Creating the Density Dashboard

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D211 Advanced Data Acquisition

Task 1 – Tableau Dashboard Using SQL data

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# Creating the Density Dashboard

For this task, I will demonstrate each step in creating the final Tableau dashboard. The data comes from a PostgreSQL database combined with two (2) external text files. I will show you how to setup the PostgreSQL database, then how to create the Tableau dashboard including all of the SQL, Tableau workseets, data sources and required calculations.

## The density dashboard will look like this when completed:

A picture containing graphical user interface

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Figure Final Density Dashboard

THE DASHBOARD IS MADE UP OF FOUR (4) SHEETS AND ONE (1) PARAMETER

# Create the PostgreSQL database

## Assuming PostgreSQL is installed locally (or you have access to the server), login to the database using pgAdmin. It should look like something like this:

Graphical user interface, application

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Figure pgAdmin

## First step is to create the database. Right click on Database(s) and select “Create” then “Database”. Name the database, for this example the database will be named “d211\_churn”. Then click Save. Here is what is looks like:

Graphical user interface, application

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Figure pgAdmin Create Database

## Once the database is created, I will use the following SQL scripts to create the required tables. Right click on the new database and select “Query Tool”, cut and paste the following SQL script into the Query Tool and click Run.

-- Table: public.payment

-- DROP TABLE public.payment;

CREATE TABLE public.payment

(

payment\_id integer NOT NULL,

payment\_type text ,

CONSTRAINT payment\_pkey PRIMARY KEY (payment\_id)

);

-- Table: public.location

-- DROP TABLE public.location;

CREATE TABLE public.location

(

location\_id integer NOT NULL,

zip integer,

city varchar(30),

state varchar(2),

county varchar(30),

CONSTRAINT location\_pkey PRIMARY KEY (location\_id)

);

-- Table: public.job

-- DROP TABLE public.job;

CREATE TABLE public.job

(

job\_id integer NOT NULL,

job\_title varchar(60),

CONSTRAINT job\_pkey PRIMARY KEY (job\_id)

);

-- Table: public.contract

-- DROP TABLE public.contract;

CREATE TABLE public.contract

(

contract\_id integer NOT NULL,

duration VARCHAR(30),

CONSTRAINT contract\_pkey PRIMARY KEY (contract\_id)

);

-- Table: public.customer

-- DROP TABLE public.customer;

CREATE TABLE public.customer

(

customer\_id text NOT NULL,

lat numeric,

lng numeric,

population integer,

children integer,

age integer,

income numeric,

marital text ,

churn text ,

gender text ,

tenure numeric,

monthly\_charge numeric,

bandwidth\_gp\_year numeric,

outage\_sec\_week numeric,

email integer,

contacts integer,

yearly\_equip\_faiure integer,

techie text,

port\_modem text ,

tablet text ,

job\_id integer,

payment\_id integer,

contract\_id integer,

location\_id integer,

CONSTRAINT customer\_pkey PRIMARY KEY (customer\_id),

CONSTRAINT customer\_contract\_id\_fkey FOREIGN KEY (contract\_id)

REFERENCES public.contract (contract\_id) MATCH SIMPLE

ON UPDATE NO ACTION

ON DELETE NO ACTION

NOT VALID,

CONSTRAINT customer\_job\_id\_fkey FOREIGN KEY (job\_id)

REFERENCES public.job (job\_id) MATCH SIMPLE

ON UPDATE NO ACTION

ON DELETE NO ACTION

NOT VALID,

CONSTRAINT customer\_location\_id\_fkey FOREIGN KEY (location\_id)

REFERENCES public.location (location\_id) MATCH SIMPLE

ON UPDATE NO ACTION

ON DELETE NO ACTION

NOT VALID,

CONSTRAINT customer\_payment\_id\_fkey FOREIGN KEY (payment\_id)

REFERENCES public.payment (payment\_id) MATCH SIMPLE

ON UPDATE NO ACTION

ON DELETE NO ACTION

NOT VALID

);

## Import contract.csv data into contract table. Right-click on desired table, select “Import/Export”, then you should see the following dialog. Click “Import” and click Header “Yes”, then browse to the contract.csv file. If everything goes well, you will see the green success message.

### Graphical user interface, application Description automatically generated

Figure pgAdmin Import .CSV file

## Import job.csv data into job table.

## Import location.csv data into location table.

## Import payment.csv data into payment table.

## Lastly, import customer.csv data into customer table.

# Create new tableau file

## Open Tableau and click File, New

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Figure Create New Tableau File

# Create postgresql Data Source

## Select Data > New Data Connection.

## Select “To a Server – PostgreSQL”, you should see the following dialog, enter database name, and username/password. Then click “Sign-In”

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Figure Connect to PostgreSQL Data

# Create new data source

## You should see the following, you see the “d211\_churn” connection that you just made. Now click on the database icon next to d211\_churn (this is the same as “Data > New Data Source”) and select “To a File” then “Text File”

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Figure Create Tableau Data Sources

## Browse to the folder containing the external data files, select states.csv file to make the initial connection. Click “Open”

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Figure Tableau New Text File Data Source

## Now you have both data source connections, here is what is looks like:

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Figure Tableau Data Sources

# Create logical views and relationships

## Select the “d211\_churn” data source, then drag the “customer” table to the right side.

## Double-click on “customer” table to create a union. By double-clicking table, you are altering the physical layout of the logical view called “customer”. We will join the other tables with the customer table to create the overall logical view of the customer data.

## Drag “location” table to the right of the “customer” table. Tableau will attempt to find a common attribute to link. Here is what it should look like:

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Figure Tableau Customer-Location Join

# Create blended Data Source

## Select the “states” data source, the “States” data is already there, double-click to create a relationship join with “population” data. Instead of joining churn and states data sources, we have created two separate data sources, this is known as blending data. “Churn & location” are joined, and “states & population” are joined, but the two are not joined.

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Figure Tableau Stats-Population Join

# Create the “region, State” collection

## The “Region, State” collection is made up of Region and State data. Currently, Tableau doesn’t know the Region’s geographic role, so right-click on Region and select “Geographic Role” then, “Create from…” then “State”. This will define the region based on the states as defined in the States data. Here is what it looks like, notice that there is now a “Globe” icon next to Region, and the “Region, State” collection has two sub-elements, the region and the state:

Graphical user interface, application

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Figure Tableau Region, State Geographic Role

When we drag and drop any part of the “Region, State” collection, Tableau will know to treat the data as geographic. We will see this is a few minutes when we create the “density map” worksheet.

# Create calculated fields

## Customer Density. For the Density Dashboard we need to calculate the density as a function of # of customers and total population. When completed, the calculation is as follows:

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Figure Tableau Customer Density Calculated Field

## Create a new worksheet called “density details”

## The calculation uses data from two different data sources, so we have to “link” the primary source with the secondary source. Select the “States” data and drag “population to the view. You will see the States data has a blue check indicating it is the primary source for this worksheet.

## Click on Data, Edit Blend Relationship to bring up the following dialog:

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Figure Tableau Edit Blend Relationship

## The default field mapping is incorrect, select Custom, then use “Code” from primary data and “State” from secondary data, then click OK, OK to finish creating the blended relationship for this worksheet. Once the tables are “blended”, you will see a “link” icon on the secondary data source indicating the field that is linking the two tables. If the link icon is red, it is good, if grey, the link is bad and you have to click the link icon to activate the link. Here is what you are looking for:

Graphical user interface, application

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Figure Tableau Link to Secondary Data

## With the two data sources connected, go back to the States data and create new calculated field. Enter the following into the field, name the field “Customer Density”, then click OK. It is now ready to be used in the worksheet

count([d211\_churn].[Customer Id])/sum([Population])\*1000

# Create the “Density Details” worksheet

The density details worksheet should look like this when completed:

Graphical user interface, application

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Figure Final Density Details Worksheet

## Drag the “Region, State” collection to the Rows

## We want this worksheet to be a “Text Table”, so double-click the new “Customer Density” measure (from the States data) which will create the first column of the text table.

## Double-click the “Population” measure (from the States data) which will create the second column.

## Double-click the “customer (count)” measure (from the d211\_churn data) which will create the third column.

## We only want “Loyal Customers”, so drag the “churn” dimension (from the d211\_churn data) to the Filters pane. Double-click and select “No” only. Loyal customers are indicated with Churn=”No”.

## If everything is going well, it should look something like this:

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Figure Density Details: Create Text Table

Check your work: (1) there should be 7,350 loyal customers and (2) 335 million total population. Also, (3) the customer density for all combined regions should be (7350/335157329\*1000 = 0.02193 = 0.022/1000). How are you doing?

# Finalize colors and layouts for the “Density Details” worksheet

We want to add color to the worksheet and maybe clean up some of the heading labels and fonts.

## Change the default properties of the “Customer Density” measure.

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Figure Customer Density Default Properties

## Default Properties > Number Format…. Select Number (Custom), set 3 decimal places and add “/1000” to the Suffix.

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Figure Customer Density - Default Number Format

## Default Properties > Color. Select Red, check “Stepped Color” and choose 5 steps.

Graphical user interface

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Figure Customer Density - Default Color

## Change the Mark type to “Square” which will fill in each row. Looking better…

## Center the table values. Select one of the cells, then right-click, format, then alignment, then Default > Pane, then select “Center” For some reason, I always have trouble finding this one…

Graphical user interface, text, application

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Figure Centering Text Table Cells

## Increase row height of labels and data

## Add Column and Sub-Totals from Analysis. Drag Totals over to view, then select “Subtotals”, then repeat to add “Column Grand Totals”

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Figure Add Analytic Totals

# Create “Density map” Worksheet

Here is what the final density map worksheet will look like:

Graphical user interface

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Figure 23 Final Density Map Worksheet

## Create new worksheet named “density map”

## Drag “Region, State” collection to right side main visualization area. Then select “Map” for the mark type. You should see a map of the United States with four (4) regions outlined

## Drag “Customer Density” to Mark Colors

## There will be a blending error, click OK, then go to the “d211\_churn” data and click the blending link to “use State as linking field”.

## We only want “Loyal Customers”, so drag the “churn” dimension (from the d211\_churn data) to the Filters pane. Double-click and select “No” only. Loyal customers are indicated with Churn=”No”.

Add elements to Details:

## Drag “Code” (from d211\_churn data) to Detail mark.

## Drag “customer (Count)” (from d211\_churn data) to Detail mark.

## Drag “State” (from STATES data) to Detail mark.

## Drag “population” (from STATES data) to Detail mark.

Add elements to Label:

## Drag “Customer Density” (from d211\_churn data) to Label mark.

## Drag “State” (from STATES data) to Label mark.

## Drag “population” (from STATES data) to Label mark.

## Experiment with the map view. Click the “+” sign next to “Region”. Notice how the view changes to outline the “States”, click again and the view goes back to “Region”. This is how the “Region, State” collection works. Click again so the individual states are outlined.

## The final map worksheet should look something like this:

Diagram

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Figure 24 Final Density Map Worksheet

# Create “Density Summary” worksheet

Here is what the density summary worksheet will look like when completed:

Graphical user interface, text, application

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Figure 25 Final Density Summary Worksheet

## Create new sheet named “density summary”

## Drag “Region” to Columns

## Double-click “Customer Density”. Click OK to branding error. Activate “States as linking field”

## Drag “Population” to label and format as desired

## Drag “customer (Count)” to label and format as desired

## Drag “Customer Density” to color, change mark type to “Square”

## Drag “Churn” to filter, then select only “No” for loyal customers

# Create “Density dashboard” – Bringing it all together

The final density dashboard will contain all the sheets we have created so far, and should look something like this:

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Figure 26 Final Density Dashboard

## Create new dashboard named “Customer Density Dashboard”

## Drag and arrange the sheets to form the dashboard, experiment with various layouts

## Remove or update titles

## Resize major areas of the dashboard

## Setup action filter on the top “density summary”. Experiment with other action filters, but in the end, only one (1) action filter is used based on the “density summary”. When you click on a region in the “density summary”, the map and details will filter on the selected region(s).

## Make final adjustments to fonts, alignments, layouts to either the dashboard or the individual sheets.

## Preview final dashboard

## Save your work