

**Assignment 2 • Visualizing Transportation Sensor Data**

**OBJECTIVE:** Visualize multiple sensor-derived datasets to make inferences about the relationship between cycling behavior and weather.

**DESCRIPTION:** Bicycling makes you happier, healthier, and smarter (perhaps [wild propaganda](#)), yet less than 1% of Americans who commute to work do so by bike. Increasing the number of cyclists on the road also reduces pollution and eases traffic congestion, and understanding patterns of bike traffic is key to promoting healthier communities. In this lab you will be given two sets of data, one on bicycle traffic on the University of Oregon campus and one from a local climate station. Your goal is to visualize, interpret, and present this data to make inferences about how weather impacts cycling behavior.

**INSTRUCTIONS**

**PART 1: DOWNLOADING AND CONNECTING TO DATA**

The Central Lane Metropolitan Planning Organization (CLMPO) has been using stationary bike count stations to collect bicycle traffic data since 2011. We will use data from their sensors around campus to begin exploring patterns of bike traffic around the University of Oregon.

1. Go to the CLMPO website: <http://www.thempo.org/356/Bicycle-Counts> and download the Lane County daily bike counts data. Save the data in your student folder.
2. Open Tableau and click the Open Data button. Use the Connect menu on the left to navigate to the file you just downloaded (under In a File, select Text File. From the file format dropdown menu, please choose Character Delimited Files (.csv). Once you are connected to the file you should be able to see the source data sheet. Choose extract.
3. Click Go to Worksheet to begin visualizing the data.

**PART 2: BEGIN VISUALIZING THE DATA**

Tableau's interface allows you to drag variables from the data menu on the left into the workspace. Variables are divided into Dimensions (fields which contain discreet qualitative data such as location, date, etc.) and Measures (fields which contain numerical data such as temperature, precipitation, etc.).

4. To see how bicycle counts vary over time drag the Date dimension in the column shelf and the Daily Count measure into the row shelf.
5. To explore the data in finer detail, click the plus sign by the Date dimension. Doing so now shows the sum of daily bicycle counts by quarter. Clicking the plus sign next to Quarter will show the sum of bike counts by month, and the plus sign next to month will break the data down into days. You can remove variables from the display simply by dragging them out of the shelf.
6. Add one of the measures of climate (precipitation, temperature, etc.) to the workspace. The Show Me menu on the right side of the work space allows you to toggle between different visualizations.
7. Experiment using different visualizations to look at the bicycle count data over time in relation to a particular climate variable. Right clicking on the vertical axis of your graph will allow you to view the data with a dual axis.

8. To add a sheet to your workbook, click the New Worksheet button in the tool bar (a little graph with a blue plus sign). This will allow you to make multiple visualizations and compare graphs to one another.
9. The data you have been working with is collected from sensors around Lane County. To get a better of idea of what bicycle traffic is like around the University we need to filter our data by location. To do so, drag the location dimension in to the Filters box to the left of the data display. From the menu that pops up select the locations you want to see data from. Use the map of counter locations to select the appropriate locations for examining bike traffic to and from campus.
10. Alternatively, you can create a group within the Location dimension that includes all campus locations. Click the arrow next to the Location dimension and select Create Group from the dropdown menu that appears. Select the locations you would like to include in your campus group and then click the Group button. This will create a new group within the list of locations, which you should name something sensible, like "Campus Locations." This group should now appear in the list of data dimensions and when you drag it into the filters box you should be able to select it to filter your data.
11. To see which data belongs to which location, drag the location dimension into the Marks box below the Filters box. Use the drop down menu to the left of the location dimension to change the visual variable used to display the different locations.
12. Continue to experiment with various visualization and incorporate different climate variables.

### **PART 3: CREATE A STORY IN TABLEAU**

Once you have generated several visualizations you will want to organize what you've learned from this data set and share it with other people. For this exercise you will create a Story in Tableau, pairing your visualizations with explanatory text and notes and then upload that story to your course webpage. The goal is to paint a picture of bicycle commuting to the University of Oregon campus and how factors like weather, weekday, and season affect patterns of bicycle commuting.

1. From the Story menu, open a new story.
2. In the left-hand menu you should now see a list of all of the worksheets you have created. In the bottom left Story menu, change the size of your story to "Story".
3. Drag a sheet into the story work area to display your visualization.
4. At the top of the frame you should give each of your visualizations a caption explaining what is being displayed. You may also want to add additional text explaining your graph or calling out points of interest in the data. You can drag the Description tab from the menu on the left into your story to add a text box.
5. Continue adding visualizations to your story using the New Blank Point button, remembering that you want your graphs to move through the story you are telling about bike commuting.

## PART 4: SHARE YOUR STORY

Tableau Public allows you to upload your visualizations to the internet to be publicly visible. You will use this feature to save your story to your Tableau Public account and then post your story to the course webpage. You be able to add additional text when you post your story to your course page to give more context to your visualizations.

1. Go to <http://www.tableau.com/public/> and click log in. From the log in menu create a free Tableau Public account. This will allow you to upload your workbooks and stories to the Internet.
2. Once you are satisfied with the story you have created in Tableau go to the Server menu, then Tableau Public -> Save to web as. When you save your workbook, you will be prompted to log in to the account you just created.
3. From a web browser, go to your Tableau Public account to view your uploaded workbook. You should be able to view the entire contents of your workbook, including the story you just created.
4. From your workbook open the story you just saved. In Tableau Public's online viewer you can navigate through the pages in your story and mouse over your visualizations to see the data. Click the Share button on the bottom right of the display to pop up options for sharing your story. Copy all of the code from the Embedded Code field. This is what you will use to post your story on the course website.
5. Log on to your personal website. Create a new page on which to post your data visualizations, giving it an appropriate title. Before you post your Tableau story, write a short introduction describing where the data is from and why you are analyzing it.
6. To embed your Tableau story into your page, toggle from Visual to Text view in the page editor. This shows you the html code for the content of your page. Underneath the text that you have written, paste the code you copied from Tableau Public.
7. Your story will not show up in the visual editor, but you can use Preview Changes to see how your story looks with the accompanying text. Once you are satisfied, click Update and then View Page.

## **DELIVERABLE**

The Assignment 2 page on your website should include the following:

1. Your Story that you created in Tableau.

**20 POINTS**

2. In 3-4 sentences, describe the patterns you observe from the annual bicycle count data.

**5 POINTS**

3. In 3-4 sentences, explain why you selected the specific temporal resolution to display the bicycle count data.

**5 POINTS**

4. In 3-4 sentences, explain how filtering the data by location changes the pattern(s) you are seeing.

**5 POINTS**

5. In 7-8 sentences, describe what survey or sensor data would be needed to elaborate/clarify/expand on our findings from this data set.

**5 POINTS**

6. In 3-4 sentences, explain the limitations of the CLMPO data set.

**5 POINTS**

**TOTAL 45 POINTS**

This exercise is due on **11:59 pm on Sunday, April 26, 2015.**