” Should be “Calendar view with stop component.”

That's all of my suggestions so far. Thanks again to all of you for the great efforts contributing to this excellent MetroViz project. Finally, I sincerely hope that my suggestions could be helpful not only in this project but also in your future visualization works

Sincerely,

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References

- [1] Wicklin, R., and R. Allison. "Congestion in the sky: Visualising domestic airline traffic with sas." ASA Statistical Computing and Graphics Data Expo 2009 (2009).
- [2] D3 Calendar View: <http://bl.ocks.org/mbostock/4063318>
- [3] Fuchs, J., Fischer, F., Mansmann, F., Bertini, E., & Isenberg, P. (2013, April). Evaluation of alternative glyph designs for time series data in a small multiple setting. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (pp. 3237-3246). ACM.
- [4] Tominski, C., Schumann, H., Andrienko, G., & Andrienko, N. (2012). Stacking-based visualization of trajectory attribute data. *Visualization and Computer Graphics, IEEE Transactions on*, 18(12), 2565-2574.
- [5] Feng, W., Figliozzi, M., Price, S., Feng, W. C., & Hostetler, K. (2011). Techniques to Visualize and Monitor Transit Fleet Operations Performance in Urban Areas 2. In 90th Annual Meeting of the Transportation Research Board, Washington, DC.