

Data Visualization



Introduction

Last Modified: September 2018

This reference and training manual was produced by the University of Maryland Libraries.

Permission to reproduce this manual or any of its parts for non-commercial, educational purposes may be granted upon written request. Appropriate citation is appreciated.

University of Maryland Libraries
GIS and Spatial Data Center
McKeldin Library, Room 4118
College Park, MD 20742-7011

<http://www.lib.umd.edu/gis>

GIS Facilities at the University of Maryland

McKeldin Library

ArcGIS and QGIS (an open source GIS software package) are loaded on all public workstations in McKeldin Library. Color printing and large format printing are also available in McKeldin Library.

The GIS instruction laboratory is located on the fourth floor of McKeldin Library in room 4120. The laboratory is open to the public during library hours when not in use by a class or librarian. The laboratory schedule is posted on the window by the door and updated each week. ArcGIS 10.5 and QGIS are installed on all computers in this laboratory, as well as other image processing and statistical packages, and can be used when they are open.

Other Facilities

There are other departmental (e.g., anthropology, architecture/urban planning, civil engineering, geographical sciences, and landscape architecture) GIS laboratories on campus that are restricted to faculty, staff, and students in each of those disciplines. Additionally, the Office of Information Technology's software licensing program (<http://www.oit.umd.edu/slic>) offers ArcGIS at special/reduced rates for faculty and staff at the University of Maryland.

Table of Content

	Page
❖ Data Dashboard Exercise.....	6
• Tableau Public	6
• Tasks Including in this exercise	
1. Data Importing(Spatial File).....	7
2. Points Map Creating in Tableau Public.....	9
3. Bar Chart Creating.....	10
4. Line Chart Creating.....	11
5. Bubble Chart Creating.....	12
6. Data Dashboard Creating & Cross Filter Setting.....	13
7. Dashboard Publishing.....	15
❖ Gephi Exercise.....	18
• About Gephi.....	18
• What do we intend to do with this exercise?	
• What you need for this exercise?	
• Importing the Nodes and Edges CSV Files to Gephi.....	18
1. Importing the Nodes CSV File to Gephi.....	18
2. Importing the Edges CSV File to Gephi.....	21
3. Making Graphs with Gephi.....	23
❖ Plot.ly Exercise.....	29
• What is Plot.ly?	
• Tasks Including in this exercise	
1. Account Setup.....	29
2. Creating a Chart.....	30
3. Creating a Heat Map.....	30
4. Changing Colors.....	32
❖ RAW	
Exercise.....	33

- What is RAW
- Tasks in this exercise.....33
 1. Opening xlsx. File.....33
 2. Selecting a chart.....34
 3. Exporting the Diagram.....35

- ❖ **Carto Exercise**.....36
 - What is Carto?
 - Tasks in this exercise:
 1. Account Setup.....37
 2. Connecting data set.....37
 3. Creating a Filter.....38
 4. Creating a Time Series Map.....40

- ❖ **Infographics Exercise**.....41
 - What is an infographic?
 - Piktochart
 - Tasks Including in this exercise
 1. Account Setup.....41
 2. Getting Started.....42
 3. Visualize Your Data.....44

- ❖ **References**.....48

Data Dashboard Exercise

- **Tableau Public**

Tableau Public is a “one-stop” free visualization & publication service that lets anyone publish interactive data visualization works to the web, which other people can view through the URL.

Visualizations that have been published to Tableau Public can be embedded into web pages and blogs, they can be shared via social media or email, and they can be made available for download to other users.

Visualizations are created in the accompanying app Tableau Desktop Public Edition (Free Version) - no programming skills are required!

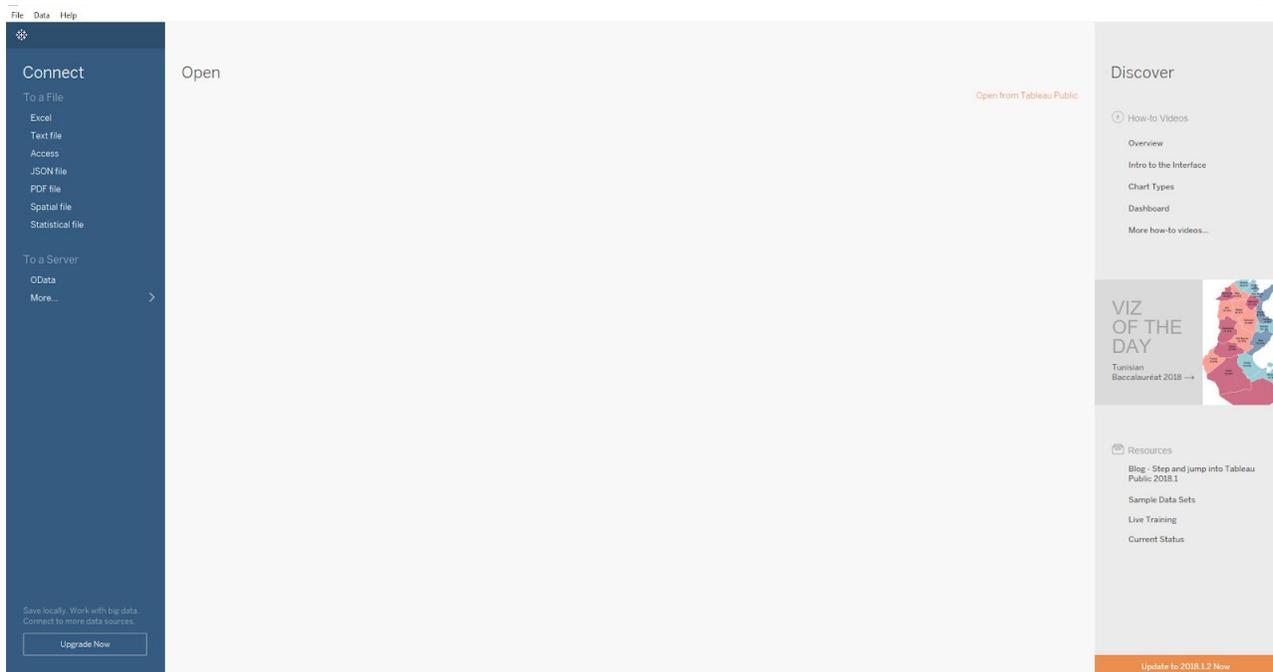
In this Exercise, we will use Tableau Public to create a Crime incidents visualization dashboard. The crime data has multiple dimensional attributes that need to display such as time-stamp, crime types and geographic location. After this exercise, you will be able to use Tableau Public to create different types of charts and publish a visualization data dashboard.

- **Tasks in this exercise:**

1. Data Importing
2. Points Map Creating in Tableau Public
3. Bar Chart Creating
4. Line Chart Creating
5. Bubble Chart Creating
6. Cross Filter Setting
7. Data Dashboard Publishing

1. Data Importing (Spatial File)

- 1.1 First, download all crime incidents files from team drive. Open Tableau Public in your Desktop or Laptop. Then choose **Spatial file** under **Connect** on the Left side and select the "Crime_Incidents_in_2016.shp" from the folder you have just downloaded.



- 1.2. After adding the file to the Tableau Public, the attribute table and its table contents will show up. Meanwhile, the data types of each column will show up as well. Then Click **Sheet 1** and select, **Go to Worksheet** on the bottom left of the current Window.

Tableau Public - Washington D.C. Crime Data 2016

File Data Window Help

Crime_Incidents_In_2016

Filters 0 | Add

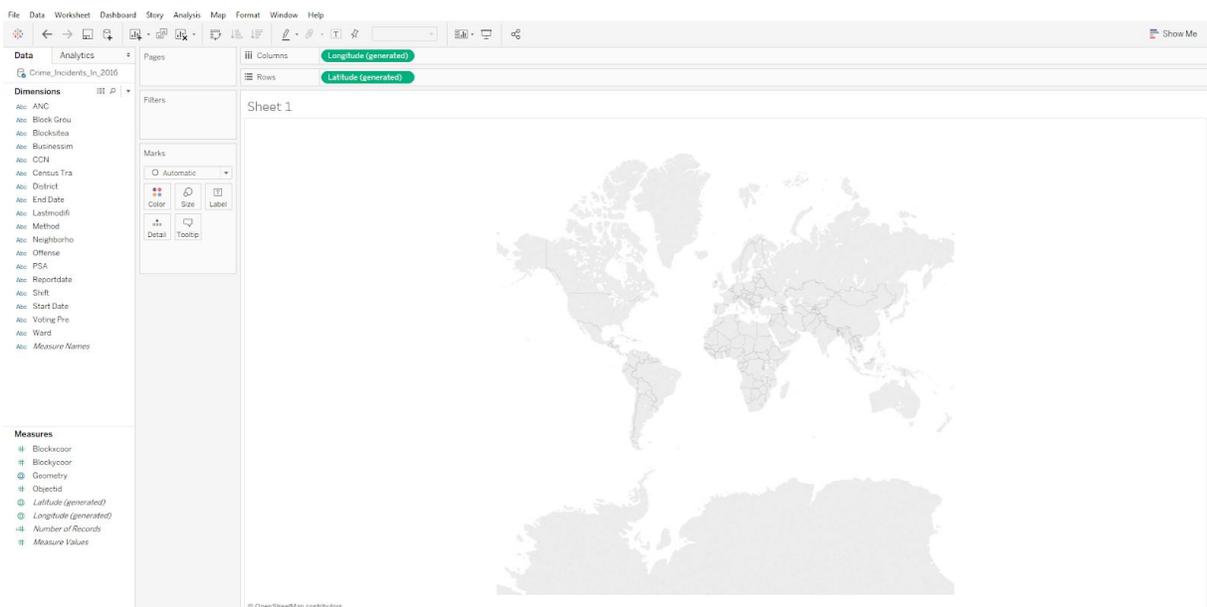
Sort fields Data source order

Show aliases Show hidden fields 1,000 rows

#	Objecid	Abc Crime_Incidents_In_2016.shp CCN	Abc Crime_Incidents_In_2016.shp Reportdate	Abc Crime_Incidents_In_2016.shp Shift	Abc Crime_Incidents_In_2016.shp Offense	Abc Crime_Incidents_In_2016.shp Method	Abc Crime_Incidents_In_2016.shp Lastmodif	Abc Crime_Incidents_In_2016.shp Blocksifea	#	#	Abc Crime_Incidents_In_2016.shp Blockcoor	Abc Crime_Incidents_In_2016.shp Blockycor	Abc Crime_Incidents_In_2016.shp Ward	Abc Crime_Incidents_In_2016.shp ANC	Abc Crime_Incidents_In_2016.shp District	Abc Crime_Incidents_In_2016.shp PSA	Abc Crime_Incidents_In_2016.shp Neighbor
192,488	16002272	1/5/2016 9:26:50 AM	MIDNIGHT	THEFT/OTHER	OTHERS	2017-05-09T07:19:16...	300 - 499 BLOCK OF 4...	404,600.00	136,168.00	7	7F	SIXTH	603	32			
192,489	16002316	1/5/2016 9:01:08 AM	DAY	BURGLARY	OTHERS	2017-05-09T07:19:16...	1400 - 1499 BLOCK OF...	401,237.00	134,507.00	6	6B	FIRST	106	26			
192,492	16002384	1/5/2016 11:45:40 AM	DAY	THEFT/OTHER	OTHERS	2017-05-09T07:19:16...	2300 - 2499 BLOCK OF...	400,541.00	139,301.00	5	5C	FIFTH	505	22			
192,490	16002368	1/5/2016 11:48:46 AM	DAY	THEFT/OTHER	OTHERS	2017-05-09T07:19:16...	2100 - 2699 BLOCK OF...	402,316.69	135,529.56	7	7F	FIRST	108	26			
192,493	16002394	1/5/2016 11:57:11 AM	DAY	THEFT/AUTO	OTHERS	2017-05-09T07:19:16...	500 - 699 BLOCK OF 4...	398,476.00	134,936.00	6	6D	FIRST	105	9			
192,491	16002374	1/5/2016 12:05:06 PM	DAY	ROBBERY	OTHERS	2017-05-09T07:19:16...	600 - 699 BLOCK OF M...	398,186.00	137,531.00	6	6E	THIRD	308	8			
192,496	16002437	1/5/2016 1:15:36 PM	DAY	THEFT/OTHER	OTHERS	2017-05-09T07:19:16...	2200 - 2299 BLOCK OF...	393,168.00	139,120.00	3	3B	SECOND	204	14			
192,494	16002412	1/5/2016 1:23:10 PM	DAY	MOTOR VEHICLE THEFT	OTHERS	2017-05-09T07:19:16...	1 - 99 BLOCK OF K STR...	399,351.00	137,184.00	6	6C	FIRST	103	25			
192,102	16002575	1/5/2016 5:21:44 PM	EVENING	ROBBERY	OTHERS	2017-05-09T07:19:16...	2500 - 2999 BLOCK OF...	402,901.00	131,166.00	8	8B	SEVENTH	702	38			
192,100	16002552	1/5/2016 5:34:26 PM	EVENING	THEFT/OTHER	OTHERS	2017-05-09T07:19:16...	3100 - 3299 BLOCK OF...	397,162.00	140,182.00	1	1A	THIRD	302	2			
192,103	16002589	1/5/2016 5:49:39 PM	EVENING	THEFT/OTHER	OTHERS	2017-05-09T07:19:16...	7400 - 7599 BLOCK O...	397,704.00	145,832.00	4	4A	FOURTH	401	16			
192,101	16002569	1/5/2016 5:55:45 PM	EVENING	THEFT/OTHER	OTHERS	2017-05-09T07:19:16...	3600 - 3699 BLOCK OF...	400,770.00	140,681.00	5	5B	FIFTH	504	22			
192,105	16002606	1/5/2016 6:11:04 PM	EVENING	THEFT/OTHER	OTHERS	2017-05-09T07:19:16...	1200 - 1299 BLOCK OF...	401,081.00	137,345.00	5	5D	FIFTH	506	23			
192,106	16002632	1/5/2016 6:54:14 PM	EVENING	THEFT/OTHER	OTHERS	2017-05-09T07:19:16...	4000 - 4121 BLOCK OF...	404,541.00	136,535.00	7	7F	SIXTH	602	30			
192,104	16002599	1/5/2016 6:58:34 PM	EVENING	ROBBERY	GUN	2017-05-09T07:19:16...	1400 - 1499 BLOCK OF...	401,398.00	133,206.00	8	8A	SIXTH	607	34			

Data Source Crime_2016 Sheet 2 Sheet 3 Sheet 4

1.3. Now we are able to create a map in sheet 1. Under **Measures** on the left side, drag **Longitude** and **Latitude** to the fields of **Columns** and the **Rows** respectively. A map will now appear.

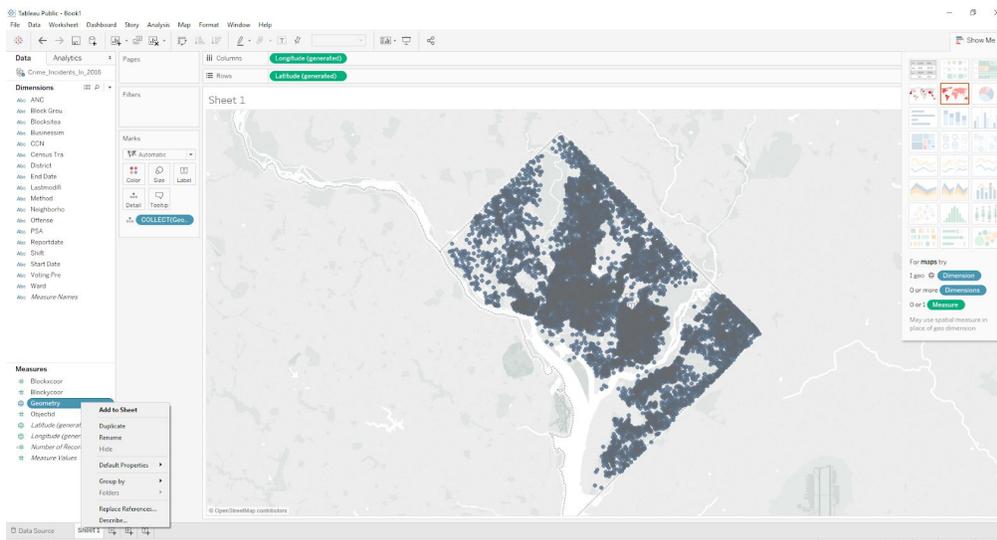


2. Points Map Creating in Tableau Public

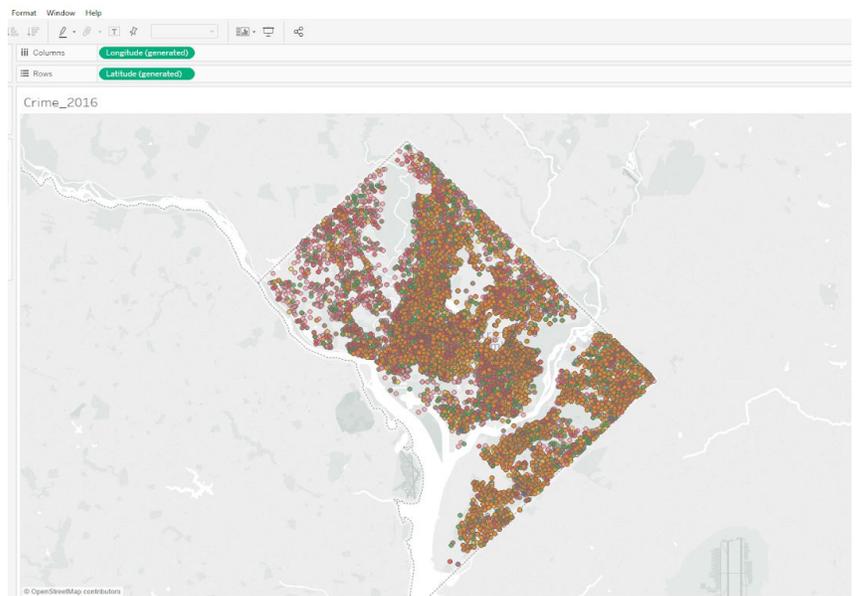
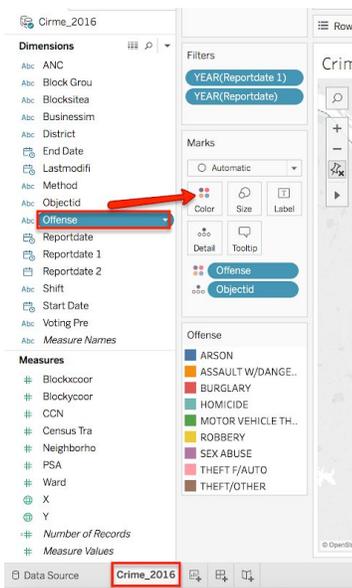
2.1 Under the Data (on left) > Crime_Incidents_in_2016 > (under that)

Measures, right click on **Geometry** and select Add to Sheet

2.2 Your map will zoom in to D.C. where the data points are, which can now be viewed as it would be in ArcMap

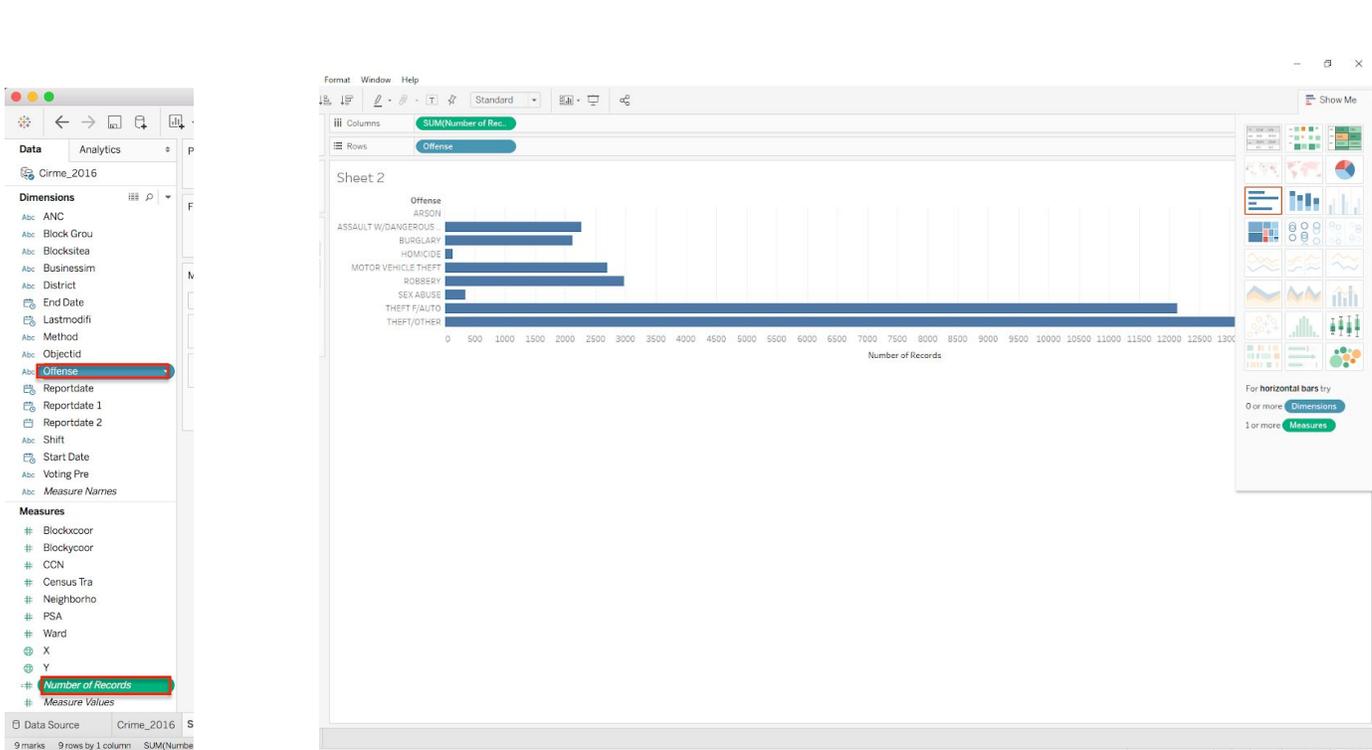


2.3 Now drag **Offense** from **Dimensions** to the **Color**. The different types of Crime incidents will be rendered to different colors. Then rename “Sheet 1” (on the bottom left side) to Crime_2016 by right clicking and selecting **rename**.

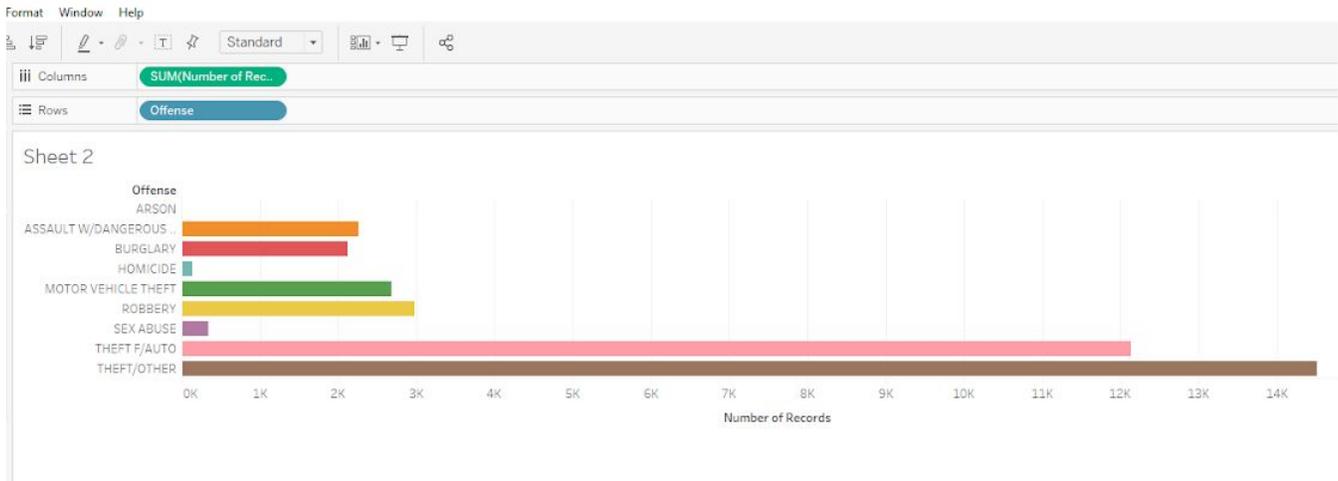


3. Bar Chart Creating

- 3.1 In the bottom of current window, on the right side of Data source, Click the New Worksheet icon,  which will generate a new Sheet, “Sheet 2”.
- 3.2 Now drag **Offense** from **Dimensions** to the **Rows** space, and drag **Number of Records** from **Measures** to the **Columns** space.



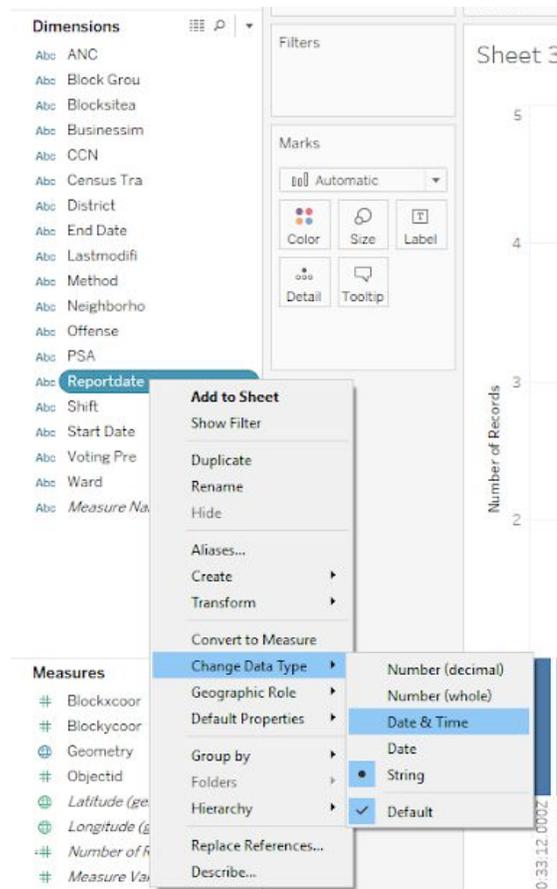
- 3.3 Now drag **Offense** from **Dimensions** to the **Color**. The different types of Crime incidents will be rendered to different colors. If you need to change it to descending order, select the Descending icon  on the toolbar. Now rename “Sheet 2” to Offense_Types.
- 3.4 This bar chart display the Quantitative relationship between the different offense types at Washington DC in 2016. The x axis of bar chart indicates Number of Crime incidents. The Y axis of bar chart indicates offense types.



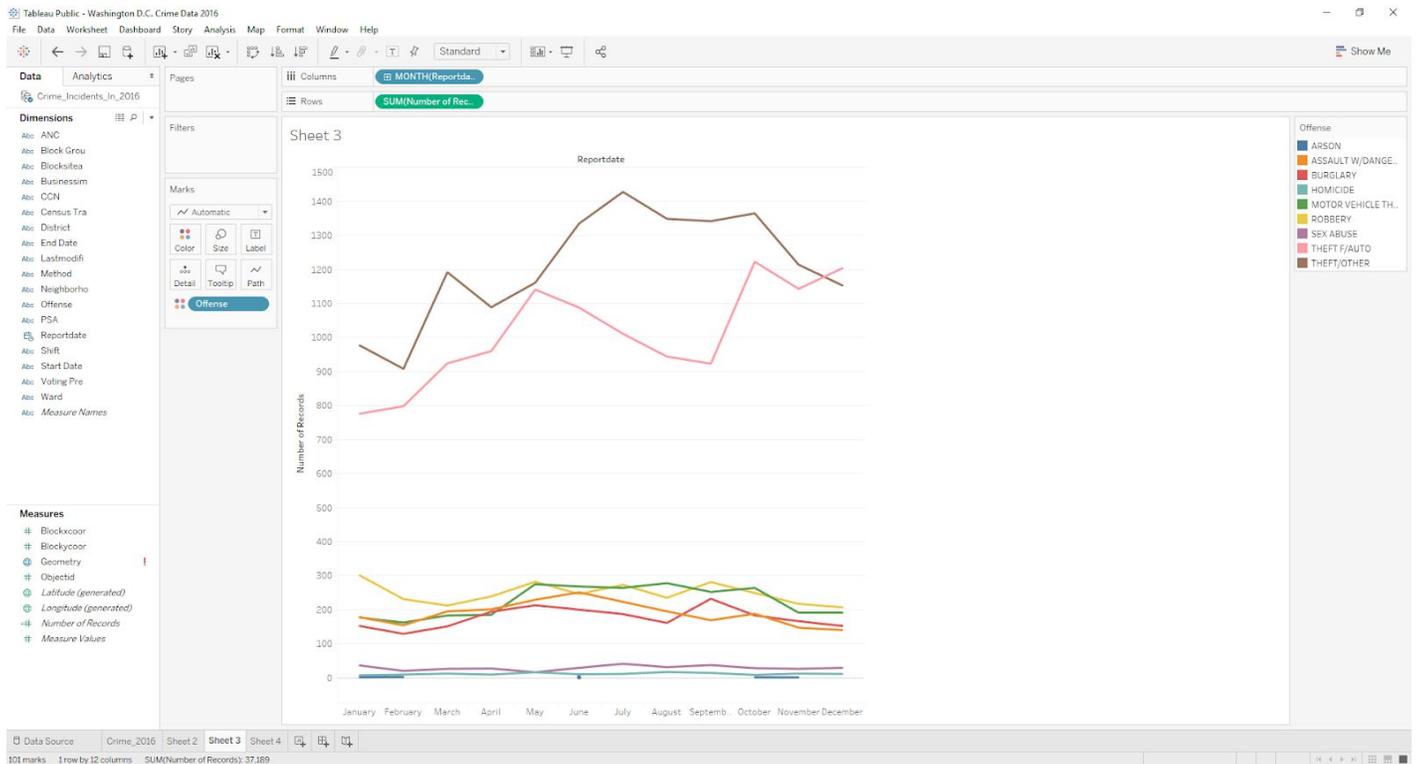
4. Line Chart Creating

4.1 In the bottom of current window, on the right side of Data source, Click the

New Worksheet icon  which will generate a new Sheet, “Sheet 3”. Now right click on **Reportdate** (under **Dimensions**) and **change the data type to date & time**.

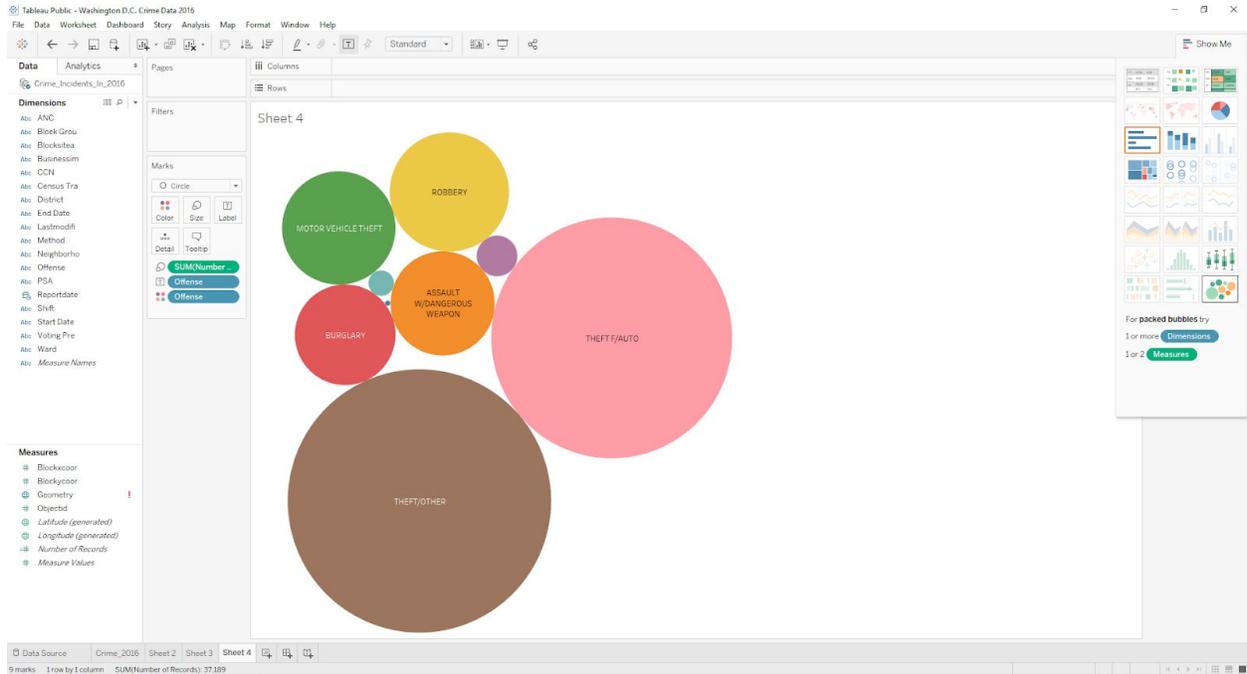


- 4.2 Now drag **Reportdate** from **Dimensions** to the **Columns**, and drag **Number of Records** to the **Rows**. Double-click the (**Reportdate**) you just dragged and replace 'year' with 'month' or right click Reportdate and click on Month.
- 4.3 Now drag **Offense** under **Dimensions**, to the **Color**. The different types of Crime incidents will be rendered to different colors.



5. Bubble Chart Creating

- 5.1 In the bottom of current window, on the right side of Data source, Click the **New Worksheet** icon which will generate a new Sheet, “**Sheet 4**”.
- 5.2 Now drag **Offense** from **Dimensions** to the **color**, and drag **Number of Records** to the **size**
- 5.3 Now drag **Offense** under **Dimensions** to **Label**. The different types of Crime Tools will be rendered to different colors. You can also use the Show Me tab on the right to select different types of visualizations like Packed Bubbles.

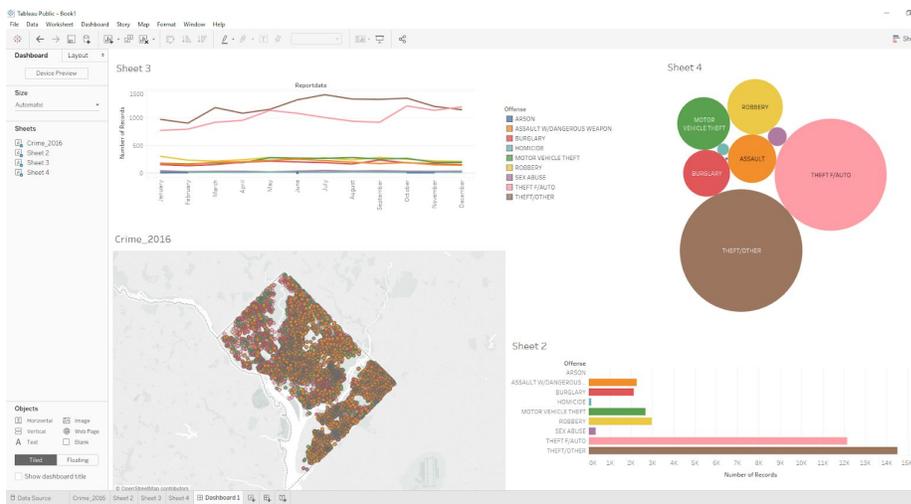


6. Data Dashboard Creating & Cross Filter Setting

6.1 Now we able to combine all charts into one dashboard. In the bottom of

current window, on the right side of Data source, Click the **New Dashboard** icon . A new empty dashboard will show up in the canvas. Now we can drop all sheets that we created before to the empty canvas, in the following Format.

6.2.. If you open a new dashboard and you want to change the size, click on **Size** on the left side under **Dashboard**. If you want to make your dashboard fit the screen then select Automatic.



Dashboard Layout

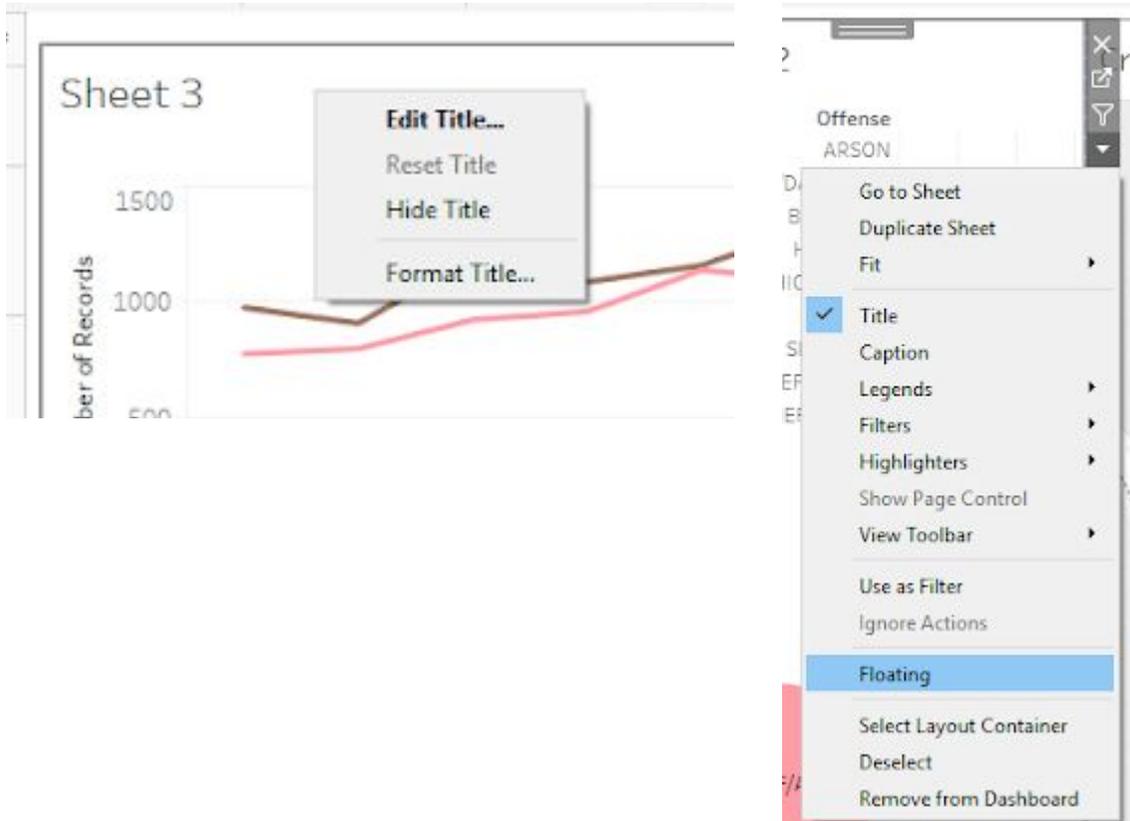
Device Preview

Size
Automatic

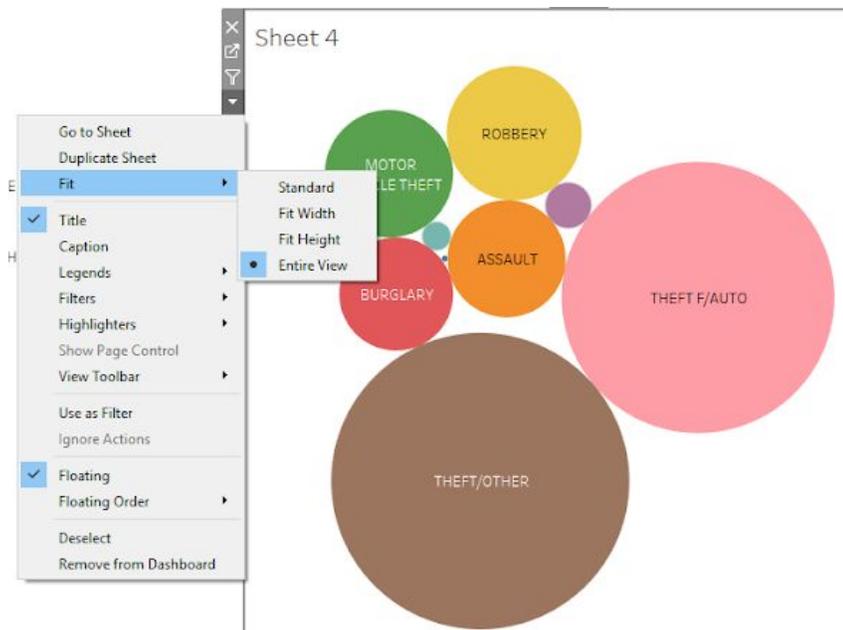
Sheets

- Crime_2016
- Sheet 2
- Sheet 3
- Sheet 4

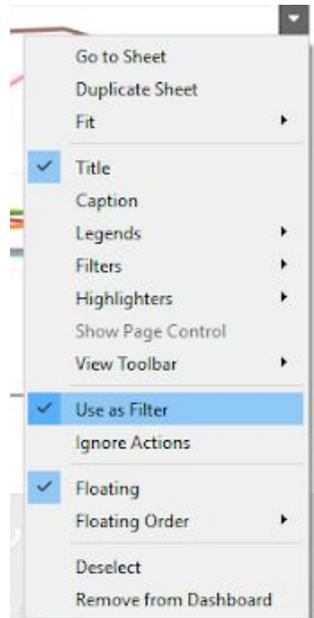
- 6.3. You can customize your dashboard layout by clicking the inverted triangle on the top window of any sheet and selecting **Floating**. Meanwhile, give a title for each sheet by right clicking in the white space close to “Sheet #” and select **Edit Title**(Check Show title).



- 6.4. Some charts might not display properly, and need to be modified to see the whole chart. Click the inverted triangle on the top window of any sheet and selecting **Fit > Entire View** to validate it.

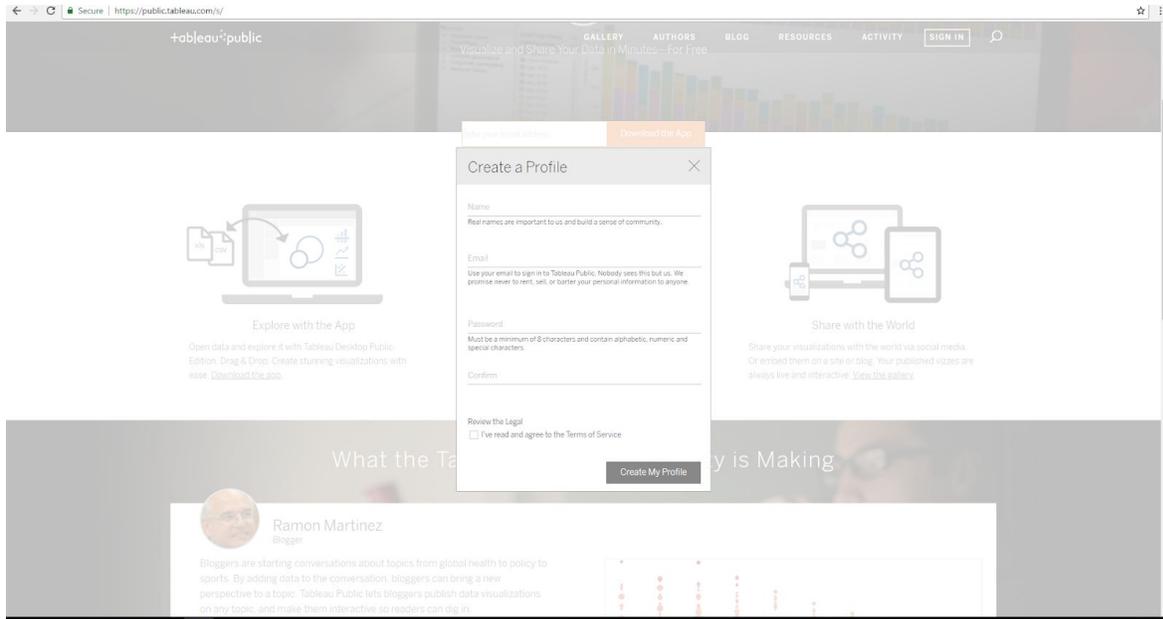


- 6.5. This crime data has multiple dimensions of attributes such as geographical location, timestamp, and Crime tools. So we can a setup a filter to look into these relationships between these different attributes in a dynamic way.
- 6.6. Now we have to look into the relationships between the offense types, Crime tools, and Month of the offense type. So we need to setup the line chart as the filter by clicking inverted triangle on the top window of any sheet and select **Use as Filter**. You also can set up other chart as filter, if you like.

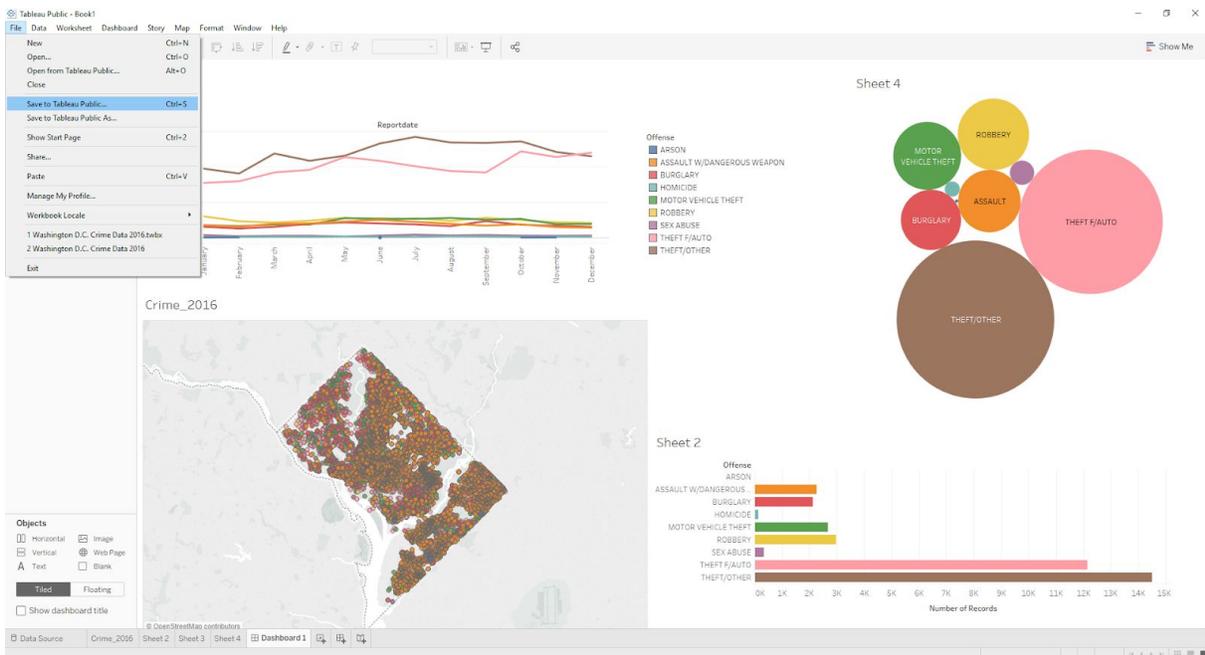


7. Dashboard Publishing

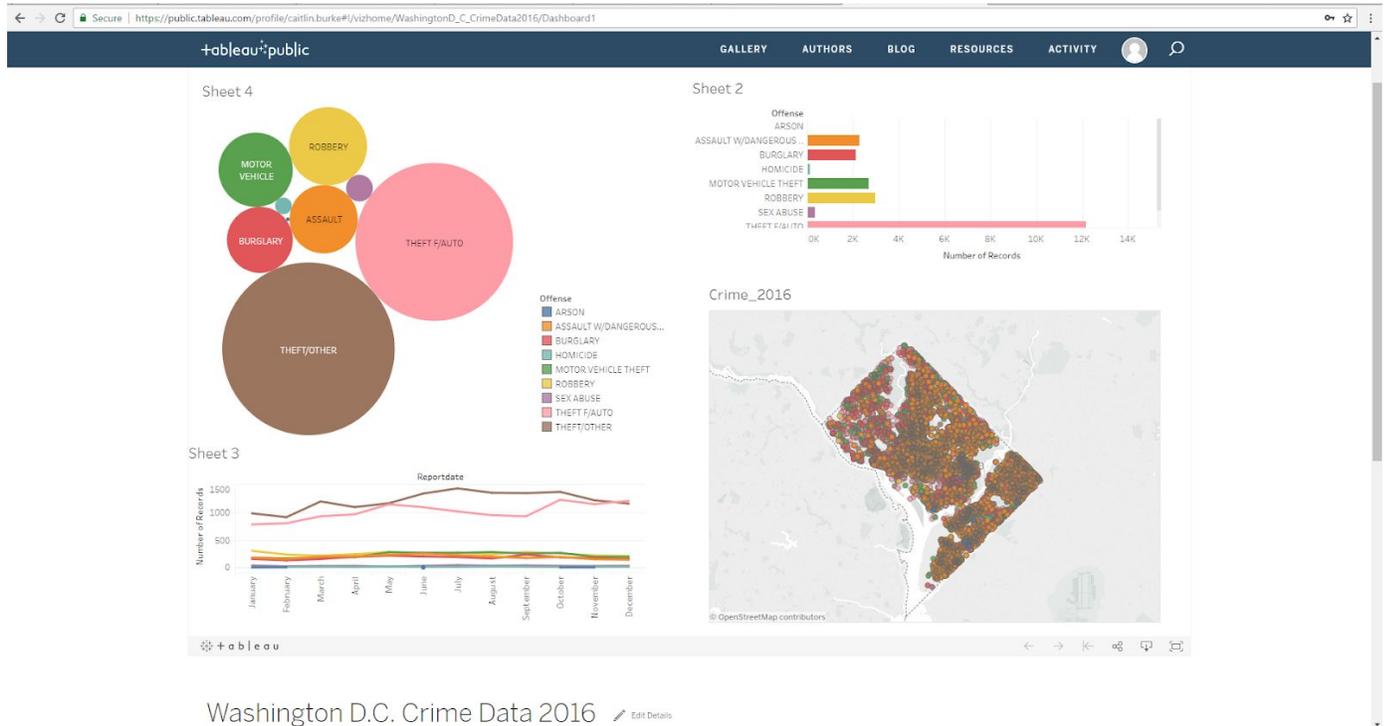
- 7.1 Now we have finished the entire data dashboard. The most import thing is to save and share it with other people. Unfortunately, Tableau public does not support saving the dashboard to your local path.
- 7.2. You have to save it on your Tableau public online account. You need to establish a Tableau Public online account by visiting <https://public.tableau.com/s/> and selecting sign in > Setup account and entering all required information (Before you sign in, check your Mailbox to verify your Email address).



7.3. Now we have everything we need to publish our dashboard. Select File > Save To Tableau Public. Then you need to log in with your account that was just created. Save it. Log in the Tableau Public Online to view and share it to other people. You also can embed it to your personal page.



7.4. Final published view.



Gephi Exercise

- **About Gephi**

Gephi is a tool for data analysts and scientists keen to explore and understand graphs. Like Photoshop™ but for graph data, the user interacts with the representation, manipulate the structures, shapes and colors to reveal hidden patterns. The goal is to help data analysts to make hypothesis, intuitively discover patterns, isolate structure singularities or faults during data sourcing. It is a complementary tool to traditional statistics, as visual thinking with interactive interfaces is now recognized to facilitate reasoning.

- **What do we intend to do with this exercise?**

We will be doing a network analysis to observe how funding agencies for research collaborate with each other.

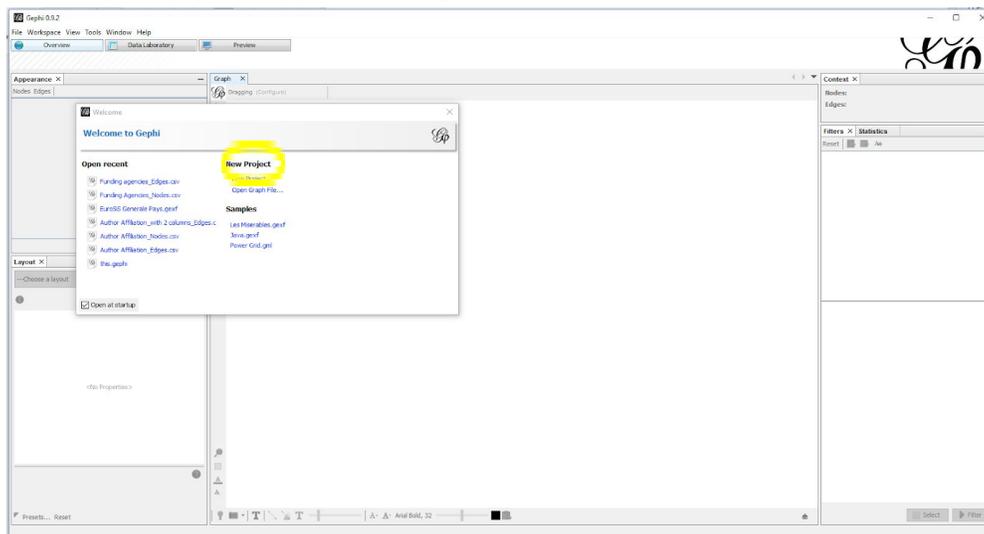
- **What you need for this exercise?**

You will need the sample Excel Document “Funding Agencies - Raw Data” OR you can use your own data.

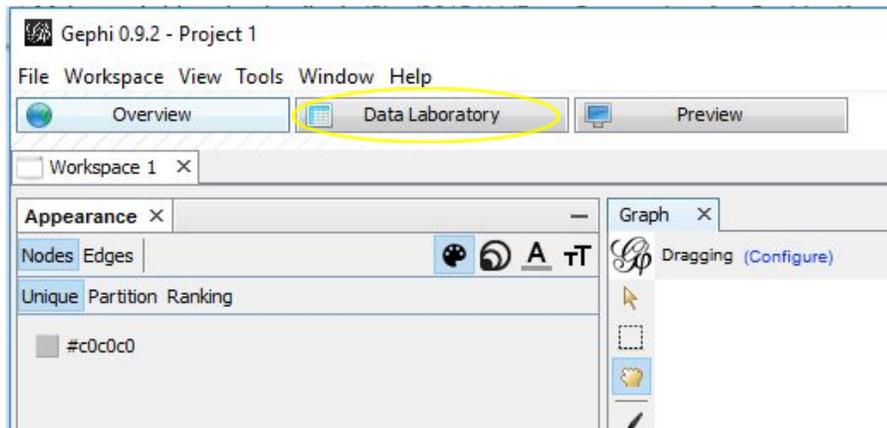
- **Importing the Nodes and Edges CSV Files to Gephi**

1. Importing the Nodes CSV File to Gephi

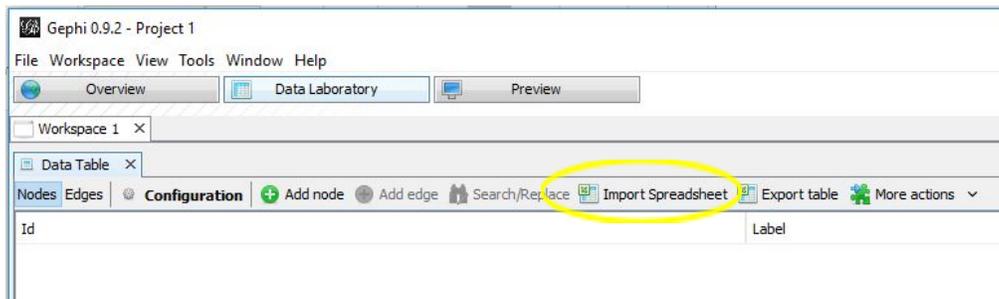
1.1 Open Gephi on your Desktop and click on “New Project”



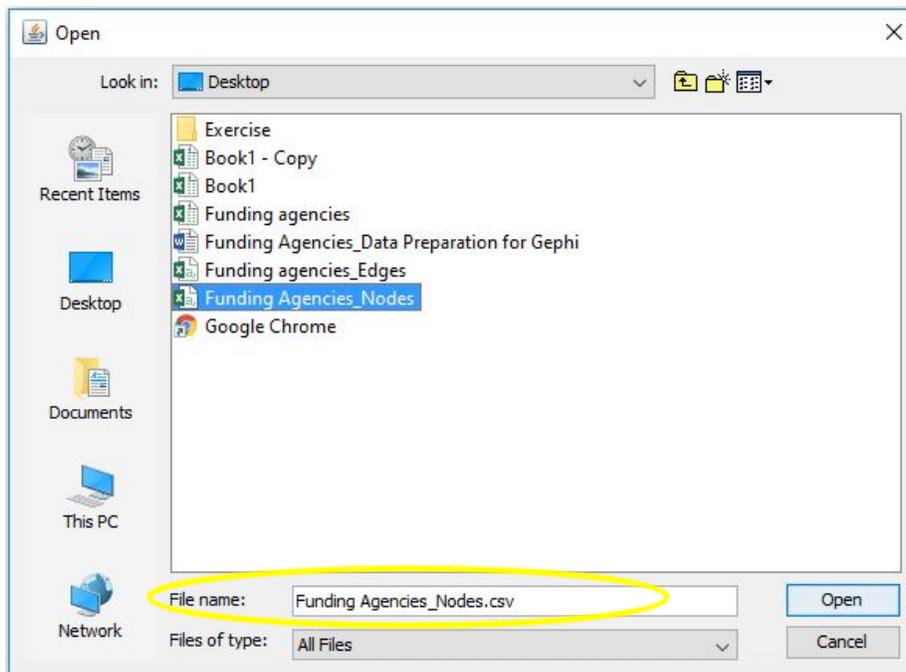
1.2. Click on **Data Laboratory**



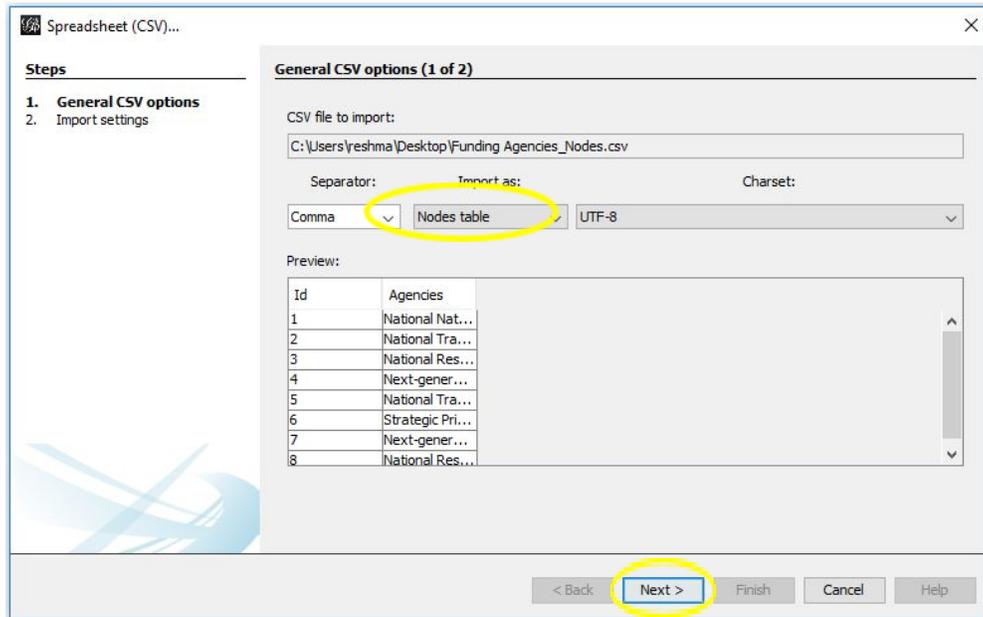
1.3. Click on **Import Spreadsheet**



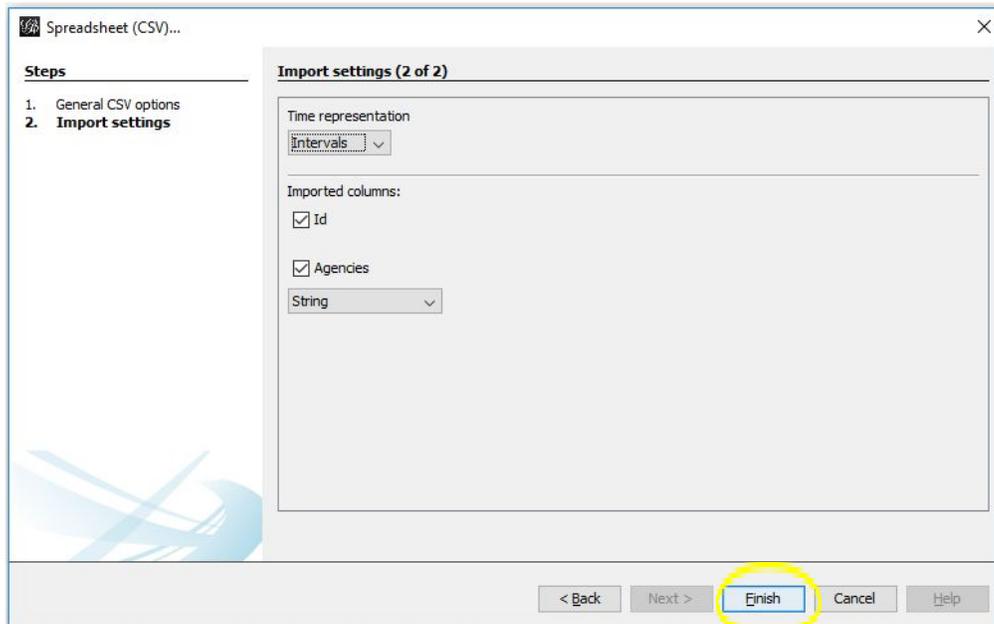
1.4. Open your Nodes CSV file



1.5. Make sure “Nodes Table” is selected under Import as: and click Next.



1.6. Click Finish



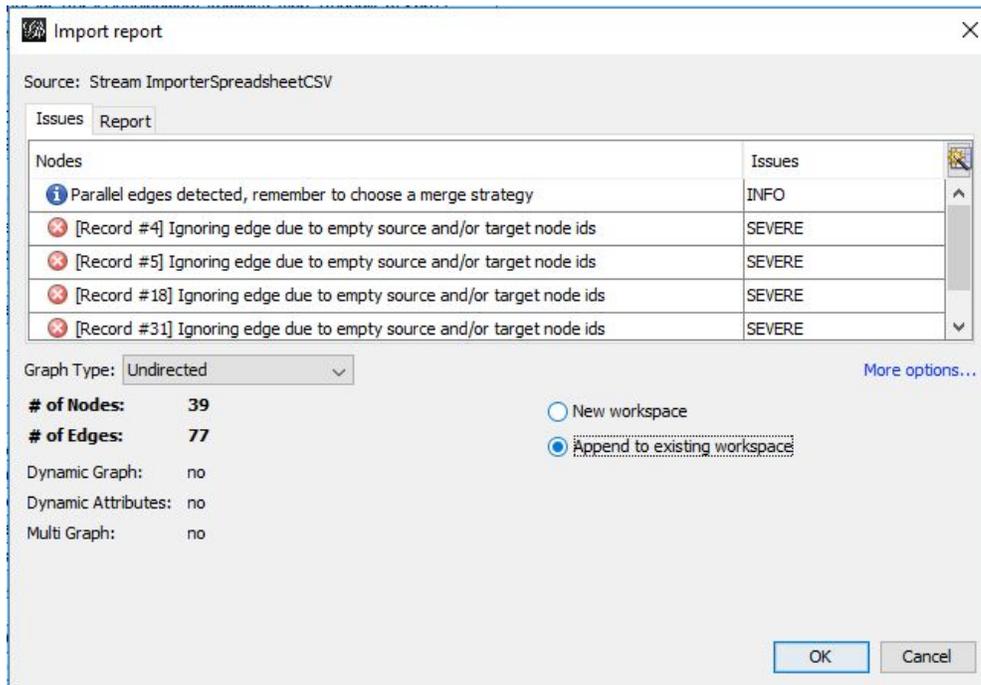
1.7. You'll see another Window pop-up which will prompt you to click on OK. You have now imported your Nodes CSV file onto the Gephi environment.

2. Importing the Edges CSV File to Gephi

- 2.1. To import the edges file, click on the Import Spreadsheet again and Open your Edges sheet. To open the edges table, click on the three dots next to the file name.

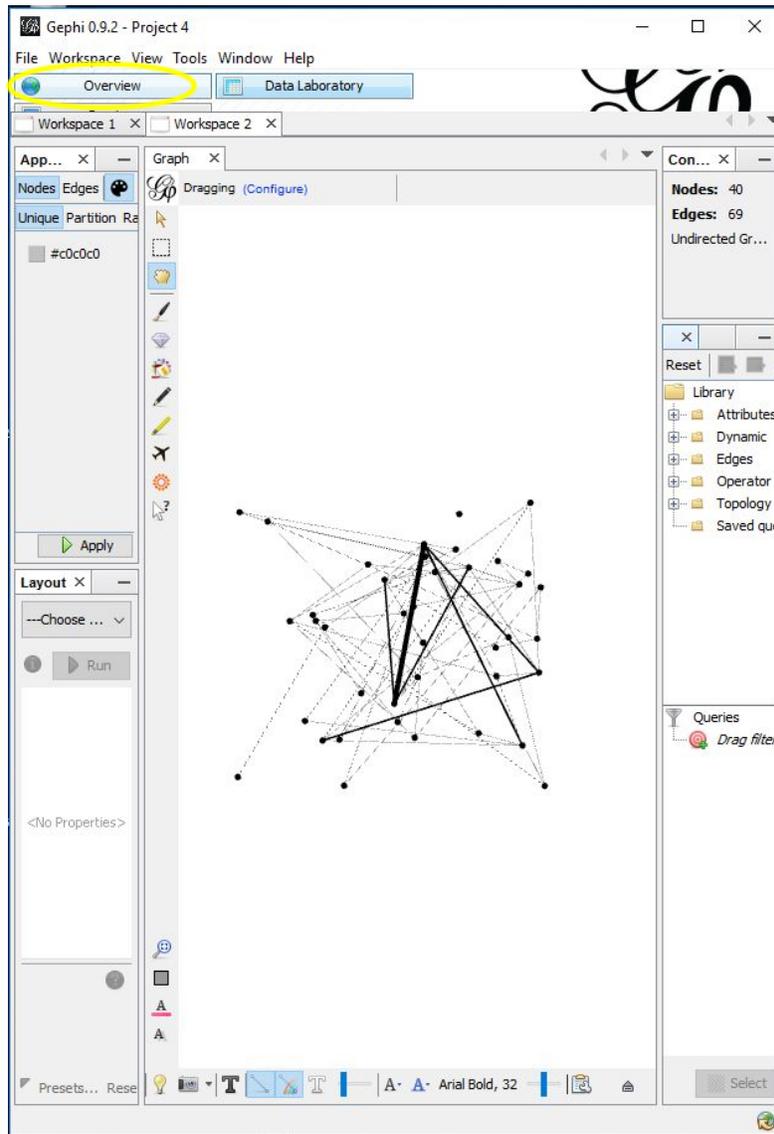


- 1.2. Make sure “Edges Table” is selected under Import as: and click Next.



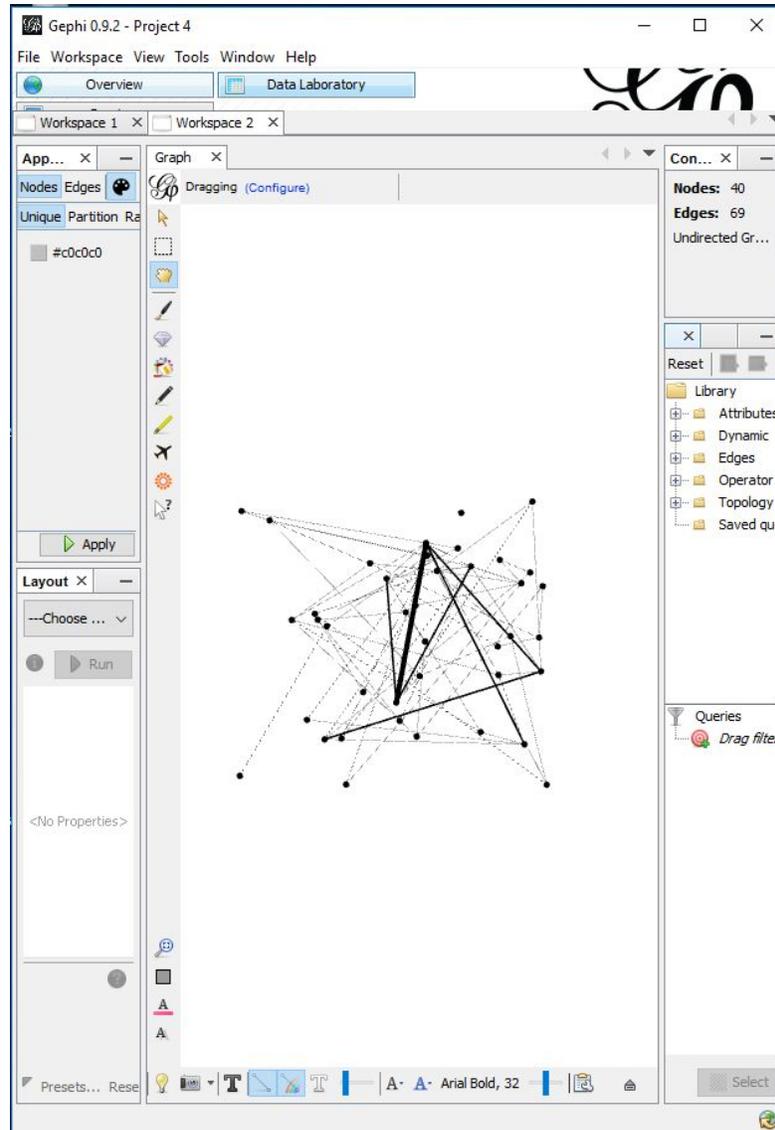
- 2.3. You’ll be prompted to click Finish.
- 2.4. Select the “**Append to existing workspace**”
- 2.5. Gephi will highlight issues which refer to the empty cells we have in our second column (under Target). But we know that the data is correct. So, go ahead and click OK.
- 2.6. You have now imported your Edges CSV file onto the Gephi environment.
- 2.7. Click on Overview and you should see your Graph.
- 2.8. This exercise was meant to demonstrate how to create and import

Nodes and Edges CSV files. We will learn Gephi functionalities to make meaningful graphs in the next section, where you can either use your own cleaned data from Web of Science or the sample data provided.

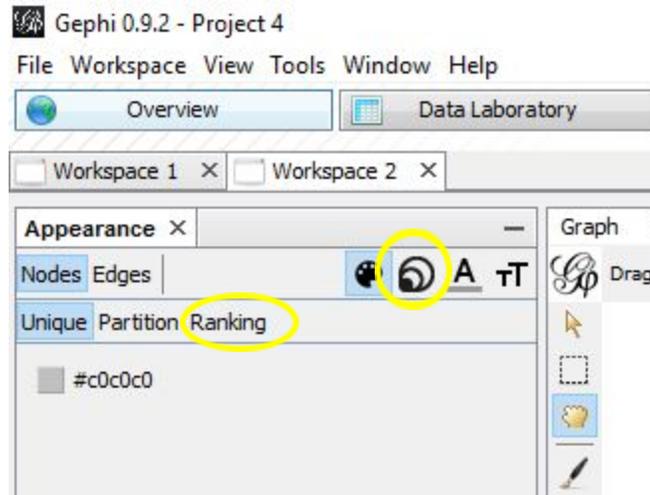


3. Making Graphs with Gephi

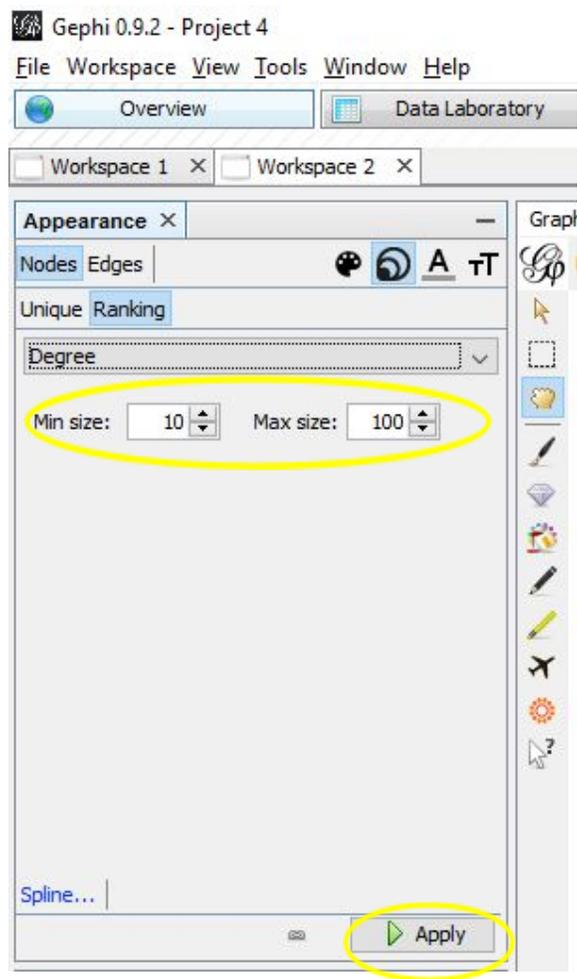
Once you import the files you should see a graph like the one below when you click overview.



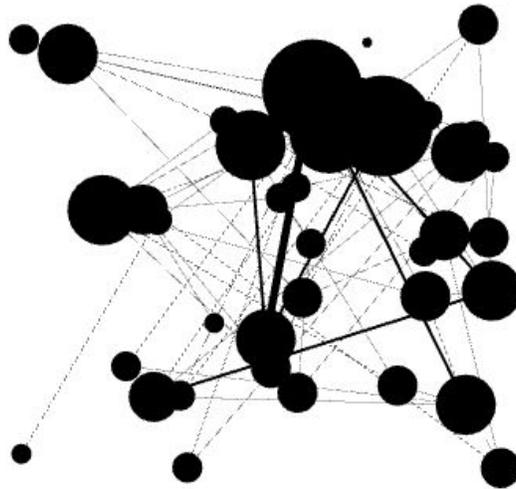
- 3.1. To change the size of the node based on how many studies the organization has funded, Click on the **Size**  option you see on the top left corner. Then click on **ranking**.



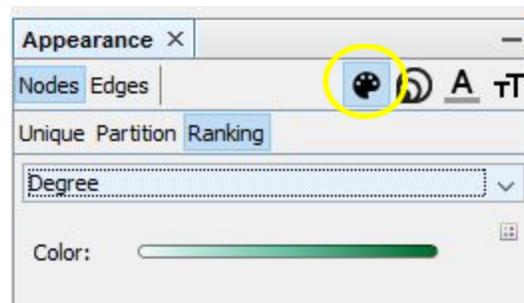
- 3.2. Under Choose an Attribute dropdown, select **Degree**.
- 3.3. Input 10 for Min size and 100 for Max size and click Apply



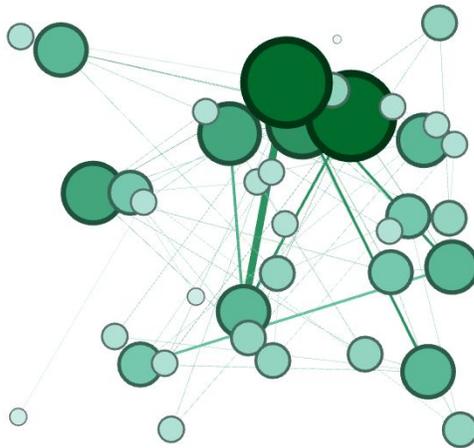
- 3.4. You will see the sizes of the nodes have changed.



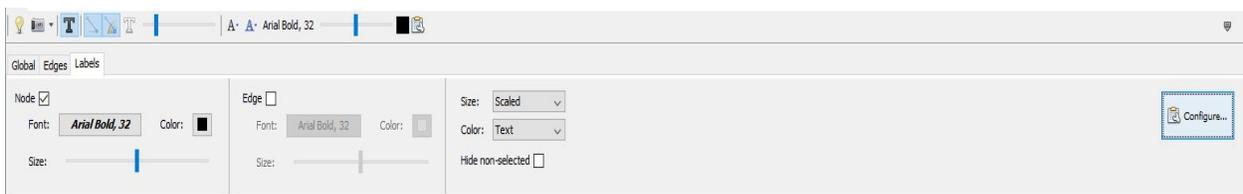
- 3.5. To further improve readability, let's use a color gradient. Click on the color  option you see on the top left corner. Then click on **ranking**. Under **Choose an Attribute dropdown**, select **Degree**. You can change the color gradient by clicking on . Click apply once you are done finalizing the color.



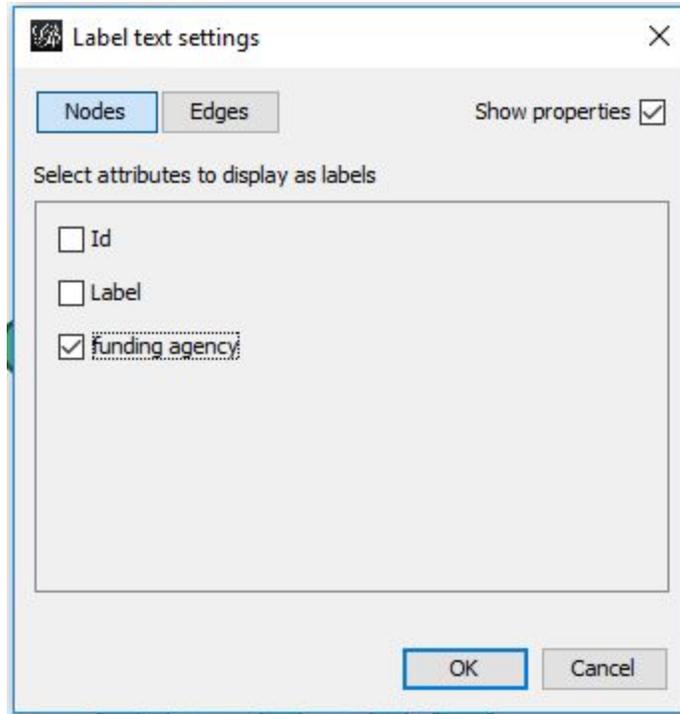
- 3.6. You should see your graph as below. The more frequently an entry appears the darker it is.



- 3.7. To label the nodes. Click on  you see at the bottom right corner.
- 3.8. Click on **Labels** and check **Node**.



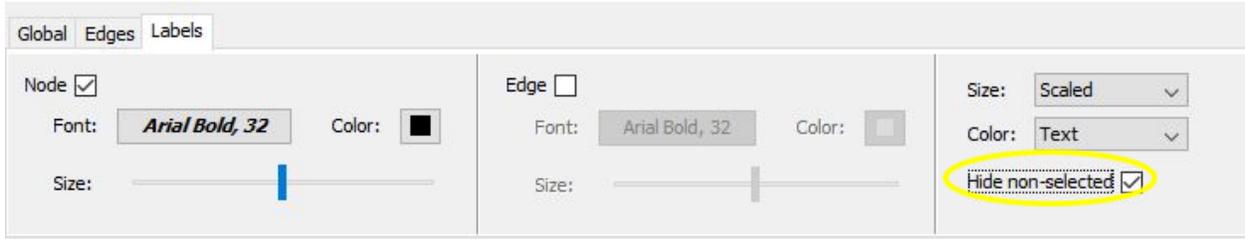
- 3.9. Click on **Configure**, Bottom, right corner, and select funding agency under nodes and click OK.



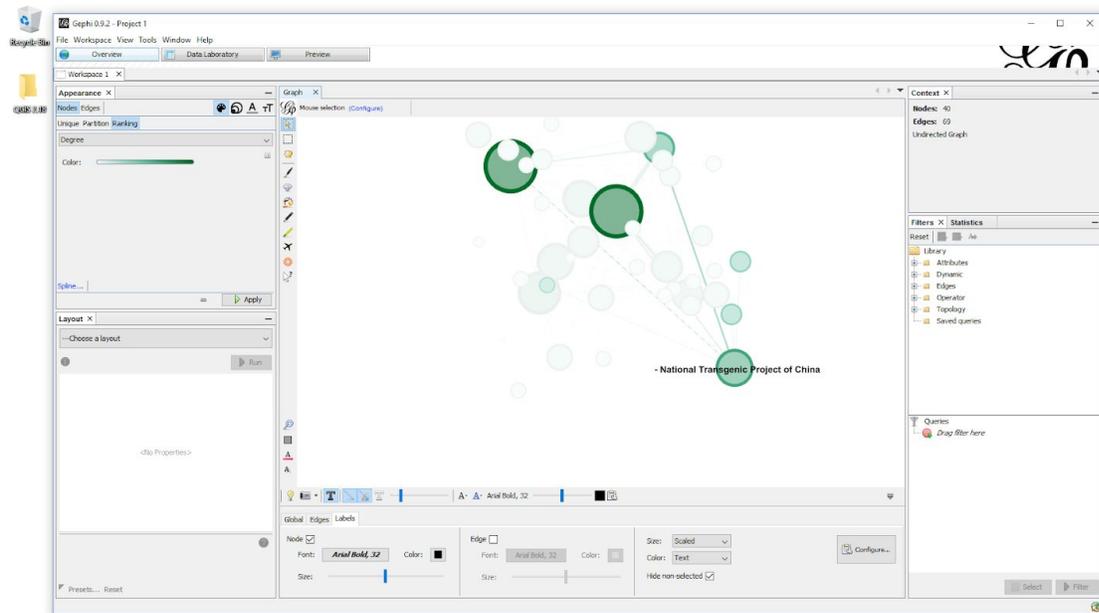
3.10. You will see that the names appear.



3.11. Check on **Hide non-selected**.



3.12. With this we will be able to see the name of only the highlighted node (when you hover arrow over a node).



Plot.ly Exercise

- **What is Plot.ly?**

Plot.ly is an open source graphing tool for composing, editing, and sharing interactive data visualization via the Web. Their services make it useful for scientists to showcase their work, make graphs without coding, and collaborate with business analysts, designers, executives, and clients.

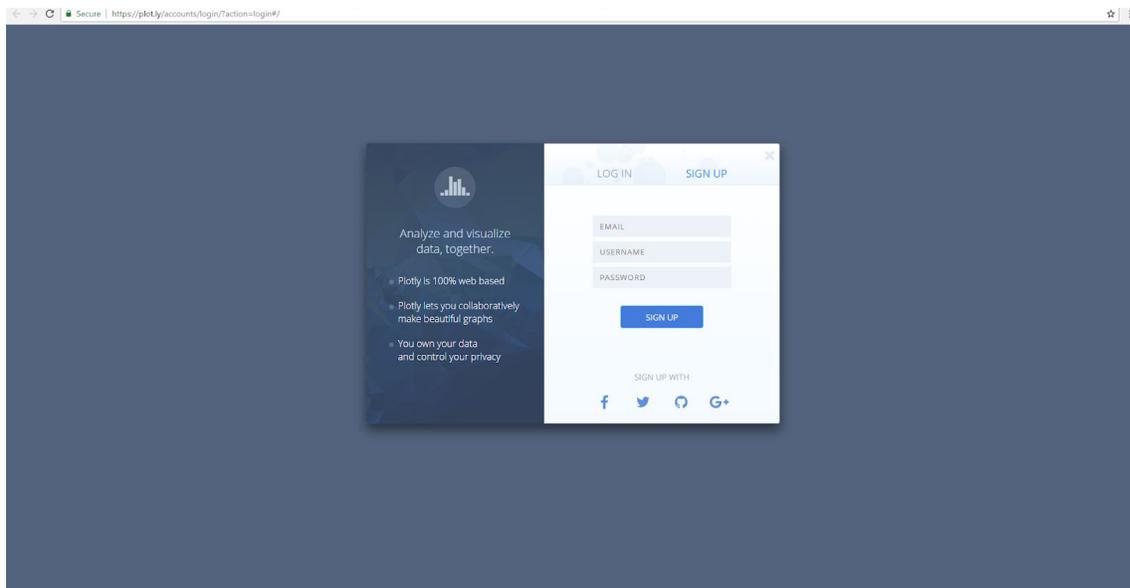
It allows you to import data from any format and upload files from your computer or copy-paste, drag and drop a file, or import from Google Drive and Dropbox. You can apply any custom function, including integrals or descriptive basic statistics. Plot.ly has many graphs to choose from, such as scatter, line, bar, area, error bar, heatmap, box, and histogram. Once your graphs are finished, you can share and edit them with coworkers or to the world.

- **Tasks in this exercise:**

1. Account Setup
2. Creating a Chart
3. Creating a Heat map
4. Changing Colors

1. Account Setup

- 1.1 Go to <https://plot.ly/accounts/login/?action=login#/> and sign up for a free account.

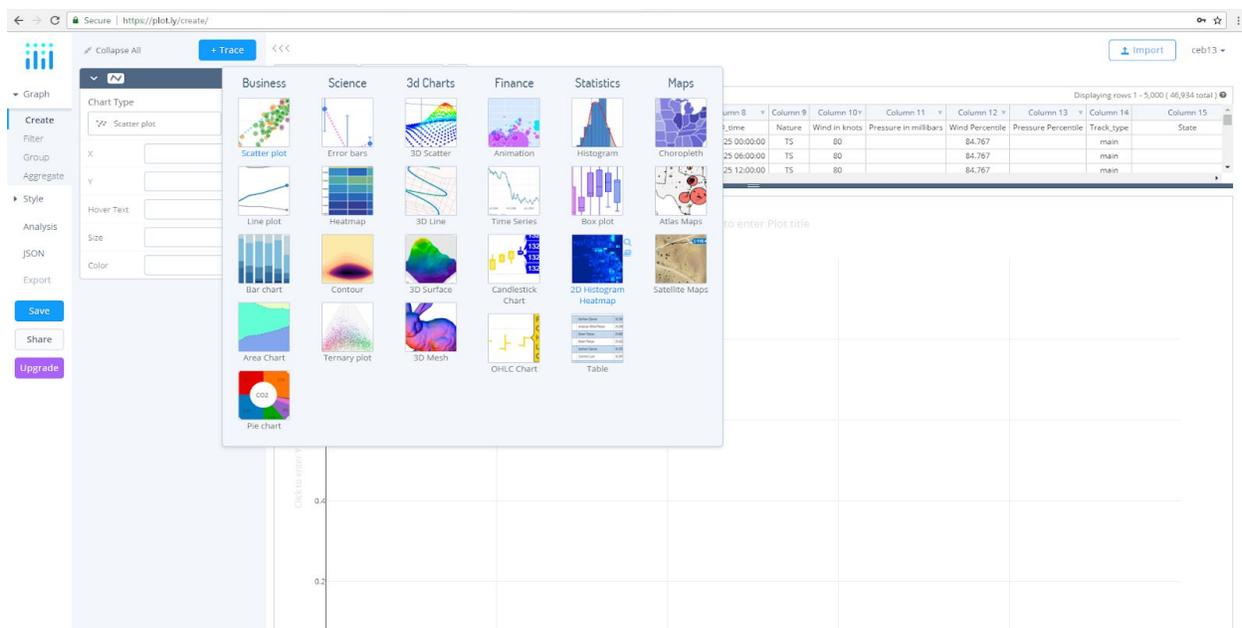


2. Creating a chart

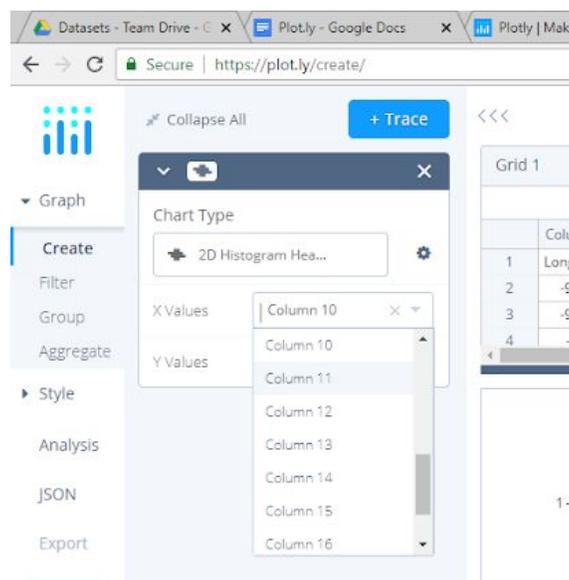
- 2.1. Once logged in, click the “**Create**” button in the upper right corner and select “**Chart**”
- 2.2. Now click the “**Import**” button in the upper right corner, and upload the “hurricane_tracts.xlsx” data that you just downloaded.

3. Creating a Heat map

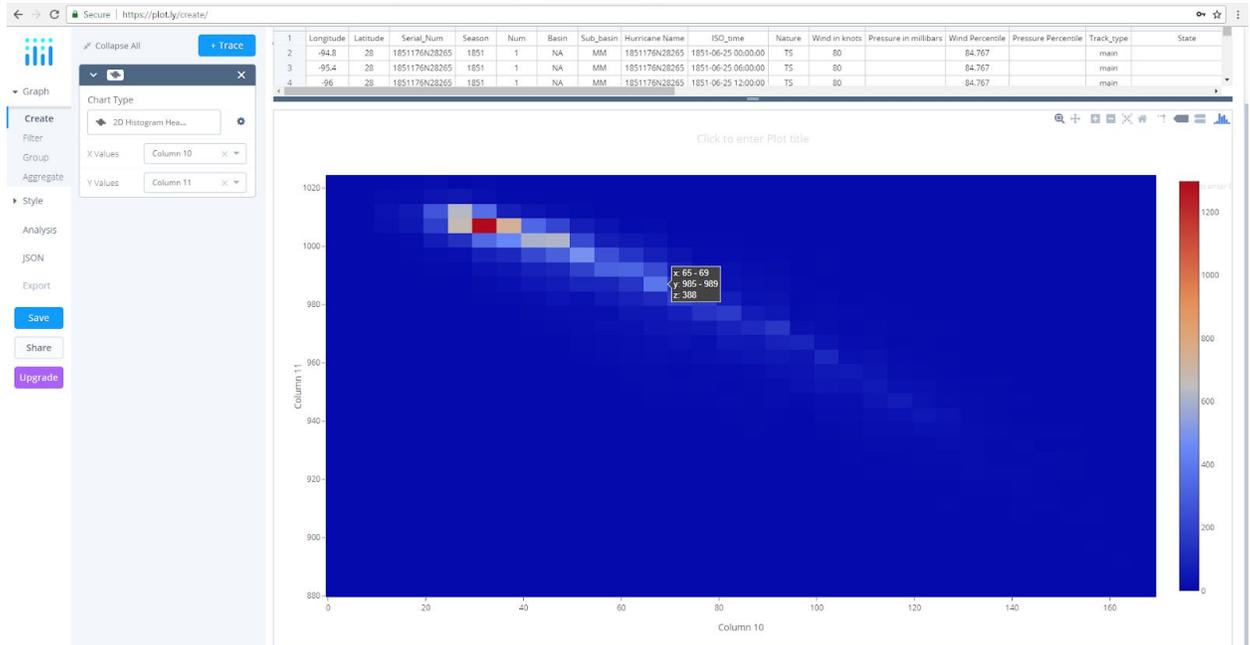
- 3.1. Click where it says “**Scatter Plot**” under **Chart Type** in the left box, and select “**2D Histogram Heatmap**” from the popup.



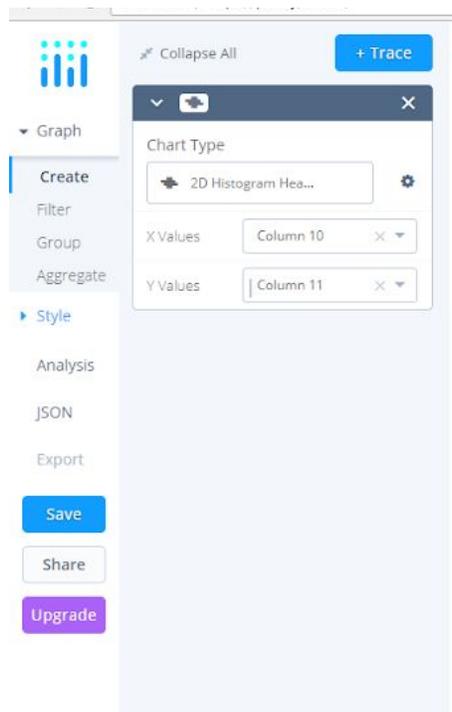
- 3.2. In the same box, change the **x-values** to “Wind in Knots” (Column 10) and the **y-values** to “Pressure in Millibars” (Column 11.)



3.3. This will create an interactive heat map. Move your mouse around the map to see the differing values for each pixel. This is what plot.ly does, it makes standard graphs interactive.

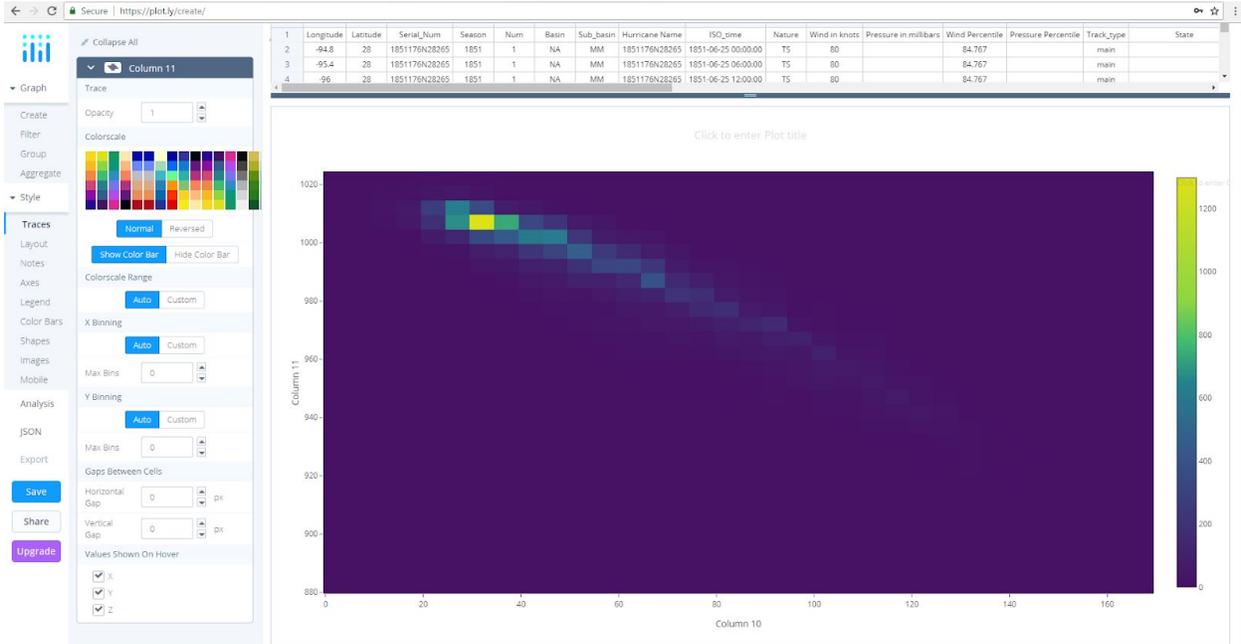


3.4. Next click the “**Style**” tab on the left hand side of the screen and under that select “**traces**”.



4. Changing colors

- 4.1. Under **Colorscale**, select different color combinations to change the colors used in your graph.



RAW Exercise

- **What is RAW**

Raw is an open source data visualization framework to visual represent of complex data to the public. Raw graphs provide a missing link between spreadsheet applications and Vector graphics editors.

You can pick a model, use your data, map your dimensions and then customize your visualization so you are ready.

- **Tasks in this exercise:**

1. Opening .xlsx file
2. Selecting a chart
3. Exporting the Diagram

1. Opening .xlsx. File

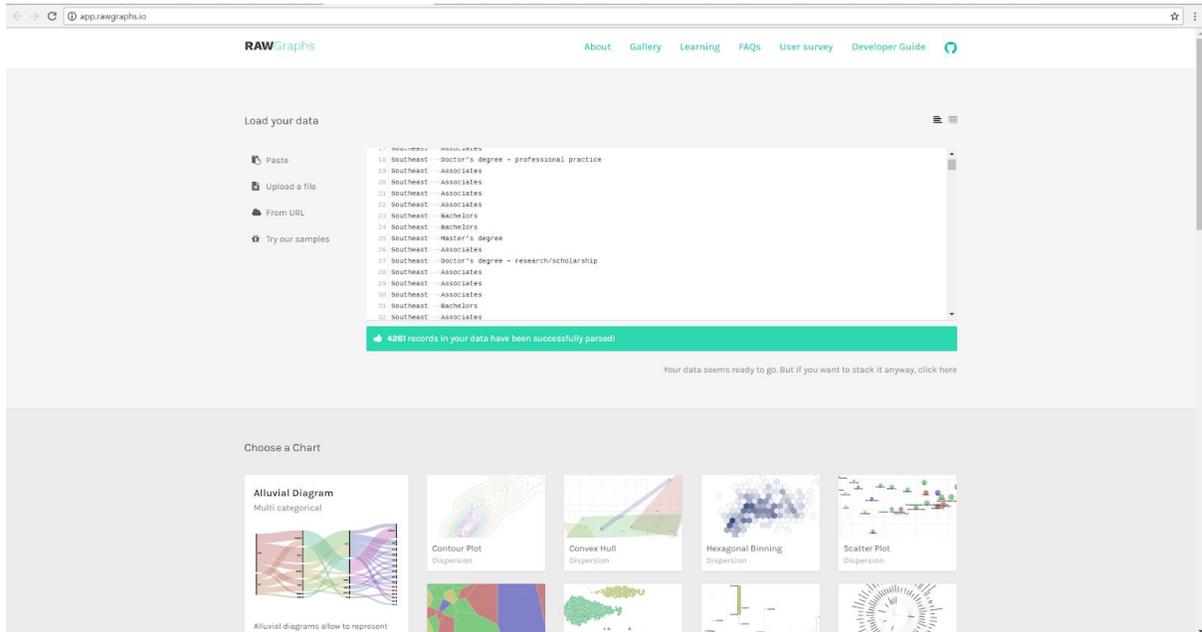
1.1. Open the “ALS_data.xlsx” file you have just downloaded.

1.2. Navigate to: <http://app.rawgraphs.io/>

1.3. Select and copy both the “OBE_REGION” and “HDEGOFR1” columns

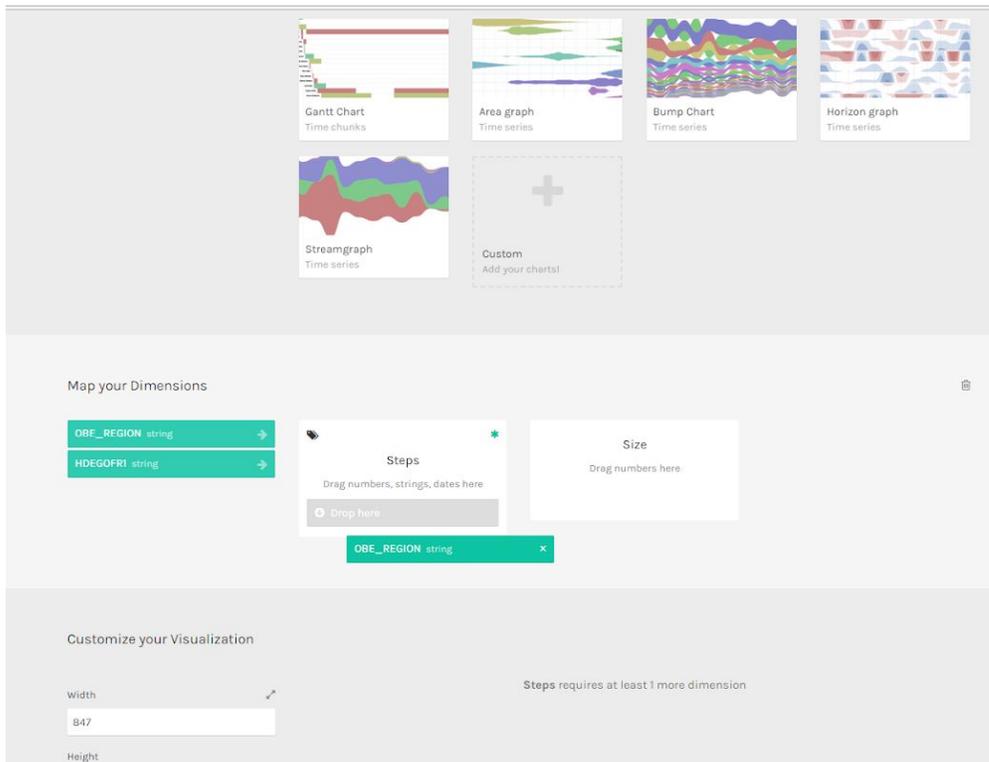
INSTNM	CITY	State	ZIP	Congressional District	OBE_REGION	HDEGOFR1	PCT_BLACK	PCT_AMER_INDIAN	PCT_ASIAN_IC	PCT_HISPANIC	CCBASIC_2005	LOCALE	FTEUSED	NUM_BRANCHES	STAFF_LIBRARIANS
Alabama A & Normal		AL	35762	05	SE	Doctor's deg	92	0	0	0	0	Master's Coll City: Midsize	4495	1	
University of Birmingham		AL	35294	07	SE	Doctor's deg	22	0	5	2	Research Uni City: Midsize	13927	2		
Amridge Univ Montgomery		AL	36117	03	SE	Doctor's deg	25	0	0	2	Baccalaureat City: Midsize	533	0		
University of Huntsville		AL	35899	05	SE	Doctor's deg	13	2	4	2	Research Uni City: Midsize	6011	0		
Alabama Stat Montgomery		AL	36104	03	SE	Doctor's deg	94	0	0	1	Master's Coll City: Midsize	4915	0		
The Universi	Tuscaloosa	AL	35487	07	SE	Doctor's deg	12	1	1	2	Research Uni City: Small	28965	9		
Central Alaba	Alexander Cit	AL	35010	03	SE	Associates	30	0	0	0	Associate's - Rural: Fringe	1816	1		
Athens State	Athens	AL	35611	05	SE	Bachelors	12	2	1	1	Baccalaureat Town: Distan	2273	0		
Auburn Univ	Montgomery	AL	36117	03	SE	Master's deg	30	0	3	2	Master's Coll City: Midsize	4061	0		
Auburn Univ	Auburn	AL	36819	03	SE	Doctor's deg	8	1	2	3	Research Uni City: Small	22875	2		
Birmingham	Birmingham	AL	35254	07	SE	Bachelors	8	1	5	3	Baccalaureat City: Midsize	1299	0	5	
Chattahooch	Phenix City	AL	36869	03	SE	Associates	42	1	1	4	Associate's - Suburb: Mids	1197	0	1	
Concordia Co	Selma	AL	36701	07	SE	Bachelors	96	0	0	0	Baccalaureat Town: Remot	665	0		
South Univ	Montgomery	AL	36116	02	SE	Master's deg	69	0	1	2	Baccalaureat City: Midsize	535	0		
Enterprise St	Enterprise	AL	36330	02	SE	Associates	21	1	2	3	Associate's - Town: Distan	2083	2		
James H Faul	Bay Minette	AL	36507	01	SE	Associates	21	2	1	2	Associate's - Town: Distan	3130	0	1	
Faulkner Univ	Montgomery	AL	36109	02	SE	Doctor's deg	46	1	1	1	Baccalaureat City: Midsize	2947	1		
Gadsden Stat	Gadsden	AL	35903	04	SE	Associates	22	0	1	3	Associate's - City: Small	4868	4	6	
George C Wa	Dothan	AL	36303	02	SE	Associates	33	0	1	1	Associate's - City: Small	3399	1	3	
George C Wa	Hanceville	AL	35077	04	SE	Associates	5	1	0	2	Associate's - Rural: Fringe	4091	0		
George C Wa	Selma	AL	36703	07	SE	Associates	76	0	1	1	Associate's - Rural: Fringe	1564	0		
Herzing Univ	Birmingham	AL	35209	07	SE	Bachelors	61	0	0	1	Baccalaureat Suburb: Large	244	0	0	
Huntingdon C	Montgomery	AL	36106	02	SE	Bachelors	17	0	1	2	Baccalaureat City: Midsize	978	0	3	

1.4. Paste these columns into the data box on the RAW webpage.

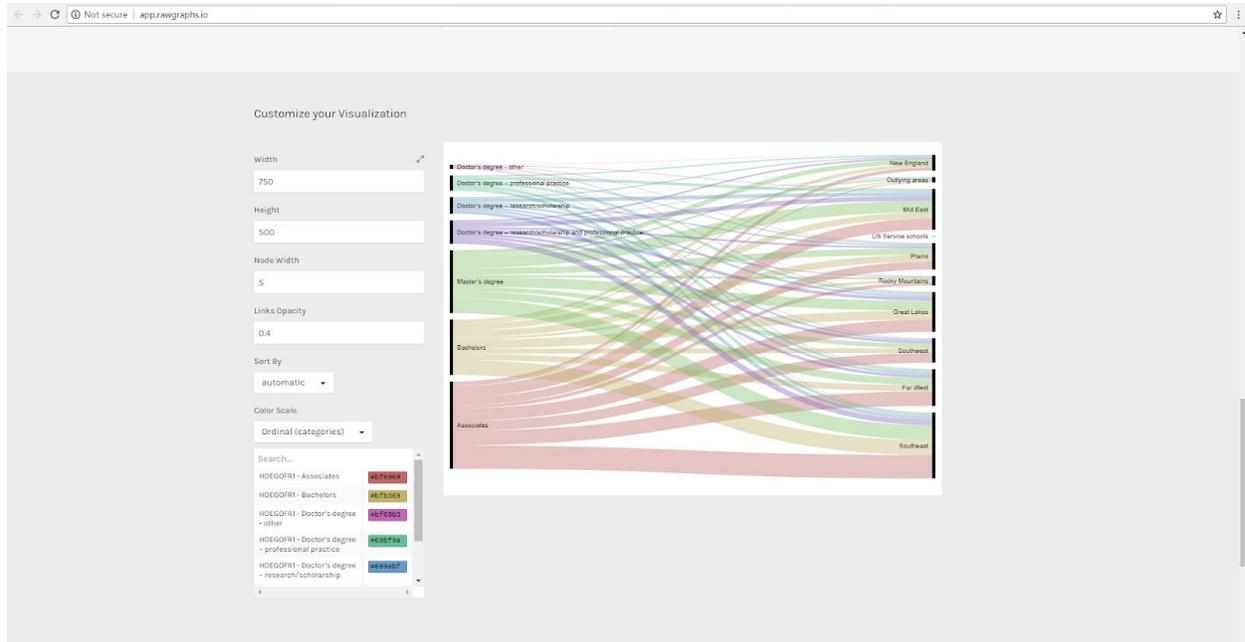


2. Selecting a chart

- 2.1. After the data has loaded, scroll down on the web page to the “**Choose a Chart**” section and select **Alluvial Diagram**
- 2.2. Now scroll down to the “**Map your Dimensions**” section and drag both the OBE_REGION and HDEGOFR1 strings/dimintions to the box labeled **Steps**.

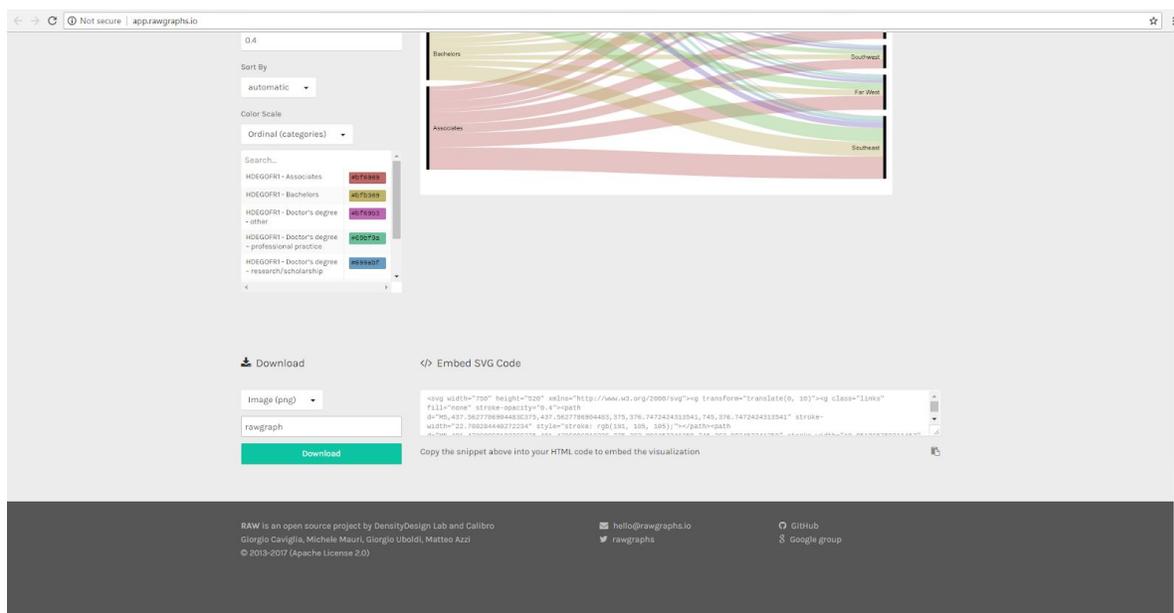


- 2.3. Scroll down to **Customize your Visualization**, and right below it change the width to 750 and Sort by to Automatic.
- 2.4. Your Alluvial Diagram has now been created.



3. Exporting the Diagram

- 3.1. To export this diagram, scroll down to “Download”
 - a. Select PNG as the image type and give the file a name.
 - b. Click Download



Carto Exercise

What is Carto?

Carto is an open source software platform that provides GIS applications and web mapping tools to display in a web browser. You do not need to have GIS or developmental experience because the company runs on a basis for creating tools for data analysis and data visualization for people with little to no experience. It uses JavaScript intensely.

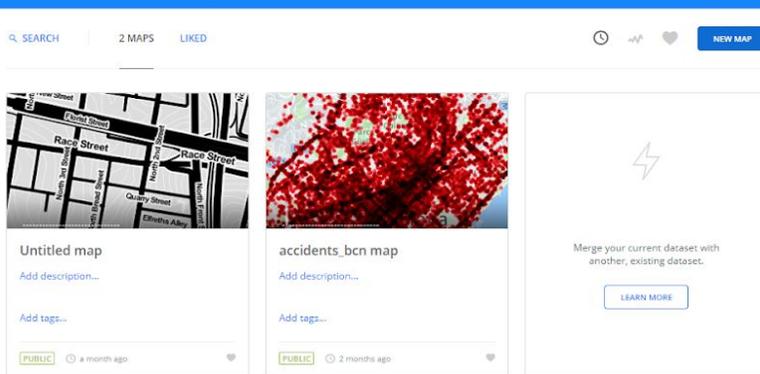
Many organizations, groups, and companies use Carto, such as Nokia, Wall Street Journal, Twitter, and NBC.

- **Tasks in this exercise:**

1. Account Setup
2. Connecting data set
3. Creating a Filter
4. Creating a Time Series Map

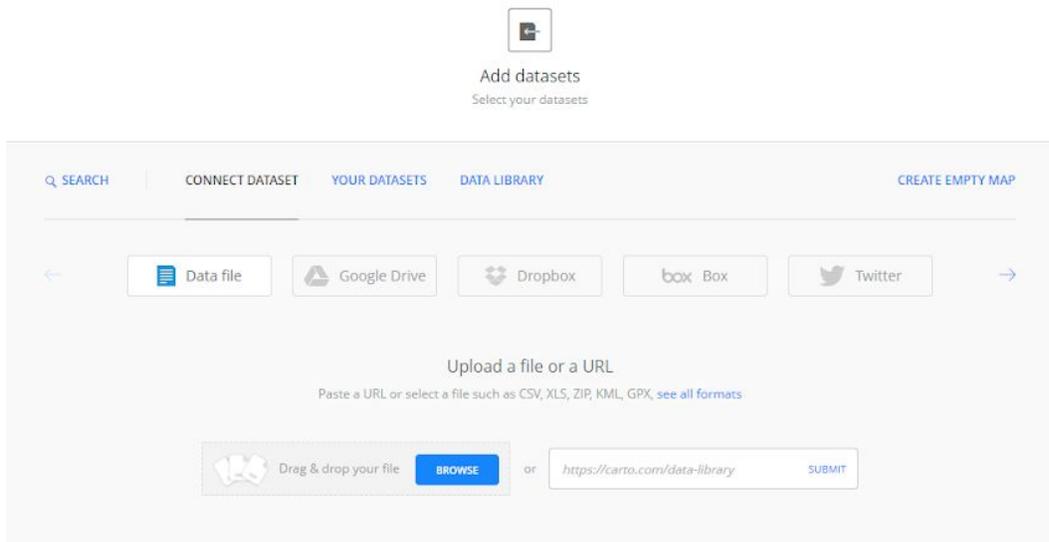
1. Account Setup

- 1.1 Navigate to: <https://github.com/join?source=header-home> and create a github account.
- 1.2. Once you have created an account, navigate to: <https://carto.com/students-access/> and click where it says “Sign up with Github”. This will allow you to access the student version of Carto.
 - a. Enter your GitHub credentials
- 1.3. Once logged in to Carto, select “**New Map**” on the top right

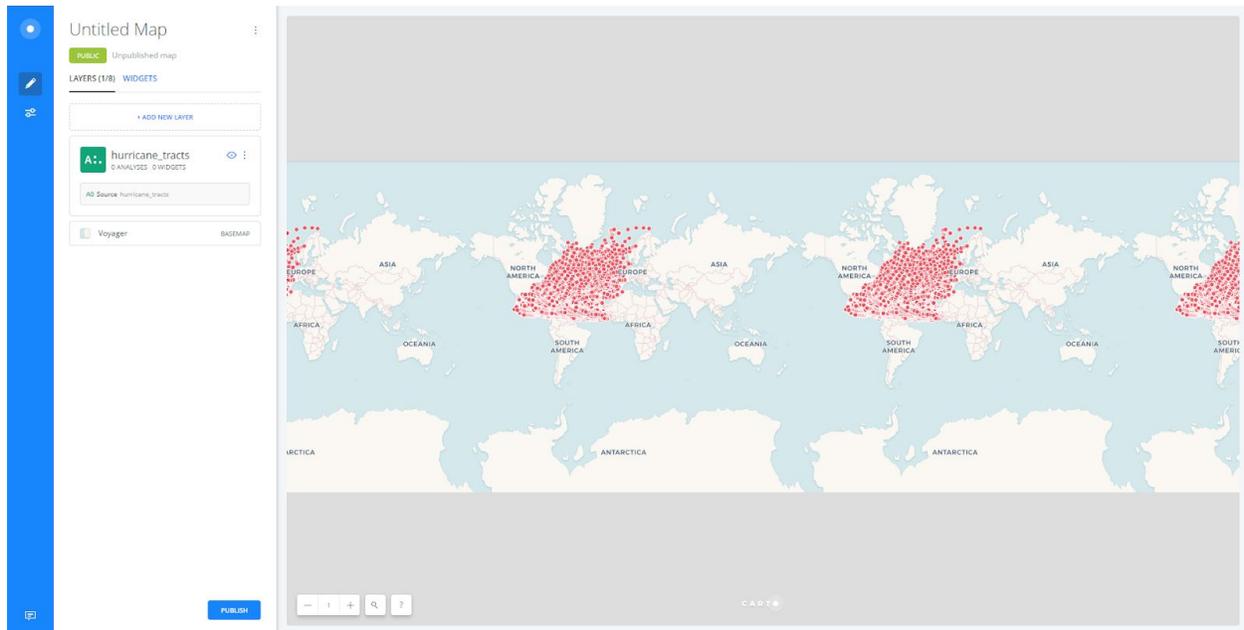


2. Connecting data set

- 2.1. Make sure you are brought to **Add datasets window** and click on **Connect Dataset**, and then click on the blue **Browse** button.

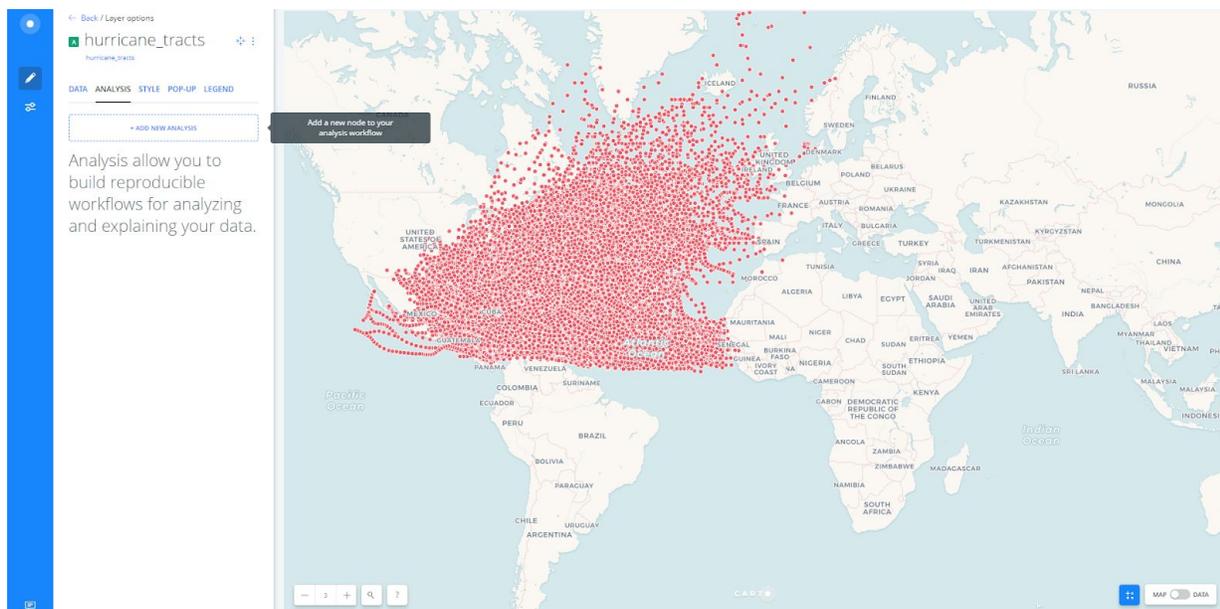


- 2.2. Browse through your files and upload the “hurrican_tracts.xlsx” file.
 - a. Connect the dataset
- 2.3. Once the dataset has loaded, you will be brought to your map.



3. Creating a Filter:

- 3.1 Click on the “Hurricane Tracts” layer that is on the left.
- 3.2 Click on the “Analysis” page that is right between Data and Style on the left.
- 3.3. Click to “Add new analysis”



- 3.4. Select, **Filter by Column Value**

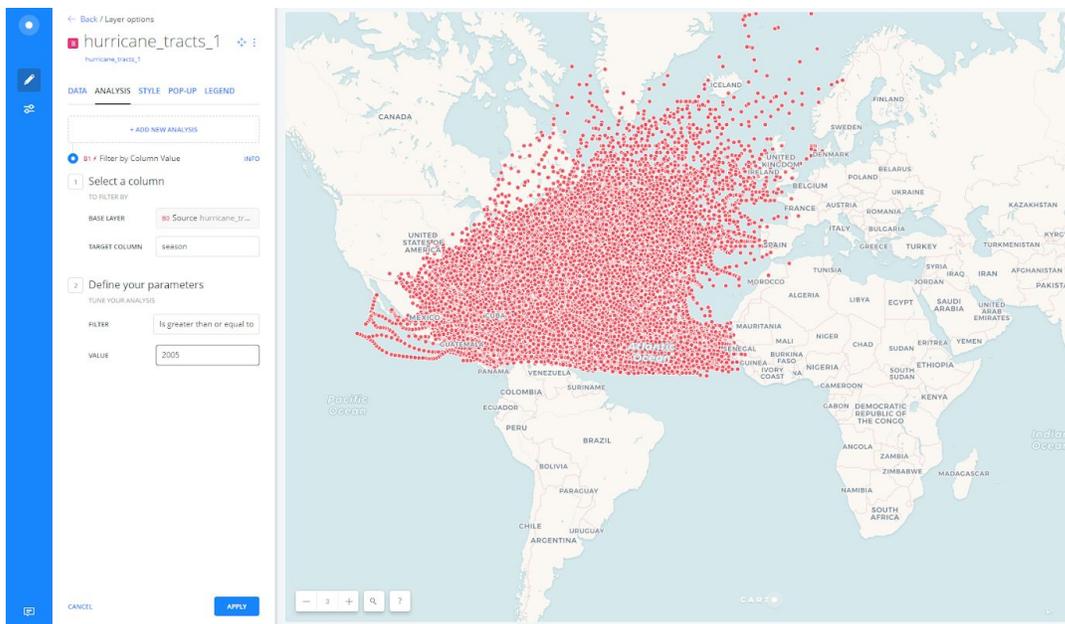


a. Click to “Add Analysis”

3.5. Change the **Target** Column to “**Season**” - This is the year that the each hurricane took place. Note, if you don’t see it when you scroll through, you can search for it in Search for column.

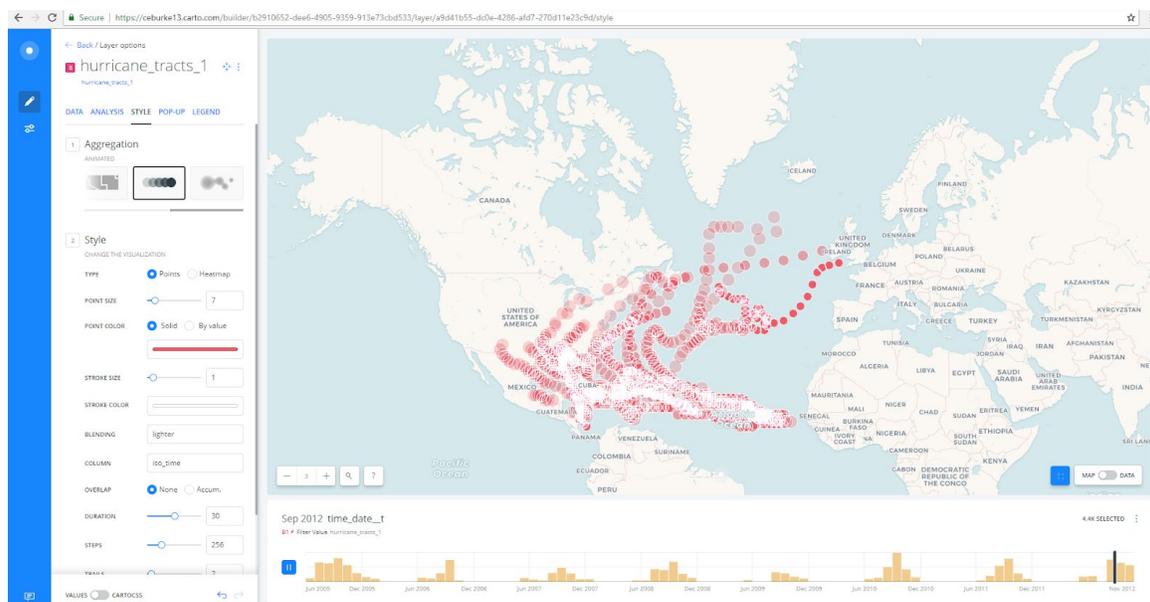
3.6. Change the filter parameters so that only hurricanes that occurred in 2005 or later are displayed.

- a. Filter=Is Greater than or Equal to
- Value=2005
- b. Click Apply
- c. Click Done



4. Creating a Time Series Map

- 4.1. Mouse over to the “Style” Tab
- 4.2. Under “Aggregation”, select “Animated”(To find animated, push the scroll bar to right)
- 4.3. Under “column”, select “Iso_time” (If you don't see "column", click on "labels" box, then you will see column.)
 - i. This will now display the data as time series data based on when each hurricane occurred.
- 4.4. You can now manipulate the settings of this visualization to make the map more visually appealing.



Infographics Exercise

- **What is an infographic?**

Information graphics or infographics are graphic visual representation of information data or knowledge intended to represent information quickly and clearly. The infographics integrated by text information and graphic information, which can enhance the audience's visual system's ability to see patterns and trends.

Nowadays, the increase of a number of infographics available to cyberinfrastructure such as social media(Facebook, twitter), traditional media(newspaper, tv, books), and different internet platforms(google).

- **Piktochart**

Piktochart is a web-based infographic application which allows users without intensive experience as graphic designers to easily create professional-grade infographics using themed templates.

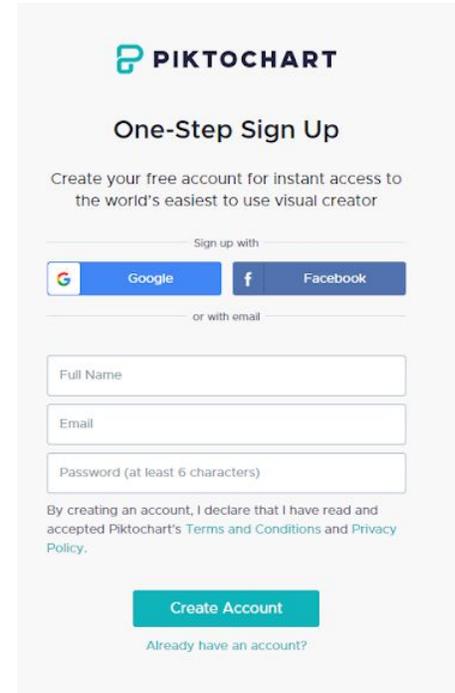
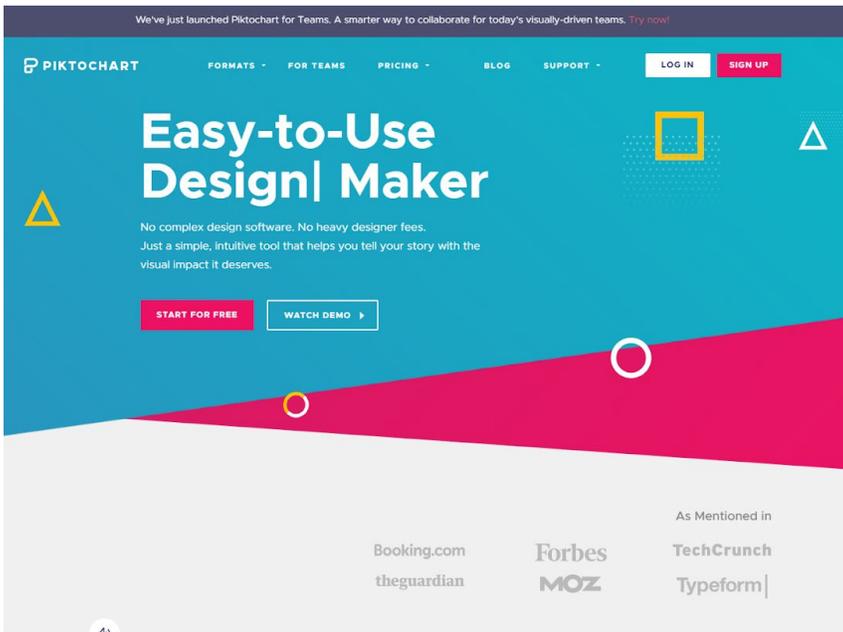
An important feature of Piktochart is its HTML Publishing capability, which generates infographics that are viewable online with multiple clickable elements for users. Additionally, the program provides tools to add interactive maps, charts, videos and hyperlinks.

- **Tasks in this exercise:**

1. Account Setup
2. Getting Started
3. Visualize Your Data

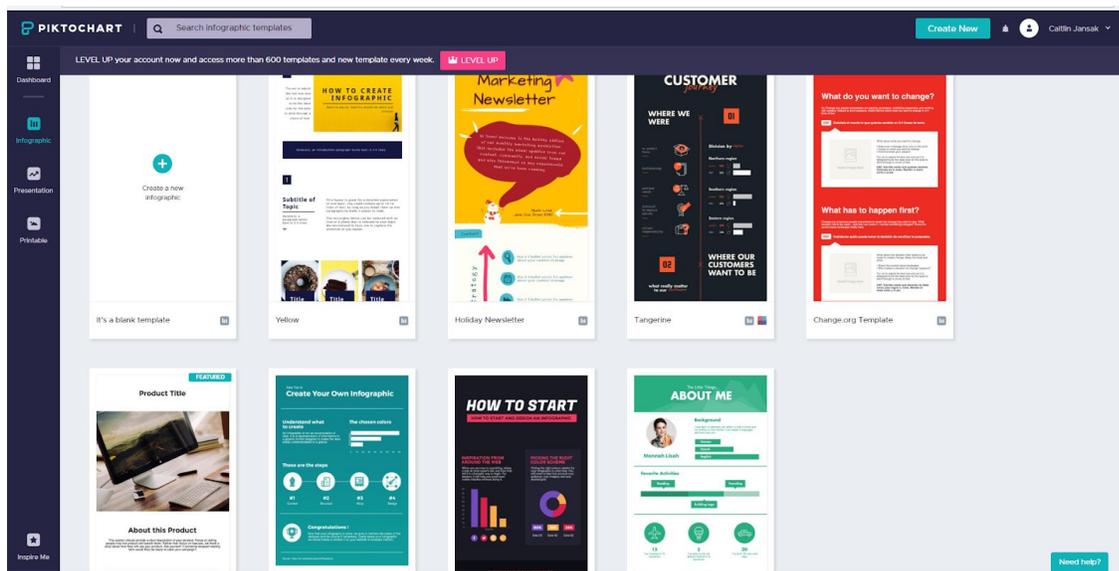
1. Account Setup

- 1.1 Go to <https://piktochart.com/> and click on the pink box at the top right that says "Sign Up". You can use your Google or Facebook accounts or just sign up with your email.

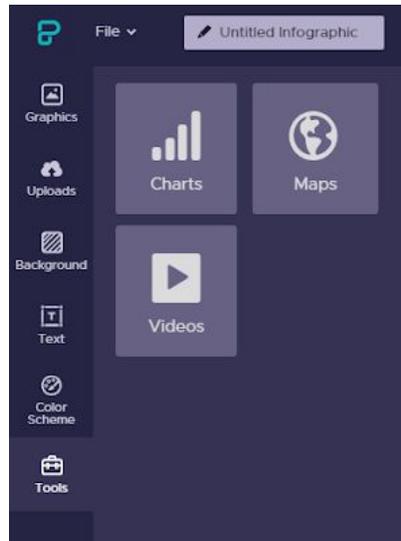


2. Getting Started

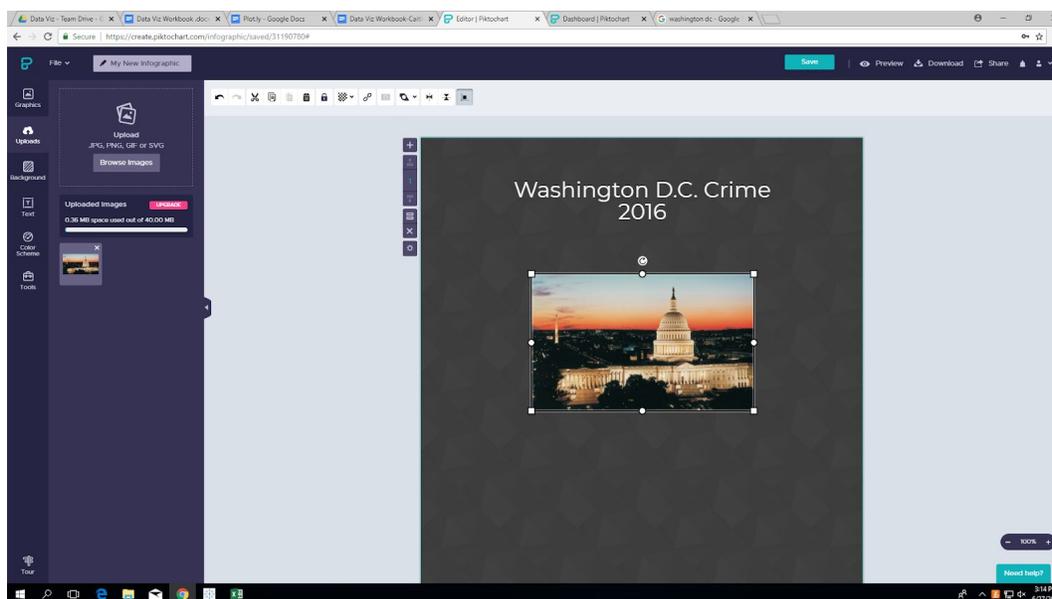
- 2.1 After you create your account and sign in, you will be brought to the creative dashboard. Click on Create New on the top right and click on Infographic. Click on the template that you think would look best to present your data or you can choose the blank template.



- 2.2 Start designing and creating your infographic! The left side has all the tools and decisions you can make to create.



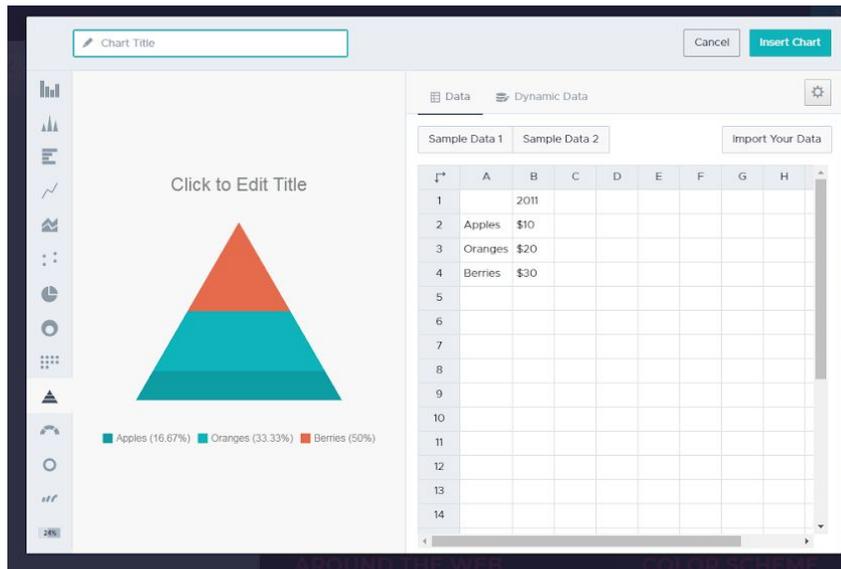
- 2.3 You can change the background of your template by clicking on **Background** on the left. There are many patterns to choose from and you can decrease the transparency if you want your background to be less vibrant.



You can also add pictures either from their library or your own. To add pictures, you need to upload them first."They have many graphics to choose from or you can search for something more specific.

3. Visualize Your Data

- 3.1. Click **tools** on the left bar and then click on **Charts**. A window will pop-up so you can present your data.

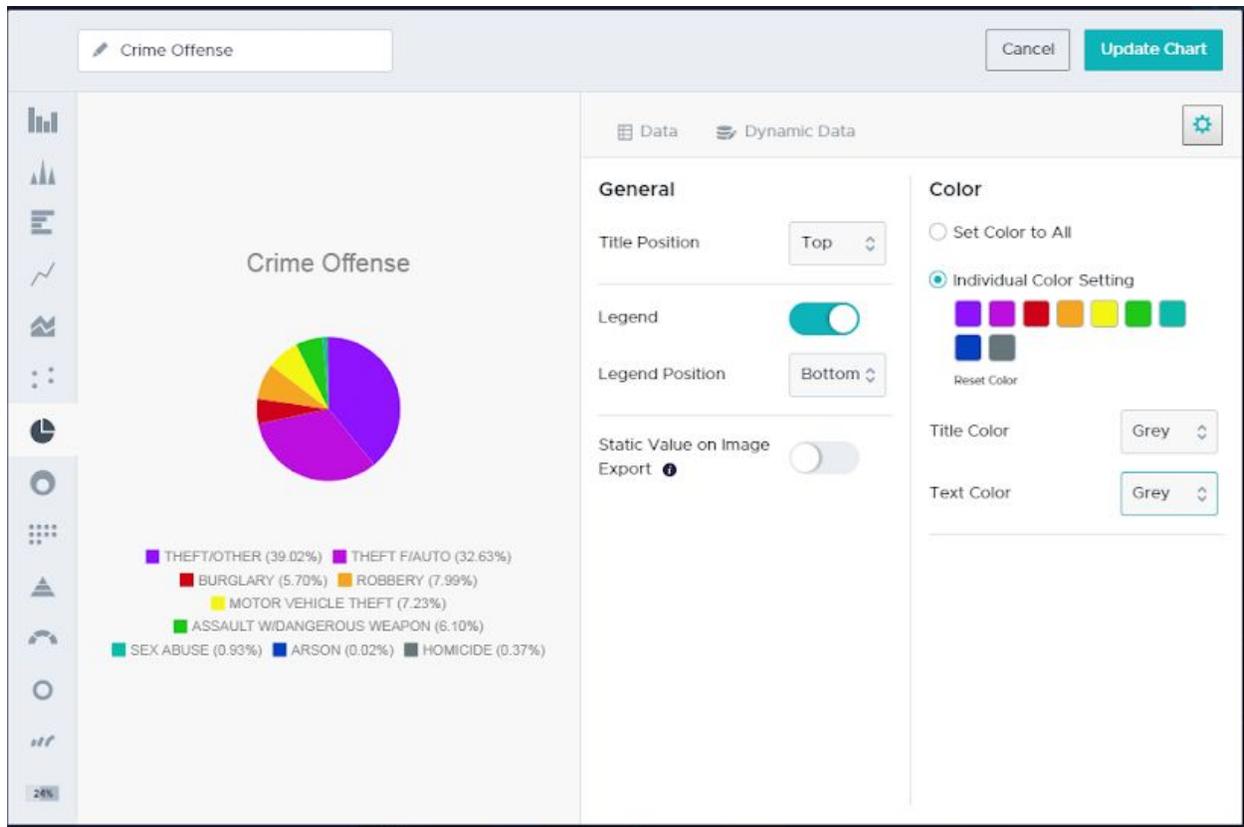


You can import your data from a file or click on **Dynamic Data** and import your data chart from a Google Drive.

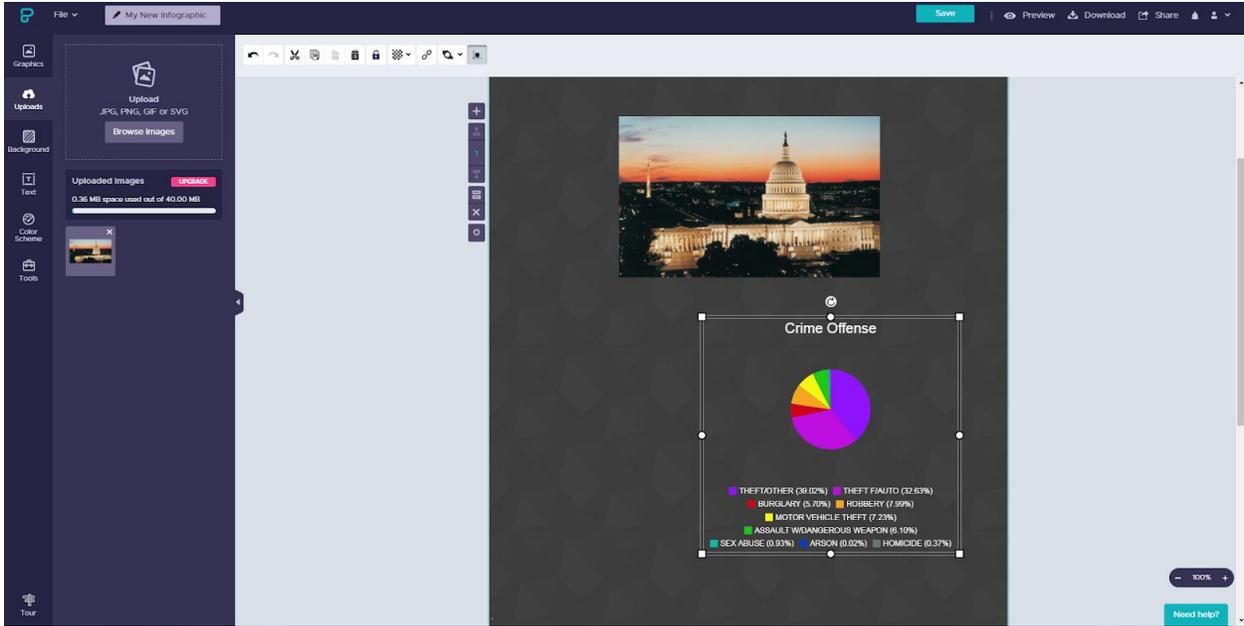
- 3.2 The more simple the data is, the better Piktochart will read it, which is why we simplified the DC crime data set and made a new version. You can add the data by clicking **Import Your Data**. If that does not work, you can copy each row and paste it into their sheet. (You can use the simple data set (Crime2016-cut.xlsx) made from the crime data, and copy and paste each column to the chart.) Make sure to double click to paste the data.
- 3.3 Once you upload all your data, you can choose which graph format you want to show for your data. The left side shows the different visual formats.

Click on the settings icon  . You can change the colors for each

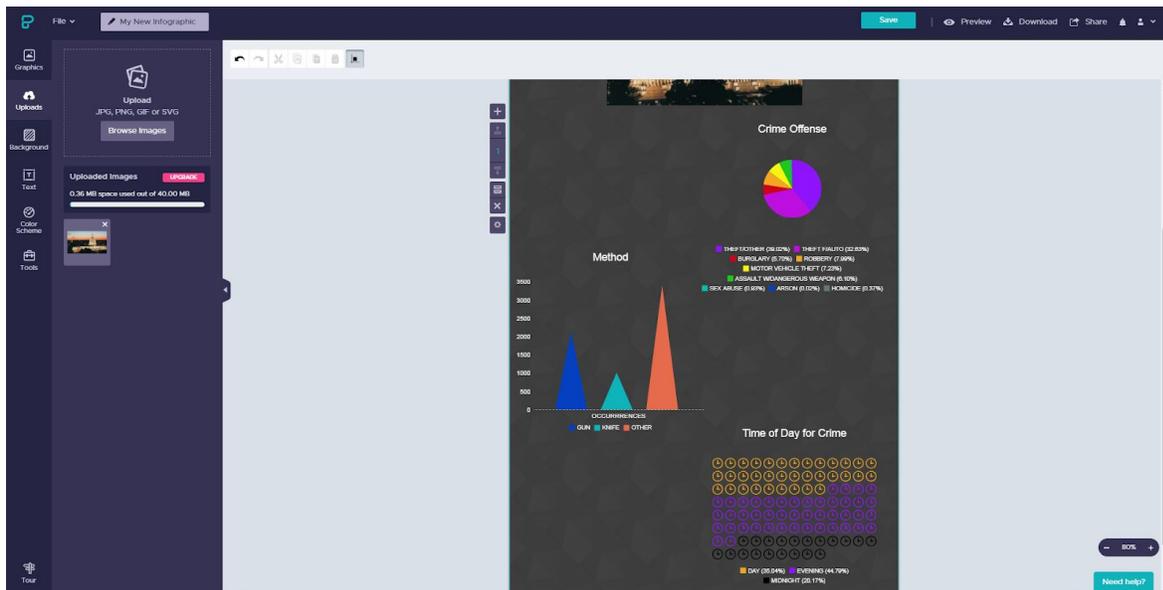
category, the legend, and title position and the title and text color. (Make sure that your data should be clean on the chart otherwise you do not see all information in the window.)



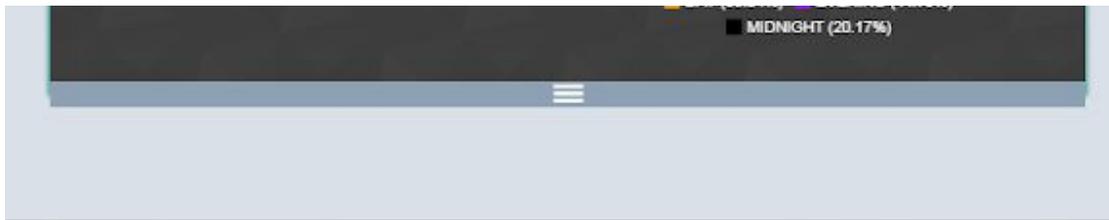
3.4. When your graph gets uploaded on the canvas, you can change its size and placement.



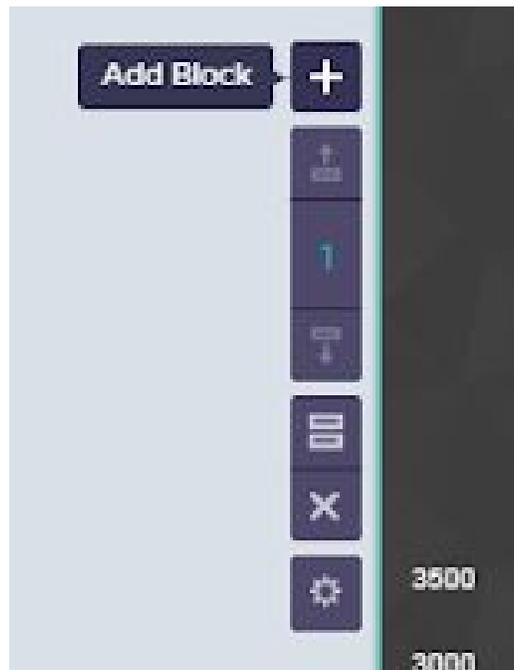
- 3.5. Repeat steps 3.1 to 3.3 for the other two sheets (Methods and Shift) in the Crimes Excel sheet. Piktochart has lots of images to change design so feel free to play around and test out different graphs and symbols. If you need to add a video, you can copy and paste the URL according to instructions in tools, but it can not play until you publish and view it online.



- 3.6. If you feel like you are running out of space on your canvas, there are a few options that you can do. You can extend the canvas by waving your cursor at the bottom of the canvas and you can make more space for your work.



- 3.7. You can also add another block to your workspace and make separate pages for each graph by clicking the top-most button on the left.



- 3.8. You can add other images, text or make any changes that you think would make for a good design. Play around and see all the things that you could do with your tools.

References

CartoDB. <https://en.wikipedia.org/wiki/CartoDB>

Chia, Lianne "A Silicon Valley of the East: Penang's thriving start-up community". Channel NewsAsia. Retrieved 2017-08-11.

Doug Newsom and Jim Haynes (2004). Public Relations Writing: Form and Style. P.236

Infographics: <https://en.wikipedia.org/wiki/Infographic>

KDnuggets Home » News :: 2013 :: Nov :: News, Software :: Plot.ly, collaborative data analysis and graphing (13:n27)

<https://www.kdnuggets.com/2013/11/plotly-collaborative-data-analysis-graphing.html>

Mark Smiciklas (2012). The Power of Infographics: Using Pictures to Communicate and Connect with Your Audience.

Piktochart: <https://piktochart.com/product-features/>

Piktochart:<https://create.piktochart.com/infographic>

Tableau Public: <https://community.tableau.com/docs/DOC-9135>