GEORGETOWN UNIVERSITY McDonough
SCHOOL *of* BUSINESS

Tableau NFL Tutorial

This tutorial will help you jump into learning Tableau. It covers the basics: accessing a data source, pulling data from multiple data sheets, creating a calculated field, changing measures/dimensions, building different types of charts (column, line, map and tree map), using some of the basic marks functionality, and building a basic dashboard. It will also briefly touch on why data are sometimes challenging. You will find that Tableau can be pretty easy and straightforward when you have notes on exactly how to accomplish tasks. Also, expect that for the rest of the class, we will focus on what to do when you do not get all the steps written out for you like in this tutorial.

The following example uses NFL data to teach Tableau fundamentals in a fun way. The general approach here is to create several worksheets that utilize different visualization styles in order to create an interactive dashboard as the final step.

Part 1 - Connecting to Data and Pulling Data from Multiple Sheets

In Part 1, we will compare NFL player hand size to player position. The goal is to determine which football position has the largest hand size on average.

Download the 'NFL stats, 1999-2013 tutorial file.xlsx' data file from our class Canvas site. Once the NFL stats data file is saved, open Tableau and connect to the data source by selecting Microsoft Excel on the left panel (see picture below).
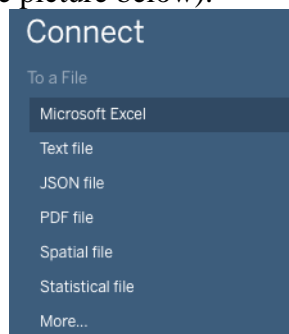
When analyzing data, if your data are all in the same spreadsheet, you are set. A challenge occurs when you need to use data from multiple spreadsheets. To demonstrate this, you are going to use data from two sheets from the NFL stats spreadsheet. If you have experience with Tableau (or databases in general), in earlier versions of Tableau, you needed to join the data. While you can still join data, Tableau recommends that you relate data[1] and establish a 'relationship' between the tables by identifying common fields. In order to establish a relationship, each sheet must

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[1] https://help.tableau.com/current/pro/desktop/en-us/joining_tables.htm

have at least one common field. In this exercise, you will analyze hand size for different football positions. The problem is that hand size and football position data are located in different sheets.

It may be helpful before you begin to open the NFL stats data file in Excel and familiarize yourself with how the data are arranged. In the Excel sheets, try to identify the two fields we will focus on: 'Fant Pos' (Fantasy Position) and 'Hands'.

To continue in Tableau, drag the '1999-2013 data' sheet to the canvas on the right side of the screen. Now drag the 'More combine data' sheet to the canvas so that these two tables have a relationship line.

The '1999-2013 data' sheet has each player's football position while 'More combine data' has player hand size. For some background, '1999-2013 data' includes all players, but 'More combine data' only includes players that chose to participate in the NFL combine prior to starting in the NFL. The combine is an optional opportunity for players to showcase their physical and mental football skills.

Select 'Player' from the 1999-2013 data sheet and 'Name' from the More Combine data sheet as the common fields to relate the tables. These are two different labels for the same type of field in separate sheets. But interestingly (or perhaps annoyingly), player name is not a unique identifier in these sheets. There have been players in the NFL with the same name. Therefore if your dialog box is closed, click the relationship link again to open the relationship dialog box and select 'Add more fields' (or if you box is still open then just select 'Add more fields.') Select on the next line 'College', and then add more fields, and select 'Fant Pos' and 'Position' on the next line. (Careful: chose 'Fant Pos' not 'Fant Pts.') Now you will not unintentionally aggregate players that have the same name.
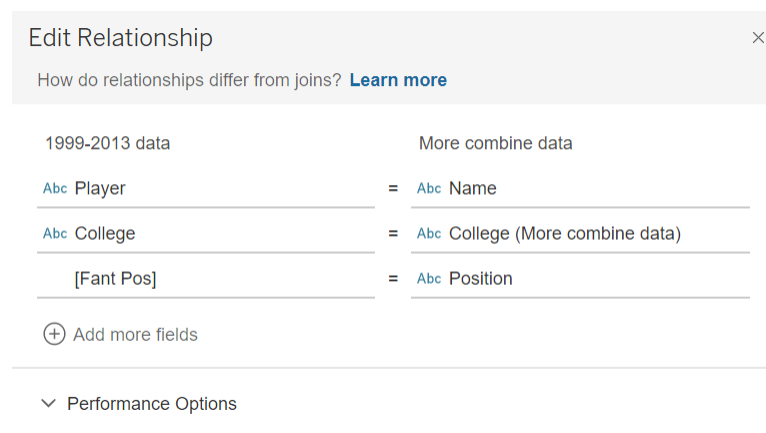

Create a new worksheet by clicking on the icon shown below.
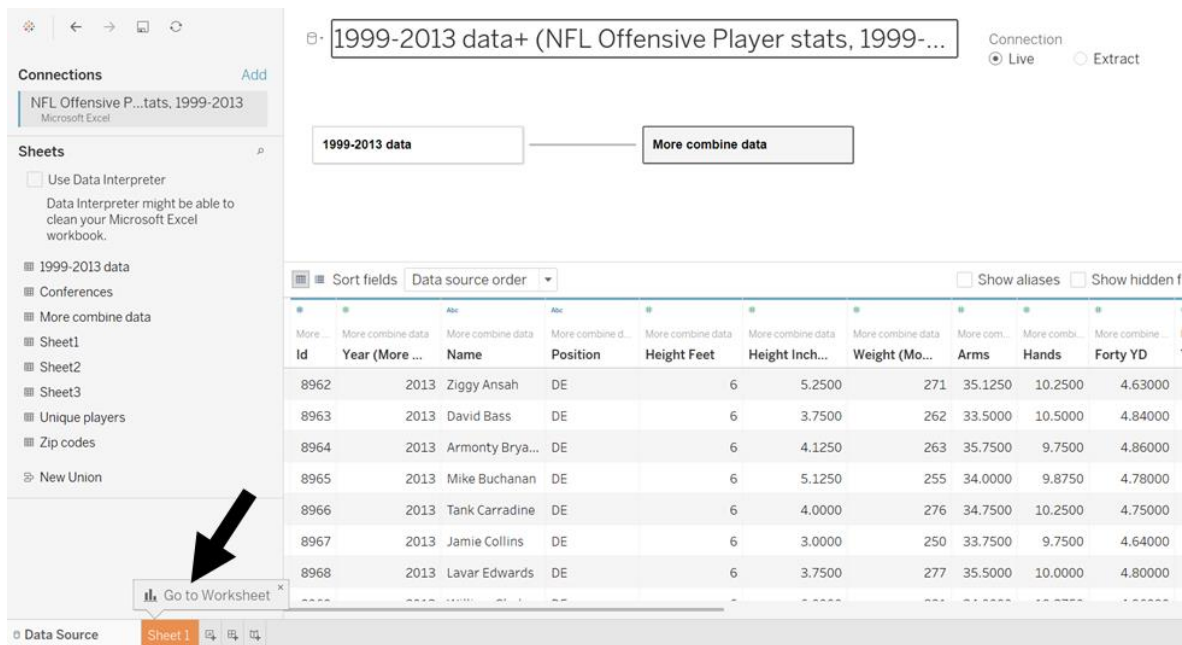
Next you will drag fields to the column and row shelves to create your first visual. A shelf is an area on the visualization screen where you can drop pieces of data so that Tableau can act on them. For the column and row, the shelf is the blank bar to the right of where it says 'Columns' and 'Rows'. The column and row shelves establish the general structure of your data visualization. Click here[2] for additional information on shelves in Tableau.

'Fant Pos' is a player's position in football (quarterback, running back, wide receiver, etc.) and 'Hands' is the length of the player's hand in inches. Before we use 'Fant Pos', let us fix the descriptor. Right-click on 'Fant Pos' and choose 'Rename.' Rename it 'Fantasy Position.' Then, drag 'Fantasy Position' to the columns shelf and 'Hands' to the rows shelf. In this example, Hands will be used to calculate averages and Fantasy Position will be used to group those averages.

[2] https://help.tableau.com/current/pro/desktop/en-us/buildmanual_shelves.htm
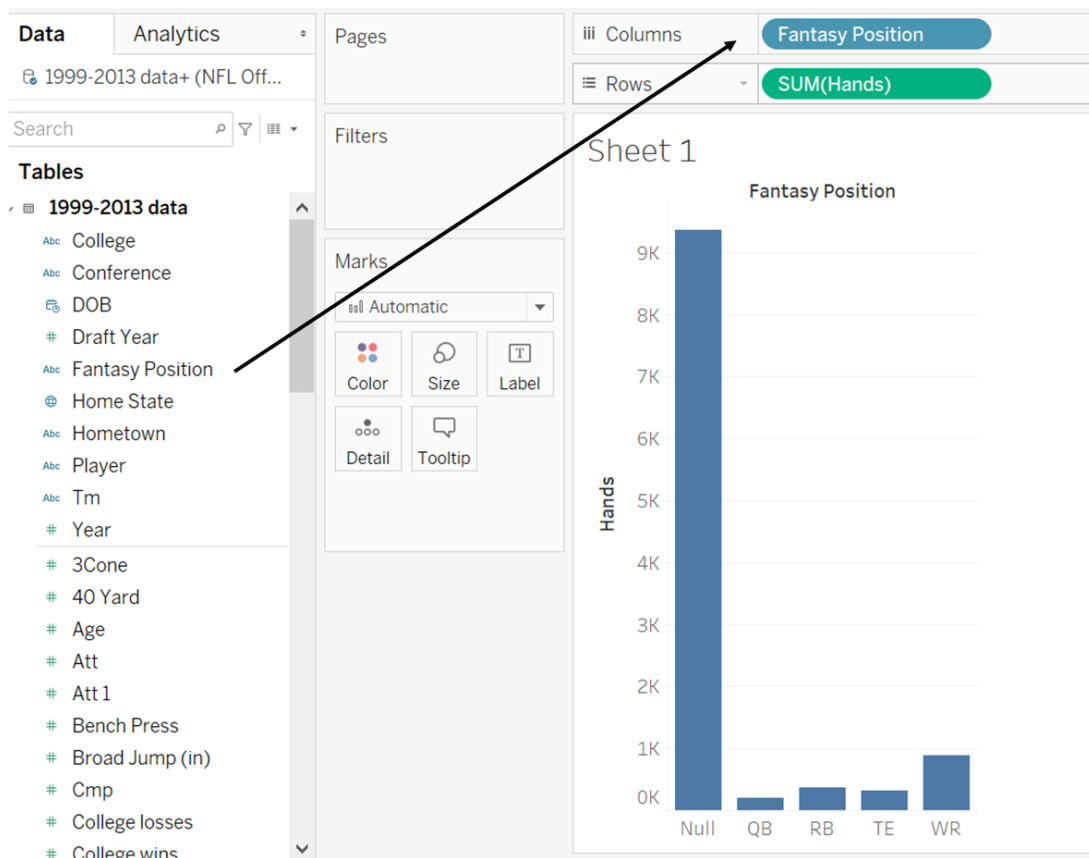
You'll notice that Tableau defaults to a bar chart, which is conveniently the type of chart you want to use to compare football position to average hand size. However, the 'Hands' measure is showing a sum of hand size and this needs to be changed to average instead. Follow the steps below by clicking on SUM(Hands) in the Rows shelf to change the sum to an average.


7/30/2024
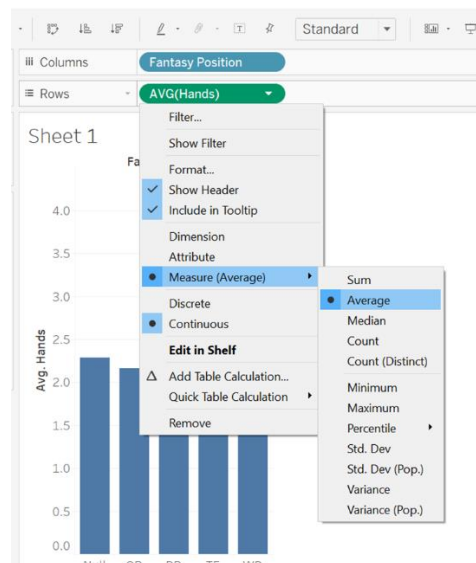
If you hover over the bars, the averages (in inches) seem very small (between 2 and 4.5 inches). Use this as an opportunity to check the data quality we are working with. Click on the Data Source tab of Tableau and scroll to the right so that you can see the Hands field. Missing data are showing as 0 in the Hands field. In order to filter data, you will drag a field to the filters area. In this case, you want to drag the 'Hands' measure to 'Filters' area and set the filter so that it does not include zero.
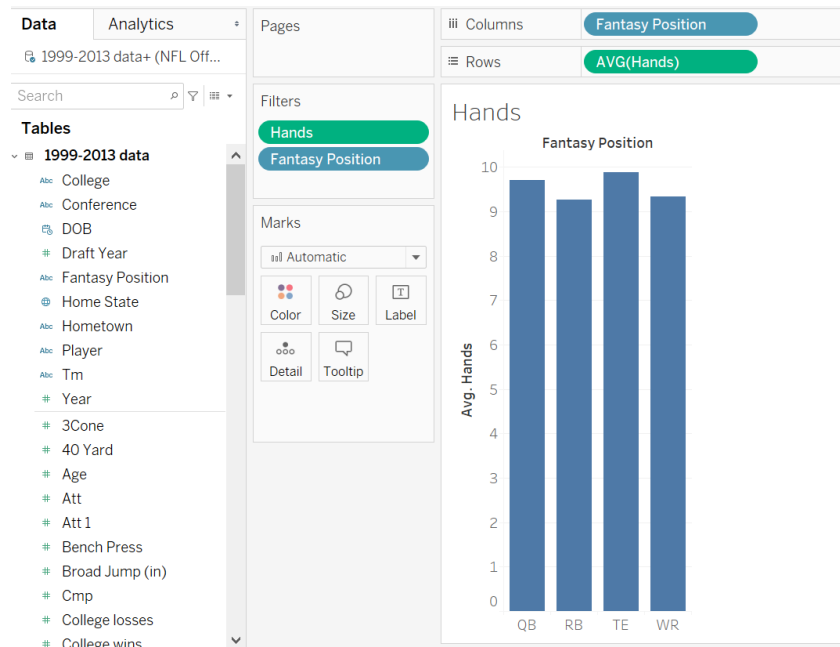
This box will pop up and you should select 'All Values'.
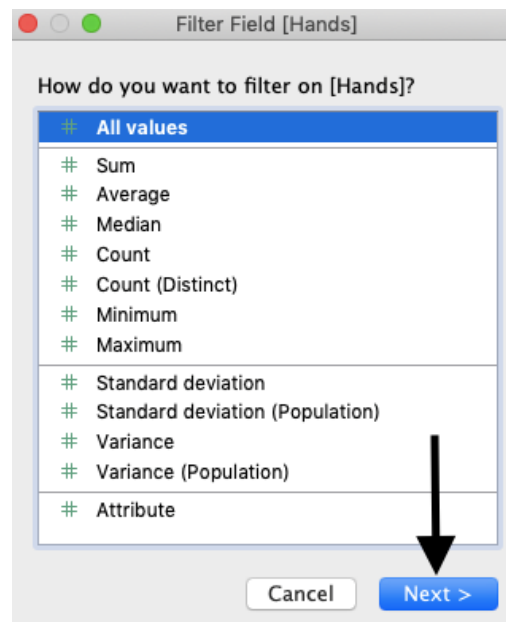
Click on the filters shelf and click 'Edit Filter…' to set the 'At least' value to 1. This will ultimately exclude all zero values.
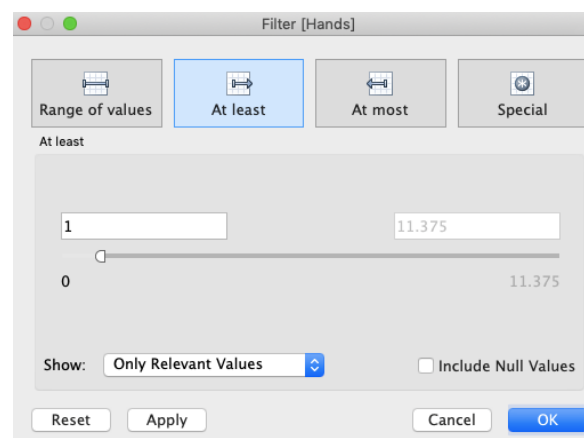
We are also missing some positions, so drag Fantasy Position to filters and filter out Null values. It turns out that tight ends (TE) have the biggest hands in the NFL based on this data.

Part 2 – Calculated Fields and Filters

Next you will compare fantasy football performances for some elite wide receivers. You must first create a new worksheet in the bottom left corner of the screen. To begin, locate the 'Td 2' field. This field shows receiving touchdowns so you can right click it and rename it 'Receiving Touchdowns'. Receiving yards are shown in the field, 'Yds 2'. Right click and rename this field to 'Receiving Yards'.

You will use these two measures to create a new Calculated Field. For additional background on calculated fields in Tableau, review this link.[3] A general formula or fantasy football wide receiver points is:

$$(6*[Receiving\ Touchdowns]) + ([Receiving\ Yards]/10)$$

To create a calculated field, right click on either of these measures, select the dropdown for Create -> Calculated Field and follow the steps below:

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[3] https://help.tableau.com/current/pro/desktop/en-gb/calculations_calculatedfields_create.htm
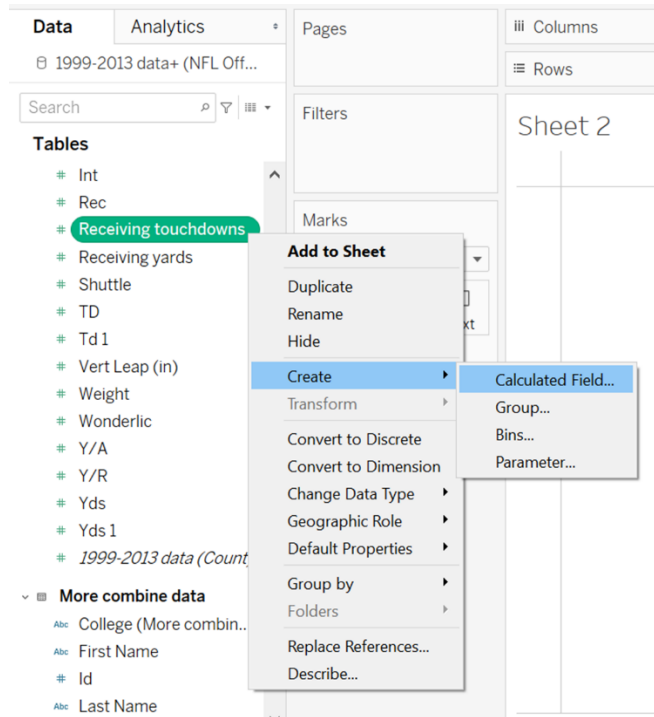
In the calculated field entry form, enter a name for the calculated field as 'Fantasy Points' and use the newly created measures to type out the formula as shown below:



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Fantasy Points                                              ×

(6*[Receiving touchdowns]) + ([Receiving yards]/10)




                                                          ▸




The calculation is valid.              Apply        OK
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Make sure the message in the lower left of the box says "The calculation is valid." If it does not, check for typos. You can use the new 'Fantasy Points' field to chart out player performance over a range of time.

On your new worksheet, drag 'Year' to the column shelf and 'Fantasy Points' to the row shelf. Make sure you use the new field you just calculated and not the Fant Pt field already in the data set. Make sure the 'Fantasy Points' is set to Measure (Sum). This will show all players aggregated together so, in order to show the trend of one player, drag 'Player' to the filter section. In the filter, select 'Larry Fitzgerald' as shown below:
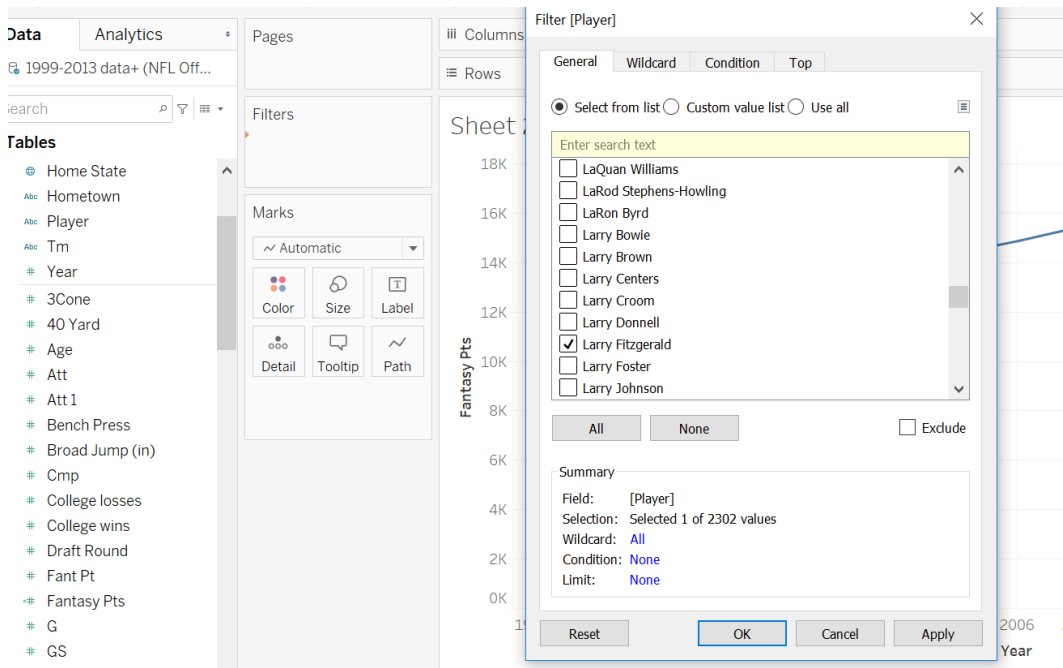
The 'Marks Card' allows you to add context in different ways to the visualization you have created. You can now start adding other fields as 'Details' to the chart. Drag 'Receiving Yards' and 'Receiving Touchdowns' to the Detail mark under the 'Marks' section on the left side of the screen. Notice that now, when you hover over a point on the line chart, it tells you how many touchdowns and receiving yards Larry Fitzgerald had that given year. The detail mark allows you to include additional information without changing the structure of the visualization.

In order to compare more players, add other players to the filter such as Terrel Owens and Calvin Johnson. Now drag the 'Player' dimension into the Color mark in the 'Marks' card. (Note: you need to drag 'Player' from dimension again to the Marks section. If you move the one from the Filter card, you will lose your filter.) This will show different lines for each player and distinguish them by color. If you do not like the default colors, you can change them but clicking Colors -> 'Edit Colors'. Now right click on a line, and select 'show trendline'.
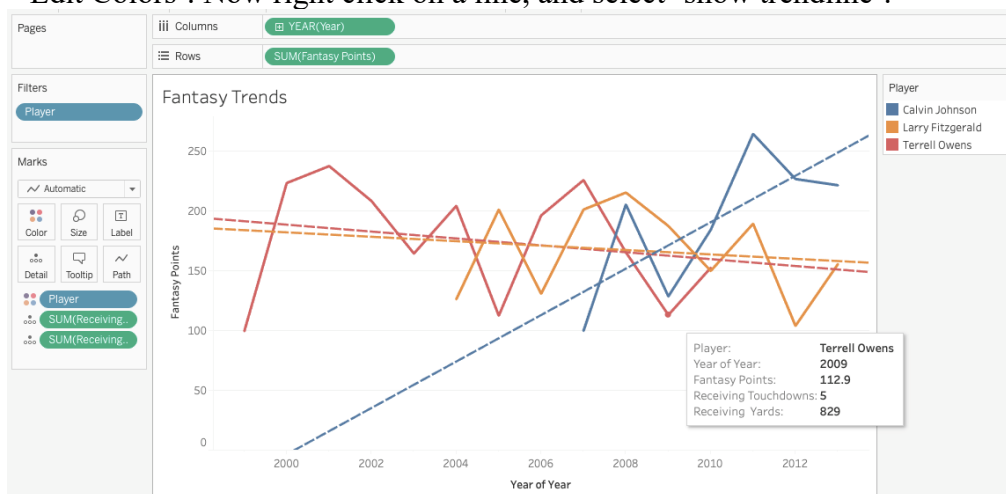
Which of these three players continued to improve in fantasy points over time? As a fun fact, Calvin's 2012 season broke the record for most receiving yards ever!

Part 3 – Alternative Charts and Geocoding

In this section, you will consider which states produce the best wide receivers in fantasy football. First, create a new sheet and make sure that Tableau is recognizing 'Home State' as a geographic string. Following the screen shot below will ensure this.
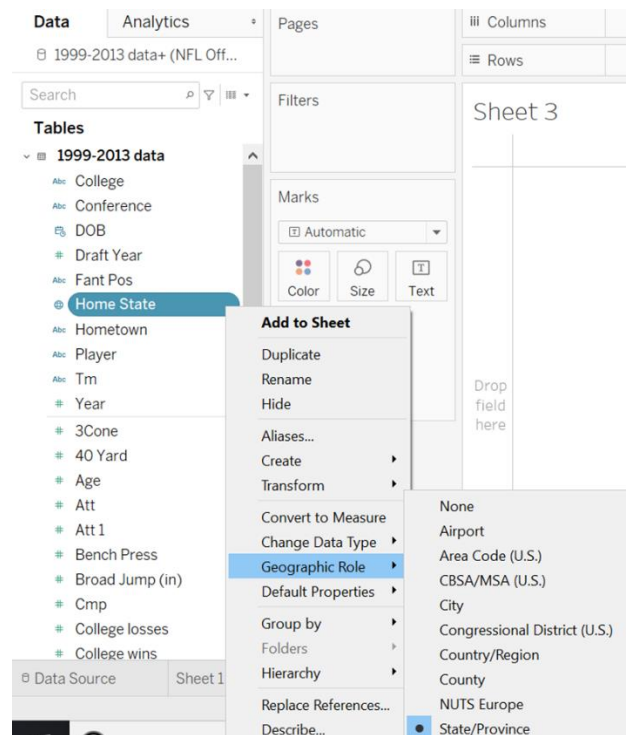

Drag 'Home State' to the column shelf and Fantasy Points to the row shelf. On the right side of the screen the 'Show Me' selection has different chart options to choose from. If you'd like to learn more about chart options in Tableau, click here.[4] For this example, select the Maps option to initiate geographic visualization. Please note that there are two options for maps and you should select 'Maps' as opposed to 'Symbol Maps'

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[4] https://www.tableau.com/learn/whitepapers/which-chart-or-graph-is-right-for-you
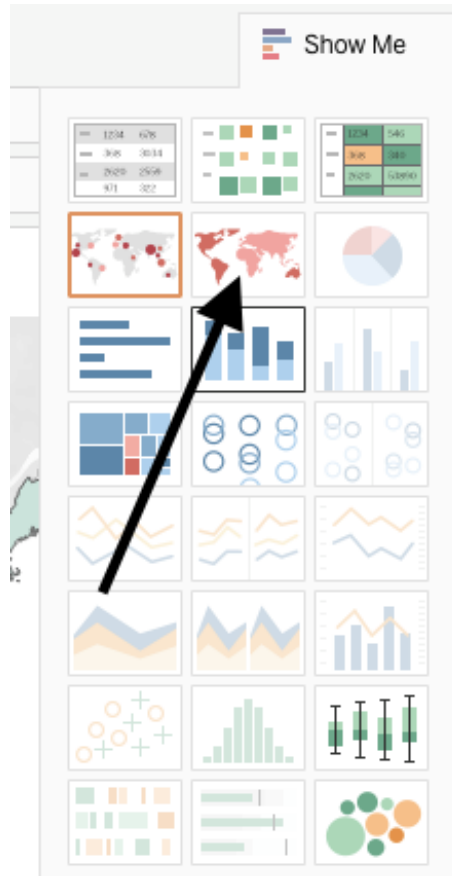
You'll notice that the 'Fantasy Points' measure moved to the marks area. Change the measure from sum to average because you are comparing states that have a different number of players. Also, drag the 'Player' dimension to the detail mark and change it to a 'Count (Distinct)' measure. This will show you how many players are from each state. This detail shows when you scroll over the chart. (Note: see "Something extra to think about" at the end of this document because there is a problem with this step because Player name is not a unique identifier. For simplicity, we will continue to refer to Count Distinct players here but will suggest how to fix it in the end.)

In order to filter the population to wide receivers, drag the 'Fantasy Position' dimension to the filter area and select 'WR'.
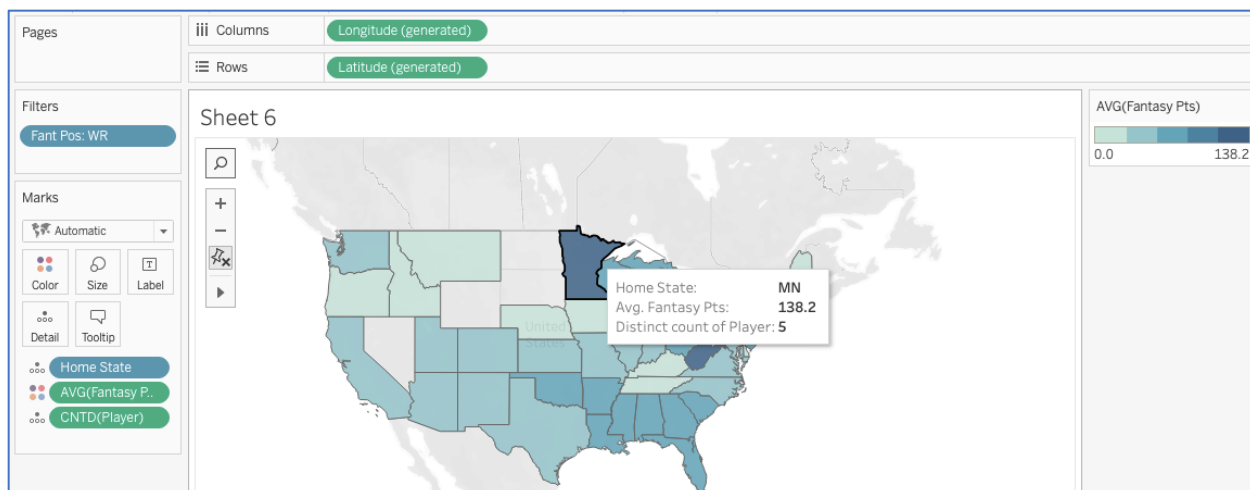
The screenshot above shows an example of what you should create. If you click on the Color mark on the left-hand side, you can change the scale. Notice that the legend on the right shows what the color scale relates to (average fantasy points).

Notice how Minnesota has one of the highest player averages for wide receiver fantasy points. It so happens that the average is so high because of one of the players was the star identified by the trendline in Part 2. To drill into the underlying data for Minnesota, click on the state and then the 'View Data...' box as shown below (it is the grid symbol in the upper-right corner) and then click where it says '1999-2013 data' for the detailed data. You could also right-click on the state, and select 'View Data'. When the detailed data are reviewed, your friend Larry Fitzgerald shows up again!
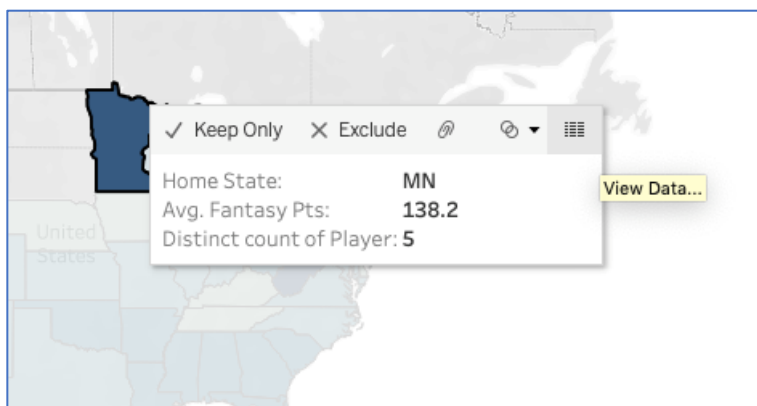
Another useful visualization is a tree map. This can compare fantasy performances for wide receivers by draft round to examine which draft rounds produce historically higher fantasy football performances. To begin, click on a new worksheet in the bottom left-hand part of the screen.

Drag 'Draft Round' to the column shelf and 'Fantasy Points' to the row shelf. Once again, make sure that 'Fantasy Points' is set to an average measure as opposed to a sum. If Draft Round is

showing as a Sum that means Tableau thinks it is a Measure (since it is a number). It needs to be a Dimension and not a Measure. There are several ways to correct this but the easiest might be to right-click the SUM(Draft Round) pill and change it to Dimension.

Under 'Show Me' pick the 'Tree Map' selection. This type of chart shows trends by both size and color of each box.

To limit the scope, drag the 'Fantasy Position' dimension to the filter area and select 'WR' as you did in the last exercise.

In the 'Marks' section, you'll notice that 'Fantasy Points' appears as both a size and a color mark. This is redundant because higher average fantasy points are indicated by both larger box size <u>and</u> darker color. To tell a better visual story, let's change the color mark to a distinct count. This will tell us how many players are included in each draft round category, indicated by color darkness. To do this, drag the 'player' dimension to the color mark (you may get a warning but you disregard it). Now change the dimension to measure with a 'Count (Distinct)' as shown below. You can change the color preferences by clicking on the color card with the (four dots) if you want different colors.

Average Fantasy Points by Draft Round
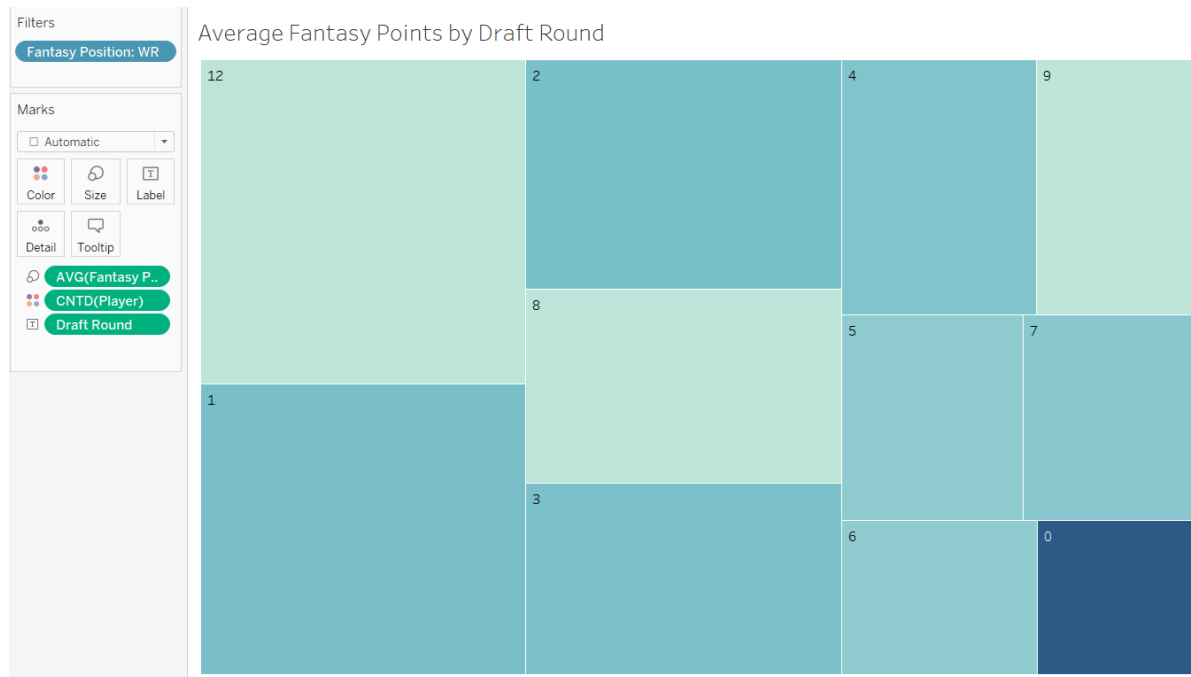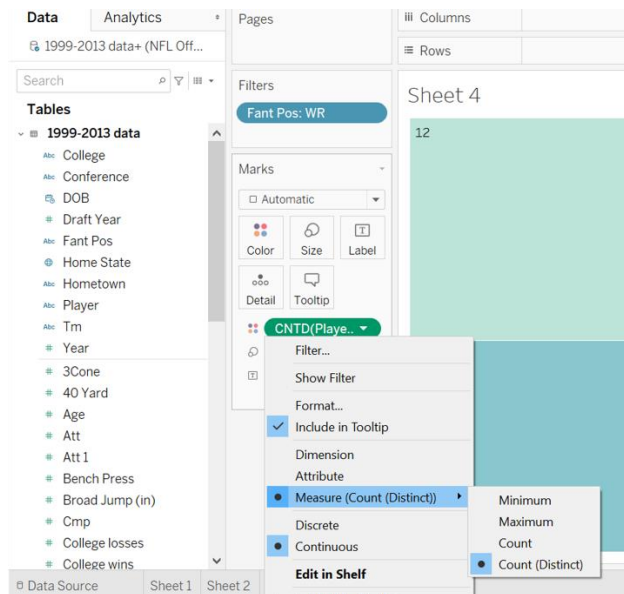
You'll notice a surprising takeaway that draft round 12 has the highest average for wide receivers! However, you need to look closely at what this is saying because there is only one player from the 12th draft round. Also, you can easily see that many players who do well in the NFL are not drafted (draft round zero means that the player was undrafted).

Part 4 – Creating a dashboard with Common Filters

So far, you have accessed a data source, used data from two data sheets, created a calculated field, changed measures/dimensions, built different types of charts, and used the marks

functionality. Next you will bring it altogether by visualizing different worksheets in a single dashboard. When talking about Tableau, you'll often hear people talking about dashboards as the end product. The work up until now is a behind the scenes look at building the pieces that ultimately go into a dashboard.

To begin, rename the worksheets by right clicking on the tabs to the names shown in the figure, and then click on the new dashboard button shown below (2nd icon next to sheet names).
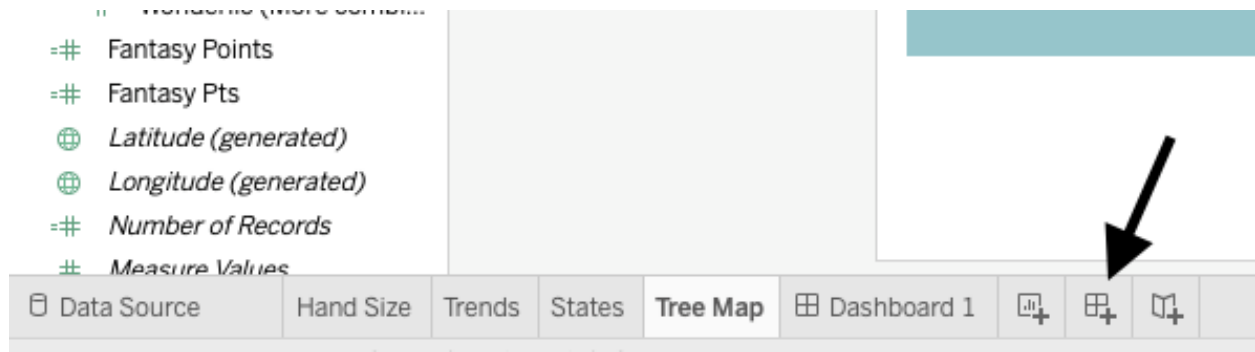

You'll notice that the worksheets built in parts 1-3 are shown on the left-hand side of the screen.
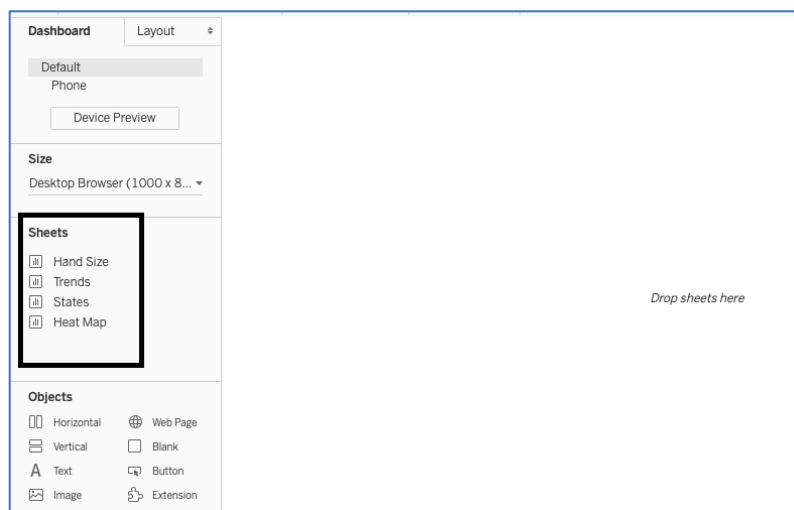

Now drag the Tree Map and Hand Size and sheets into the dashboard canvas. You can change the way each sheet is displayed by selecting the fit option below. You should consider starting with 'Entire View' for each. For additional information on sizing and layout for a dashboard, click here.[5] You'll notice that the legend for the tree map is located on the right side of the dashboard. You can right click on any sheet or filter and select "Floating" to move it around the dashboard freely. Right click on the dashboard tab and name it 'NFL Dashboard' as well.

[5] https://help.tableau.com/current/pro/desktop/en-gb/dashboards_organize_floatingandtiled.htm
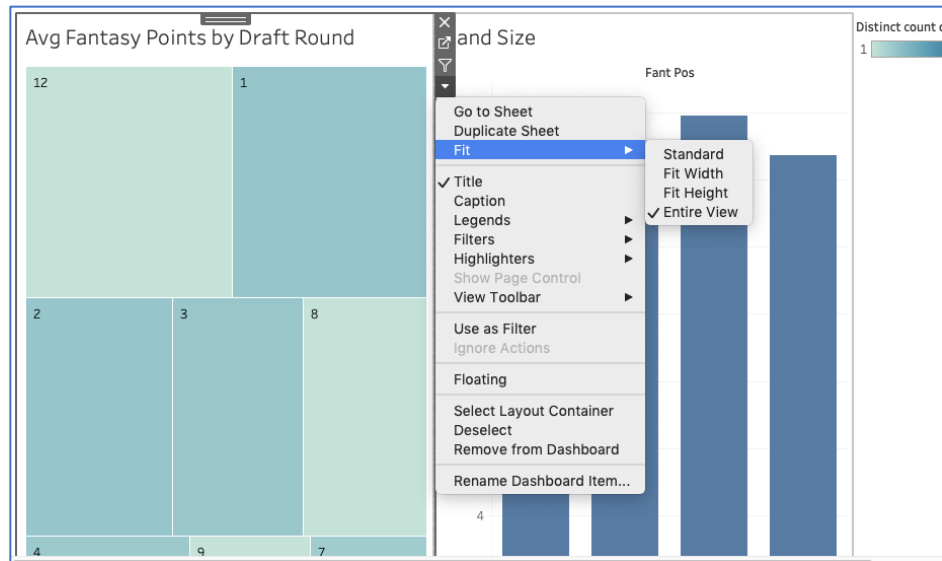
The next step is to add an interactive feature to the dashboard. This is arguably why people find so much value in Tableau dashboards.

You will add a team filter to the dashboard. The intention here is to add one filter that will change both charts in the dashboard. To begin, go back to the 'Tree Map' worksheet tab created earlier and drag the 'Tm' dimension to the filter section. This dimension has teams that each NFL player is on. Now when the filter shelf appears, select 'Use all' as shown below.
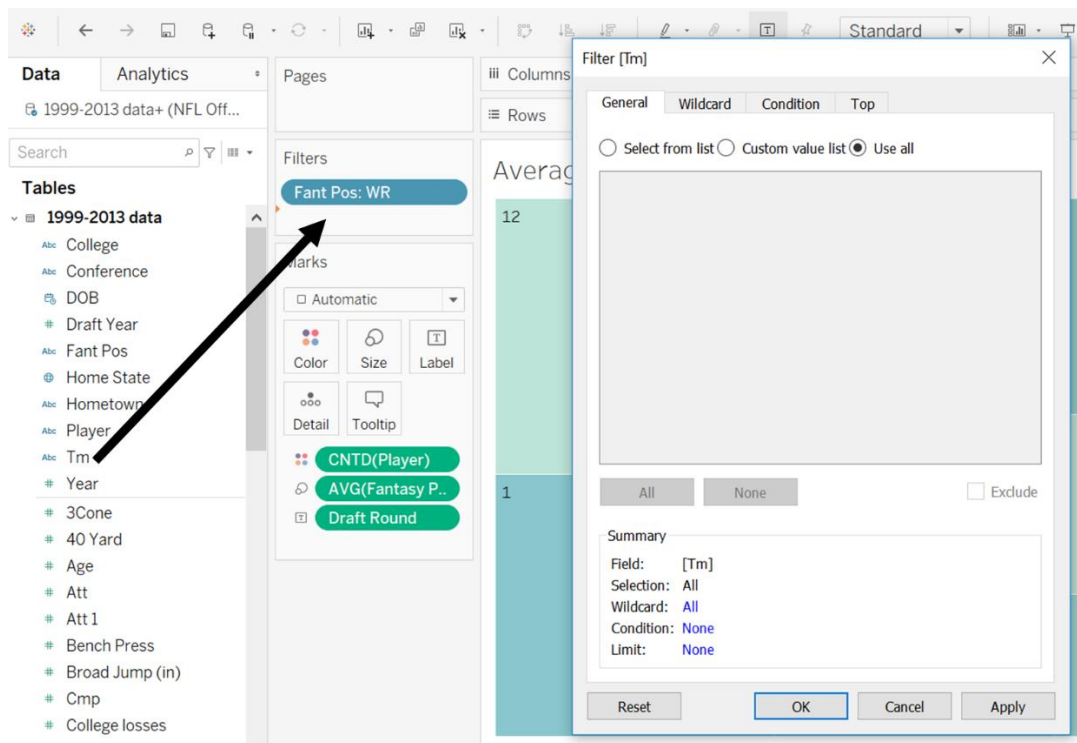

Now go back to the 'NFL Dashboard'. On the Tree Map, follow the steps below to insert the 'Tm' filter.
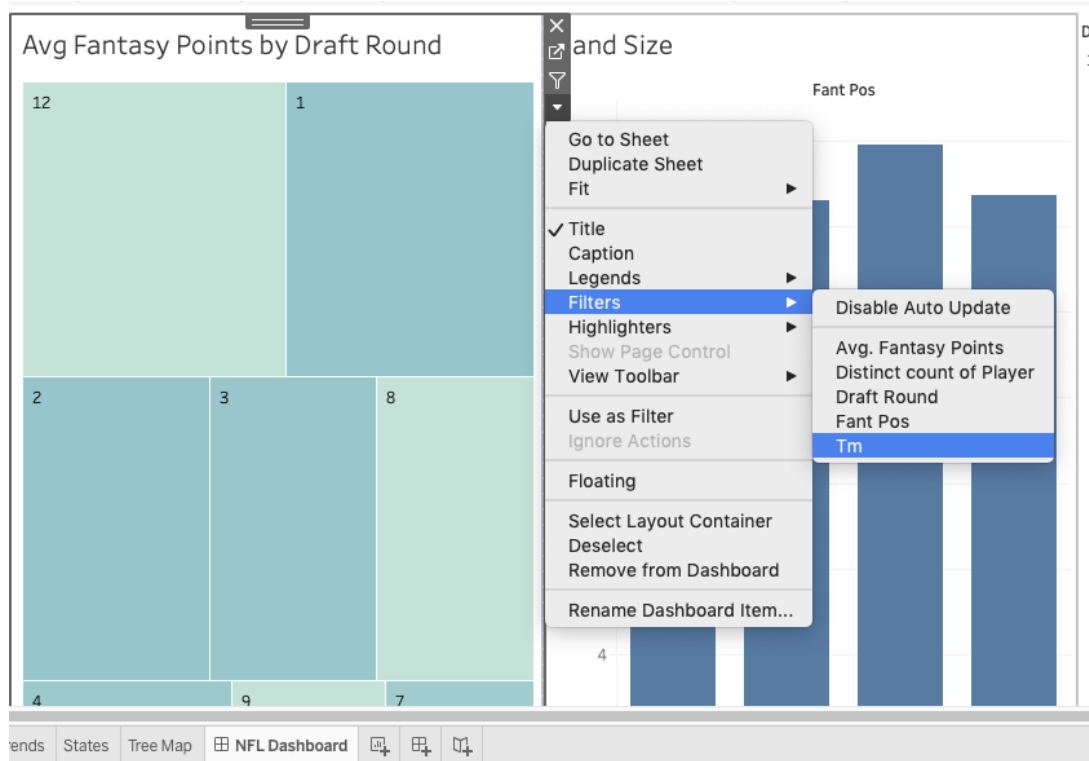
Select the Treemap portion of the Dashboard and you should be able to select some options in the upper right corner of the Treemap 'box'. Select the drop-down arrow and select Filters and choose 'Tm'. You should see the filter appear on the right side of the dashboard under the legend. Click on the dropdown option for the filter and change the filter type to 'single value dropdown' as shown below.
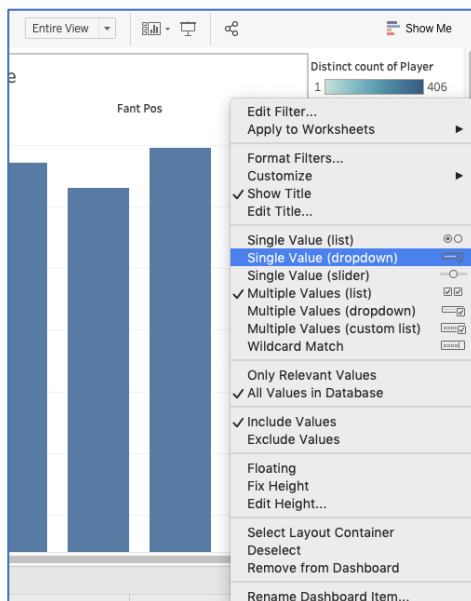
The filter only applies to 'Tree Map' but if you want it to also apply to the 'Hand Size' bar chart, click on the filter options again and select the filter to apply to all worksheets using this data source as shown below.
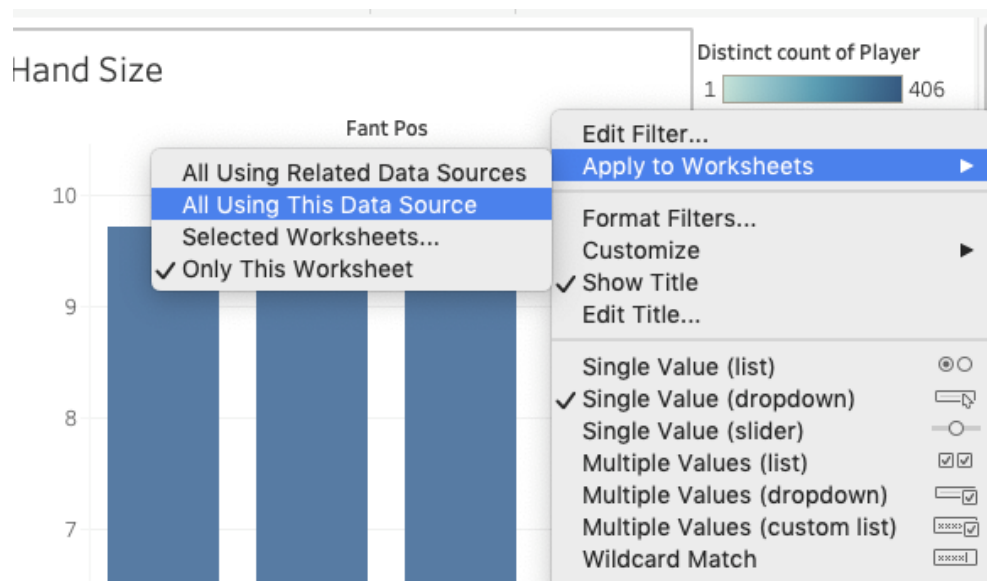
The filter now applies to both worksheets on the dashboard! Try it for yourself and select Baltimore (BAL) from the team filter. Notice how each visualization updates accordingly with the new filter.
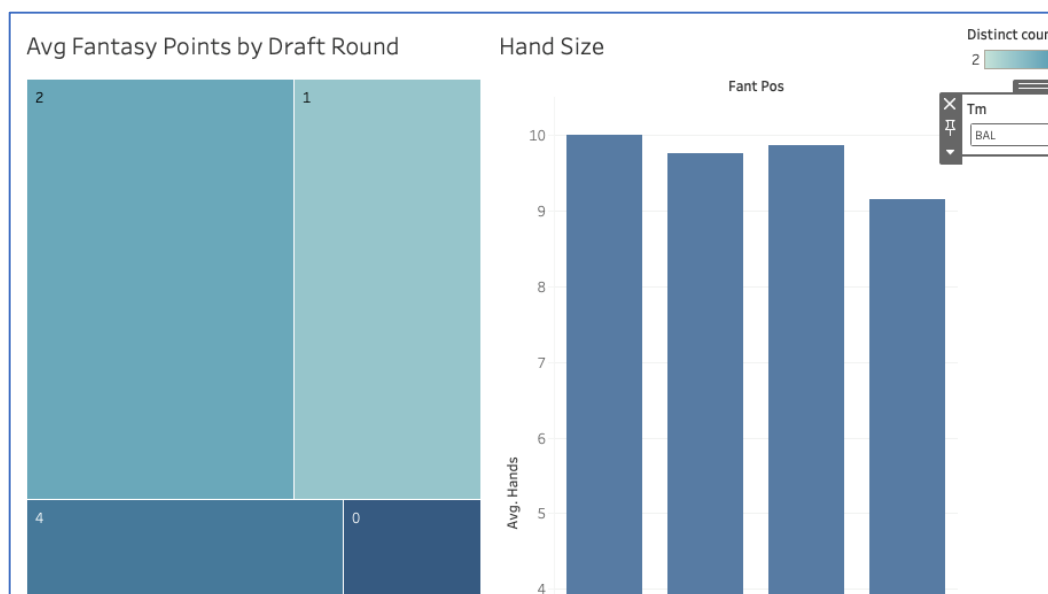
You can now see how the data is different when you drill into specific teams. Instead of showing all the data, you are now looking at one team specifically. For Baltimore, round 2 has produced the highest average fantasy points for WRs and QBs have the largest hands historically!

Something Extra to Think About

Your analysis is probably pretty close except remember that there are some players that have the same name in the data set. How might that affect your results?

Possible solution to try

While some players share the same name, Player Name + College + Position is unique, i.e., no two players with the same name attended the same college and played in the same position.

Create a Calculated Field that concatenates the other fields.

Unique Players

[Player]+[College]+[Fantasy Position]

If you use unique players rather than players, how do the results change? Redo the steps that involved counting distinct player names and assess the impact.