

Hands-On Lab: Generative AI for Data Visualization

Estimated time needed: 60 minutes

Overview

In this lab, you will learn how to use generative AI to generate various visuals from the data set. You will use the <https://www.einblick.ai/> platform to create multiple charts and graphs automatically using simple steps.

Learning objectives

After completing this lab, you will be able to:

- Sign in on <https://www.einblick.ai/>
- Generate visuals
- Change the color theme in the chart
- Generate Python code on Einblick for developing charts

Prerequisites

- Einblick account
- Basic understanding of exploratory data analysis (EDA)

About Einblick

With Einblick's ChartGen AI feature, you can create charts using descriptions written in natural language. This facilitates and increases accessibility to data visualization.

With the help of this natural language interface, users can ask questions about their data and get text summaries, code, or charts as responses. Using generative AI models, Einblick Prompt interprets user intent and provides a suitable response.

Data set

In this lab, you will work on the Student Alcohol Consumption data set "student-mat.csv" by UCI Machine Learning, which can be obtained at [Kaggle](#). It is based on data collected from two secondary schools in Portugal. The students included in the survey were in mathematics and Portuguese courses.

The data set we are using is for the mathematics course. The number of mathematics students involved in the collection was 395. The data collected in locations such as Gabriel Pereira and Mousinho da Silveira includes several pertinence values. Examples of such data are records of demographic information, grades, and alcohol consumption.

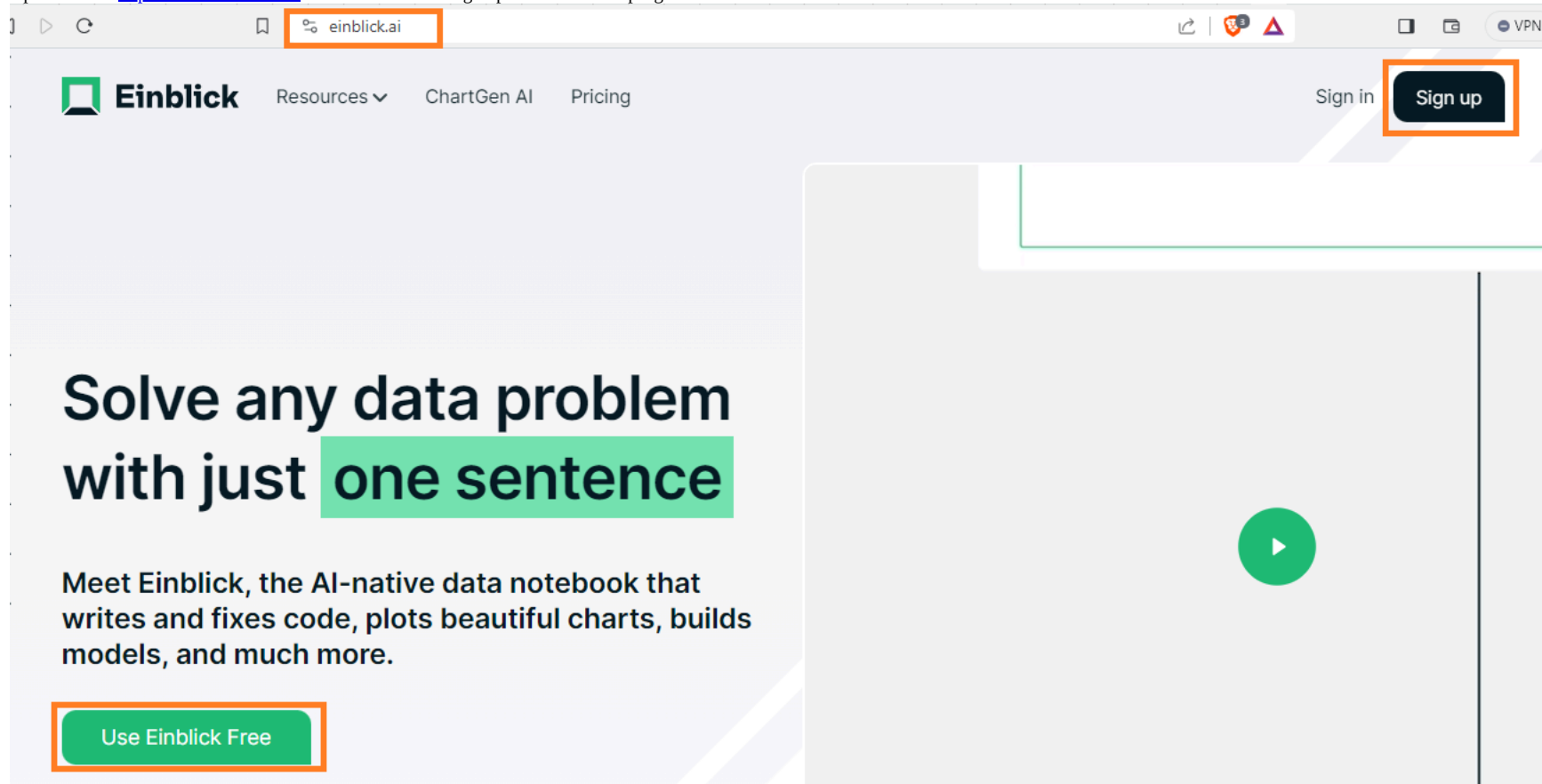
Field	Description
school	GP/MS for the student's school
sex	M/F for gender
age	15-22 for the student's age
address	U/R for urban or rural, respectively
fam size	LE3/GT3 for less than or greater than three family members
Pstatus	T/A for living together or apart from parents, respectively
Medu	0 (none) / 1 (primary-4th grade) / 2 (5th - 9th grade) / 3 (secondary) / 4 (higher) for mother's education
Fedu	0 (none) / 1 (primary-4th grade) / 2 (5th - 9th grade) / 3 (secondary) / 4 (higher) for father's education
Mjob	'teacher,' 'health' care related, civil 'services,' 'at_home' or 'other' for the student's mother's job
Fjob	'teacher,' 'health' care related, civil 'services,' 'at_home' or 'other' for the student's father's job
reason	close to 'home,' school 'reputation,' 'course' preference, or 'other' for the choice of school
guardian	mother/father/other as the student's guardian
traveltime	1 (<15mins) / 2 (15 - 30 mins) / 3 (30 mins - 1 hr) / 4 (>1hr) for a time from home to school
studytime	1 (<2hrs) / 2 (2 - 5hrs) / 3 (5 - 10hrs) / 4 (>10hrs) for weekly study time

Field	Description
failures	1-3/4 for the number of class failures (if more than three, then record 4)
schoolsup	yes/no for extra educational support
famsup	yes/no for family educational support
paid	yes/no for extra paid classes for Math or Portuguese
activities	yes/no for extra-curricular activities
nursery	yes/no for whether attended nursery school
higher	yes/no for the desire to continue studies
internet	yes/no for internet access at home
romantic	yes/no for relationship status
famrel	1-5 scale on quality of family relationships
freetime	1-5 scale on how much free time after school
goout	1-5 scale on how much student goes out with friends
Dalc	1-5 scale on how much alcohol consumed on weekdays
Walc	1-5 scale on how much alcohol consumed on the weekend
health	1-5 scale on health condition
absences	0-93 number of absences from school
G1	0-20 for the first-period grade
G2	0-20 for the second-period grade
G3	0-20 for the final grade

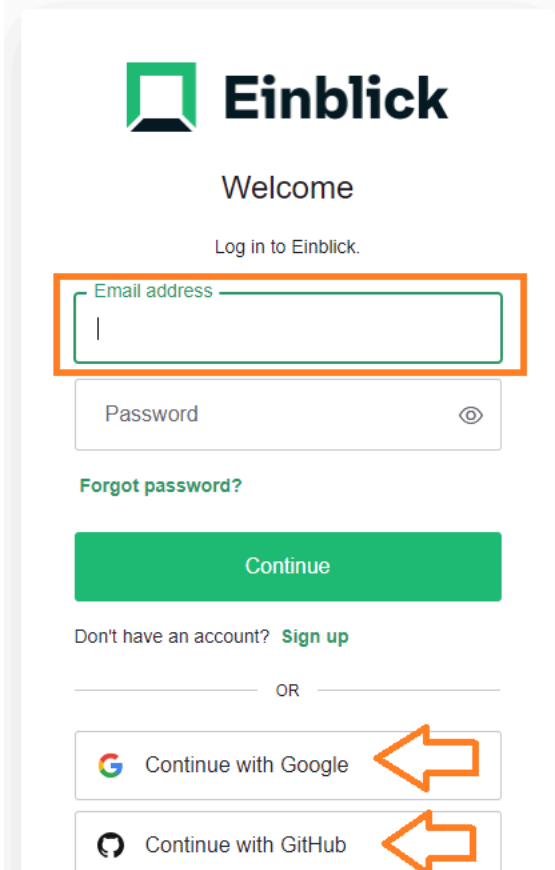
Task 1: Signing up and creating the account

- 1. Sign up for Einblick.

2. Open the link <https://www.einblick.ai/> and then click the 'Sign up' button at the top right corner



3. You will see the 'Welcome' pop-up window. You may continue with an existing Google or GitHub account or create a new one by clicking sign up under the continue button.



The image shows a 'Welcome' screen for the 'Einblick' application. At the top is the 'Einblick' logo, which consists of a green square icon with a white 'E' shape inside, followed by the word 'Einblick' in a bold, black, sans-serif font. Below the logo is the word 'Welcome' in a smaller, black, sans-serif font. Underneath 'Welcome' is the text 'Log in to Einblick.' in a small, gray, sans-serif font. The main form area contains an 'Email address' input field, which is highlighted with an orange border. Below this is a 'Password' input field with a small eye icon to its right. Below the password field is a link that says 'Forgot password?' in green text. Below that is a large green button with the word 'Continue' in white text. Below the button is the text 'Don't have an account? Sign up' in gray text, where 'Sign up' is a link. Below this is a horizontal line with the word 'OR' in the center. At the bottom are two buttons: 'Continue with Google' and 'Continue with GitHub'. Each button has a small icon to its left (Google 'G' and GitHub octocat) and is highlighted with an orange arrow pointing to it from the right.

Einblick

Welcome

Log in to Einblick.

Email address


Password


[Forgot password?](#)

Continue

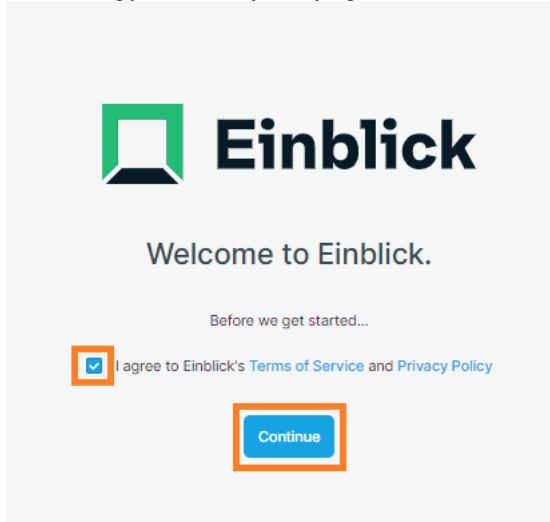
Don't have an account? [Sign up](#)

OR

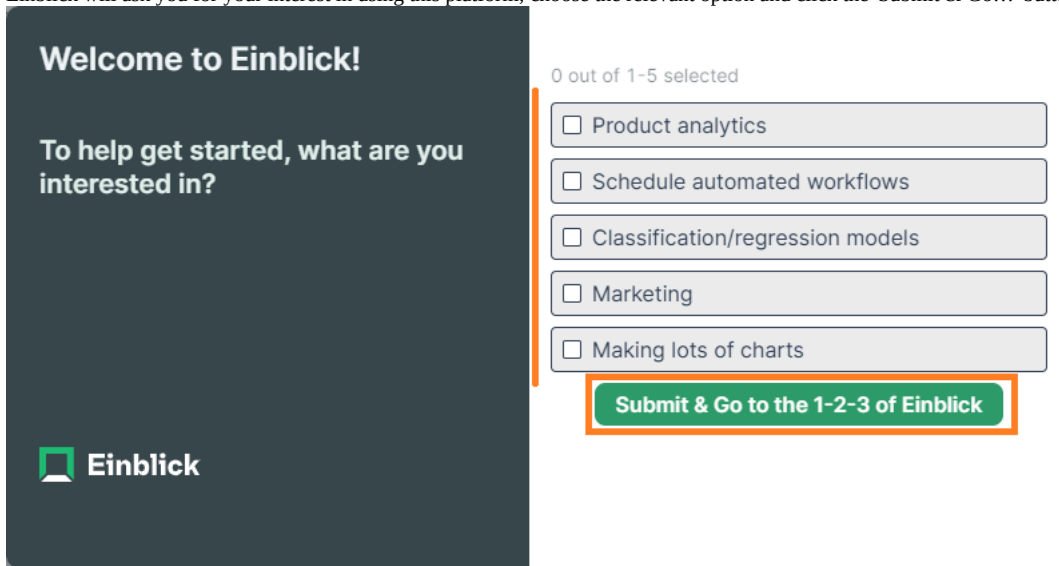
 Continue with Google

 Continue with GitHub

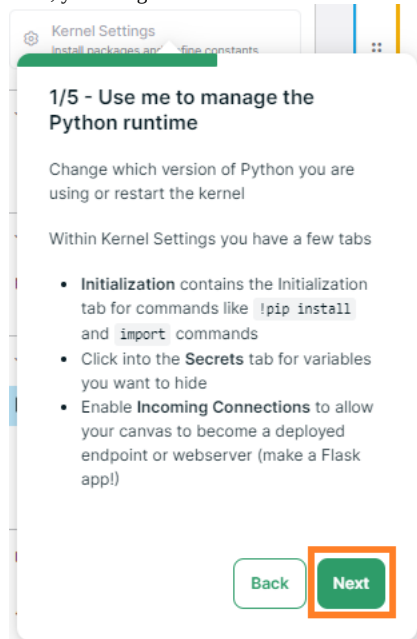
4. After creating your account, you may sign in and see the following welcome screen. Click the 'Continue' button.



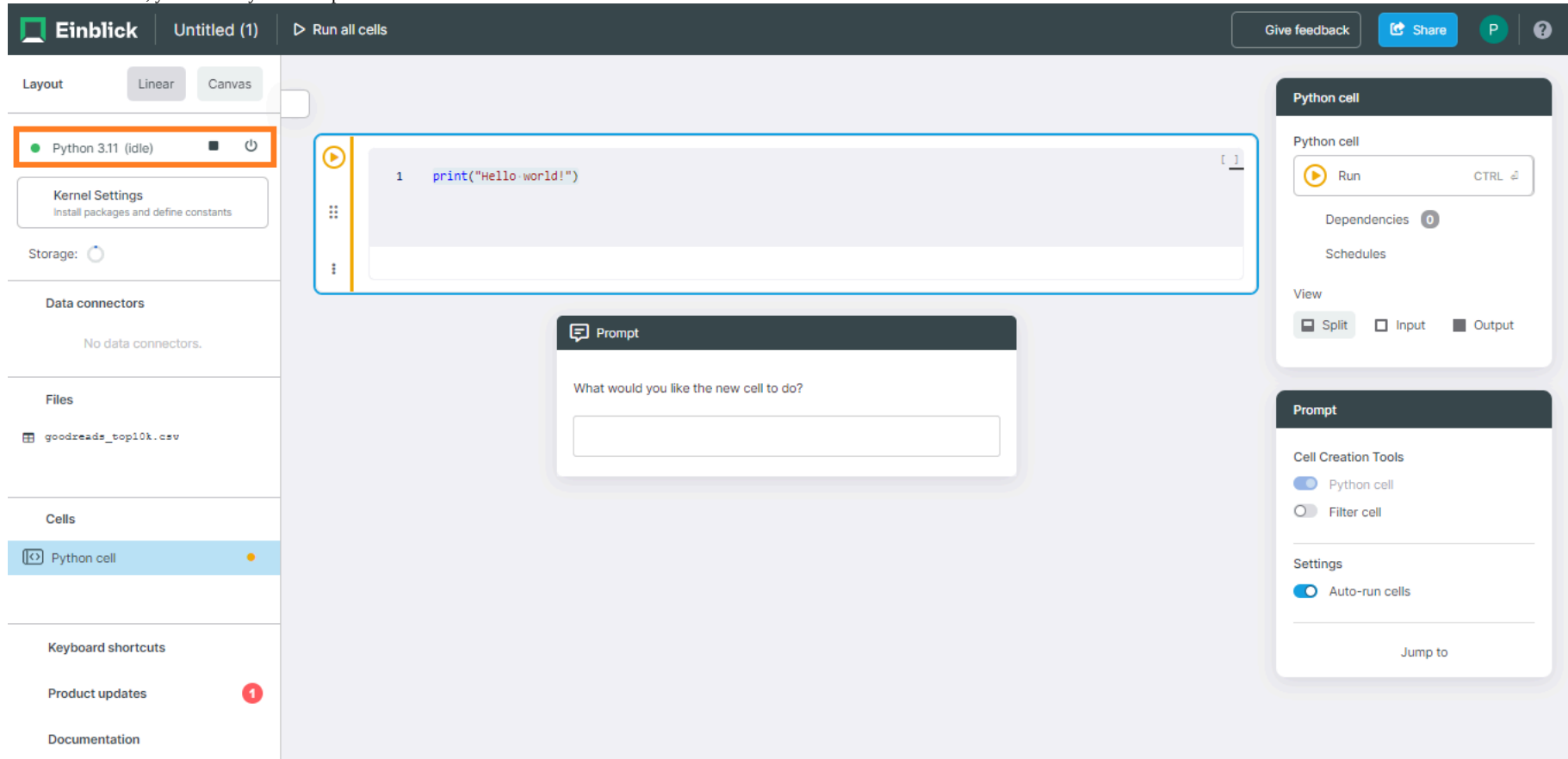
5. Einblick will ask you for your interest in using this platform; choose the relevant option and click the 'Submit & Go...' button.

The image shows the second screen of the Einblick onboarding process. On the left side, there is a dark gray vertical panel. At the top of this panel, it says 'Welcome to Einblick!'. Below that, it asks 'To help get started, what are you interested in?'. At the bottom of the panel is the Einblick logo. On the right side of the screen, there is a list of five options, each with a checkbox and a text label: 'Product analytics', 'Schedule automated workflows', 'Classification/regression models', 'Marketing', and 'Making lots of charts'. Above this list, it says '0 out of 1-5 selected'. At the bottom right of the screen is a green rectangular button with the text 'Submit & Go to the 1-2-3 of Einblick' in white. The background of the right side is white.

6. Here, you will get a short tour of how to use Einblick. Follow along the steps by pressing the 'Next' button.



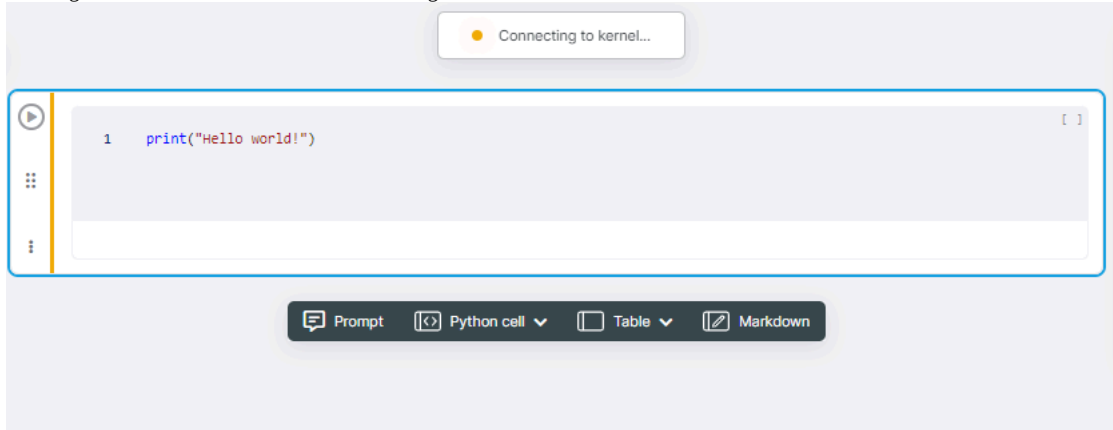
7. After the tour ends, you will see your workspace as below:



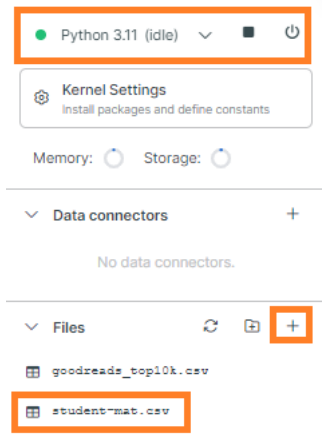
Try to switch between different layouts, linear and canvas, and see how the appearance of your workspace changes on Einblick.

Task 2: Connecting to the data set

You might have to wait for a while till the kernel gets connected.



First, you will upload the data set in your case student-mat.csv file. To do so, click the drop-down arrow of 'Files' on the left-hand panel, click the '+' sign, and upload the data set from where you stored it earlier.



Once the data set is uploaded, double-click the Files menu.



Einblick will automatically write the Python code to import it in your canvas and present to you the data set as below:

The screenshot shows the Einblick interface. On the left, the 'Files' panel lists 'goodreads_top10k.csv' and 'student-mat.csv', with an orange arrow pointing to the latter. The main canvas displays a Python cell with the following code:

```
1 import pandas as pd
2 student_mat = pd.read_csv("student-mat.csv", sep=",")
```

Below the code, the data is visualized as a table with columns: school, sex, age, address, famsize, Pstatus, and Me. The table shows 200 rows (plus 195 more) and 33 columns.

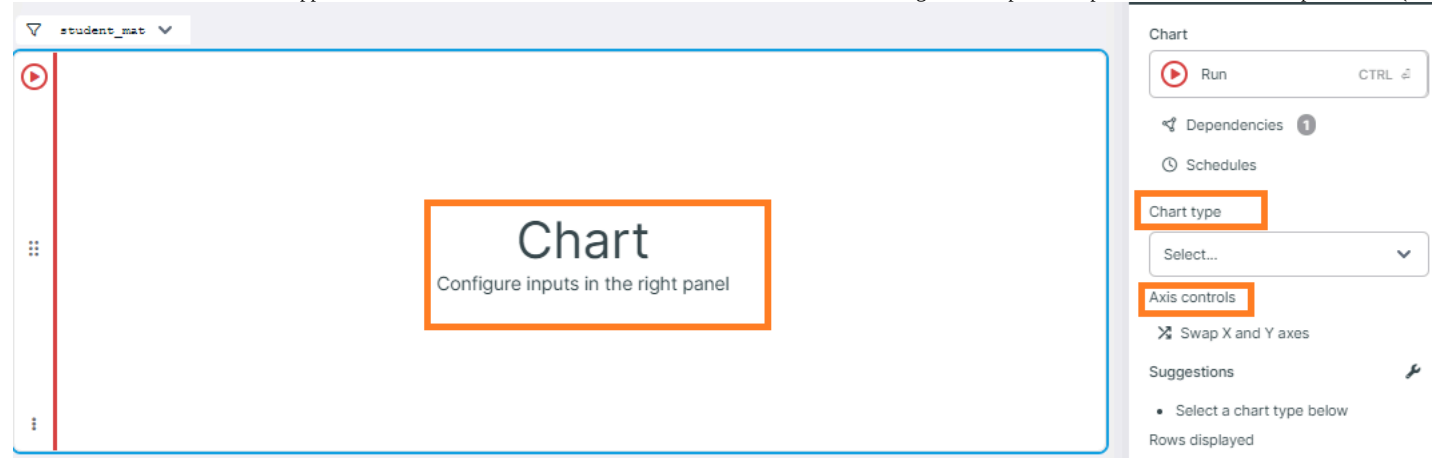
school	sex	age	address	famsize	Pstatus	Me
GP	F	18	U	GT3	A	4
GP	F	17	U	GT3	T	1
GP	F	15	U	LE3	T	1
GP	F	15	U	GT3	T	4
GP	F	16	U	GT3	T	3
GP	M	16	U	LE3	T	4

Task 3: Generating a first visual on the data set to know the total number of male and female students in the data set

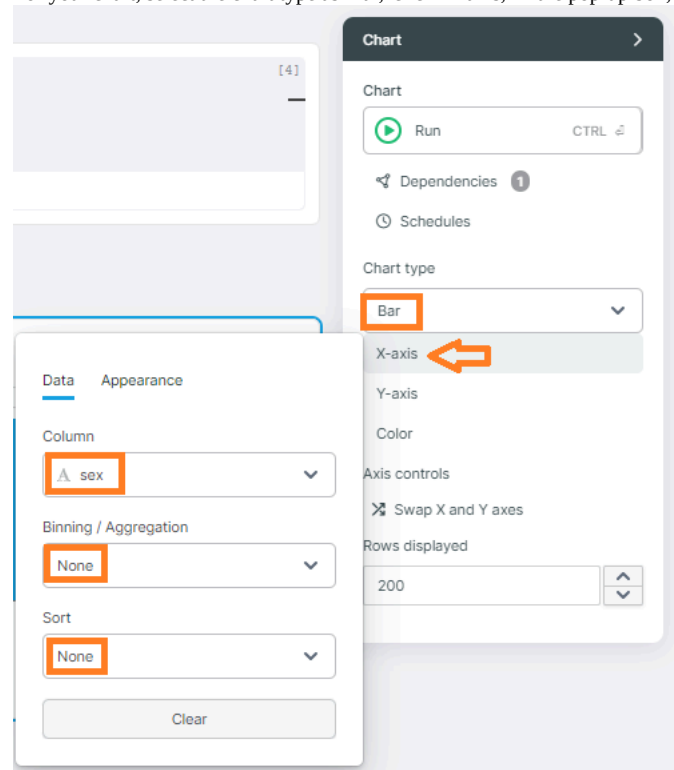
Click the drop-down arrow of 'Table' and select 'Chart' in the Visualize section.

The screenshot shows the same data table as before. A context menu is open over the table, with the 'Visualize' section highlighted. The 'Chart' option is selected, indicated by an orange arrow. The menu also includes options for 'Data' (CSV, Google Sheet), 'Transform' (Filter, Join), and 'Table' (Table, Aggregation).

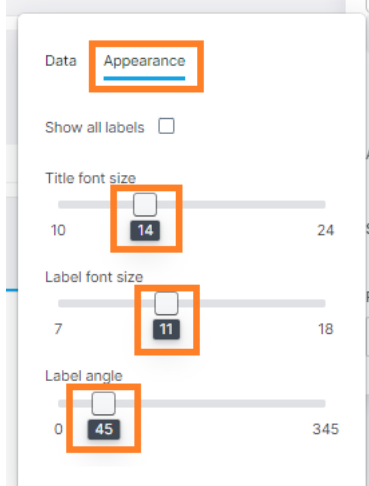
In the canvas, a blank chart will appear. See the data selected for this chart is "student-mat.csv.". On the right side, a panel is opened to choose various parameters (chart type, axis control, etc.) for this chart.



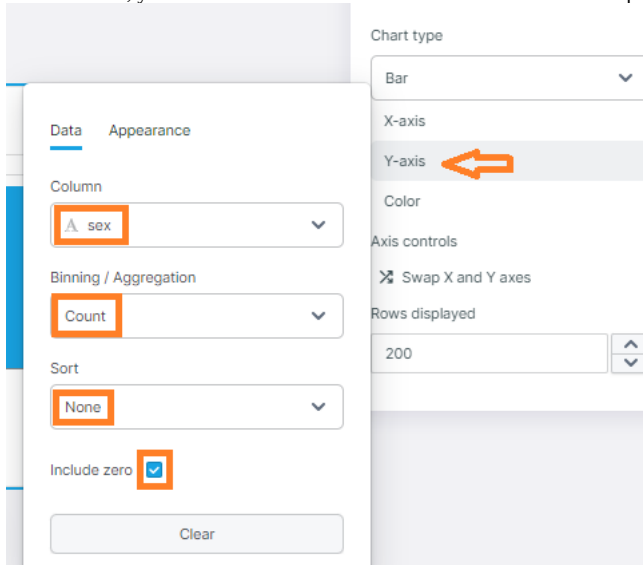
For your chart, select the chart type as 'Bar,' click 'X-axis,' in the pop-up box, select the Column as 'sex,' and in 'Binning / Aggregation,' select 'None.' The same is true for 'Sort' under 'Data', as shown below:



To change the appearance, click 'Appearance' and then select the appropriate font size and angle as shown below:



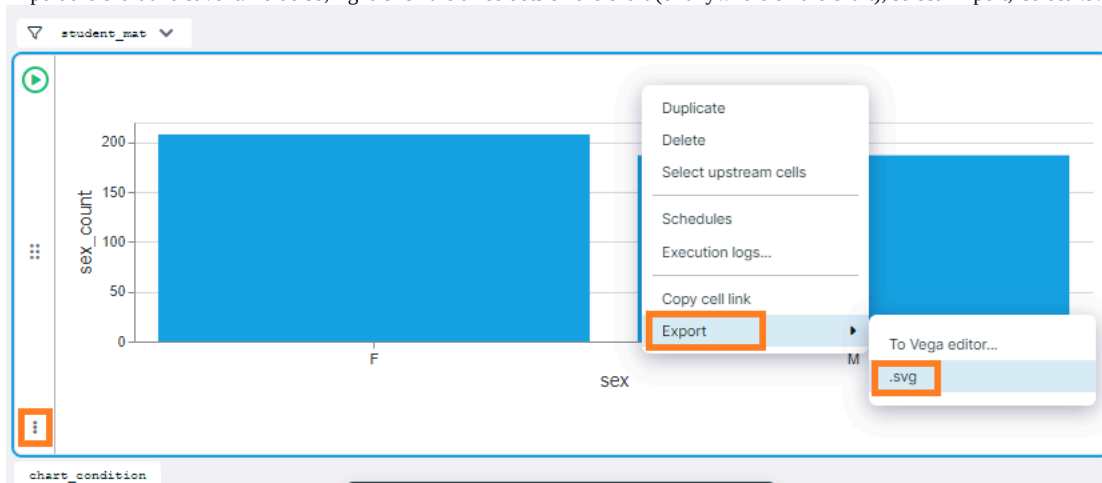
For the Y-axis, you will select the same column. As the count is to be displayed, you will select 'Count' in the 'Binning / Aggregation'. Check on the box to include zeros while displaying the values.



The generated chart will look like this:



Export the chart and save it. To do so, right-click the three dots on the chart (or anywhere on the chart), select 'Export,' select '.svg,' and save it on your machine.



Task 4: Generating a pie chart for displaying the average value of weekend alcohol for each sex in the data set

Click the drop-down arrow on 'Table', and then select 'Chart' in the Visualize section.

The screenshot shows the Tableau interface with a data table titled 'student_mat'. The table has columns: school, sex, age, famsize, Pstatus, and Me. A 'Visualize' menu is open, showing options: Data, CSV, Google Sheet, Visualize (highlighted with an orange box), Table, Chart (indicated by an orange arrow), Aggregation, Transform, and Filter. The bottom menu bar shows 'Table' selected, with an orange box around its drop-down arrow.

school	sex	age	famsize	Pstatus	Me
GP	F	18	3	A	4
GP	F	17	3	T	1
GP	F	15	3	T	1
GP	F	15	3	T	4
GP	F	16	3	T	3
GP	M	16	3	T	4
GP	M	16	3	T	2
GP	F	17	3	A	4

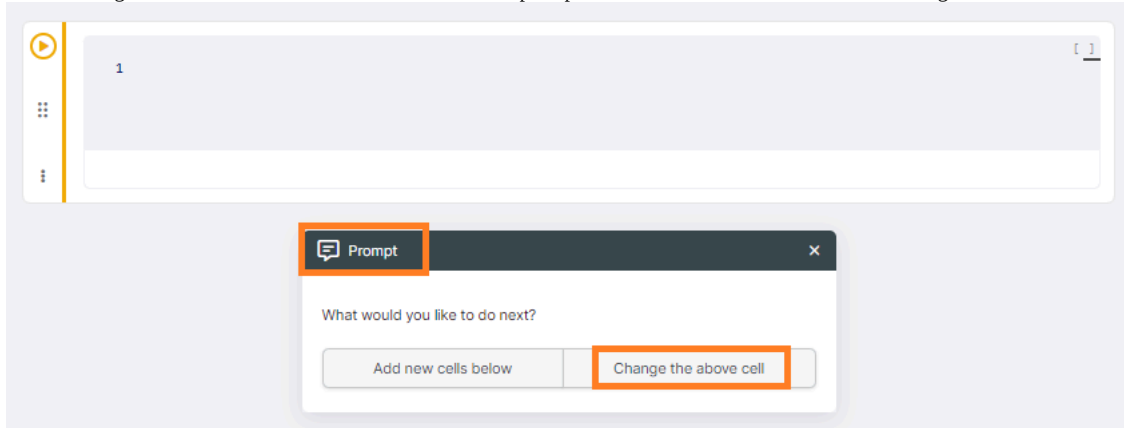
In the canvas, a blank chart will appear. If "student-mat.csv" is not selected for the chart, click the 'Select data' drop-down arrow and click 'student_mat.'

The screenshot shows the 'Select data' dropdown menu open. It has tabs for 'Dataframes' and 'Files'. Under 'Dataframes', there is a search bar labeled 'Filter...' and a list containing 'student_mat', which is highlighted with an orange box. An orange arrow points to the 'Select data' dropdown arrow in the top left corner.

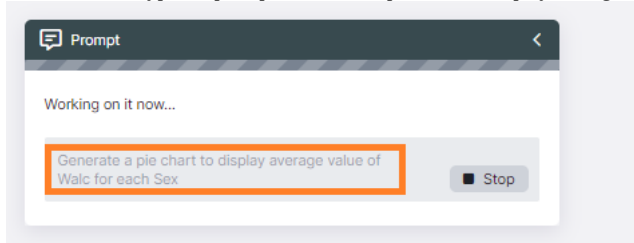
Now, you will add a new Python cell. To do so, click the "Python cell" drop-down on the menu bar and select "Python cell."

The screenshot shows the bottom menu bar with a dropdown menu open. The dropdown menu has two options: 'Python cell' (highlighted with an orange box) and 'SQL cell'. The 'Python cell' option in the main menu bar is also highlighted with an orange box.

A new coding cell is included in the canvas. Now, click the 'prompt' at the bottom of the cell and select 'Change the above cell' as shown below:

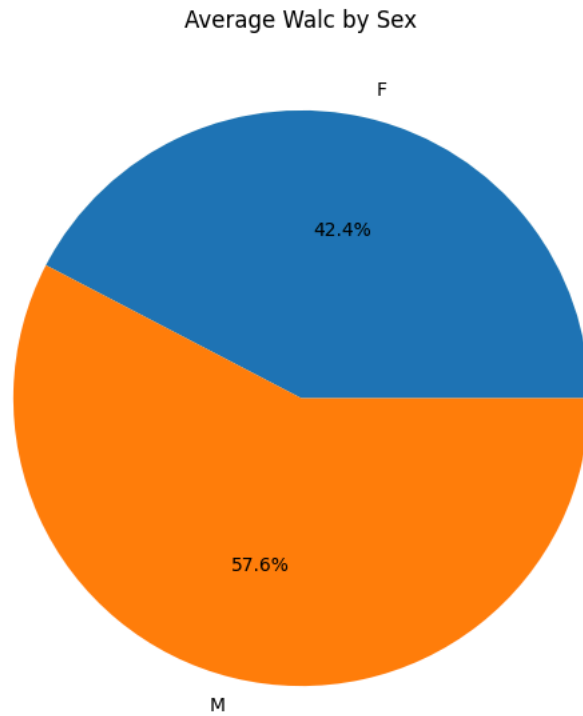


In the text box, type the prompt "Generate a pie chart to display average value of Walc for each Sex" and then press Enter.

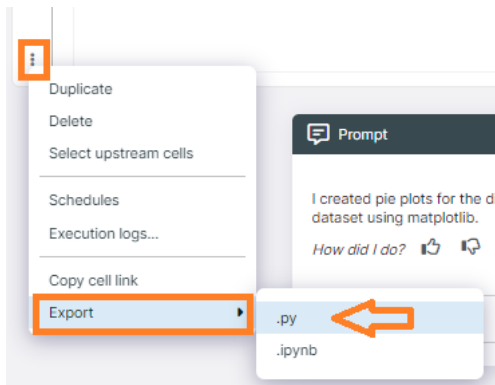


Einblick will generate a Python code for creating this pie chart and will also display the chart as shown below:



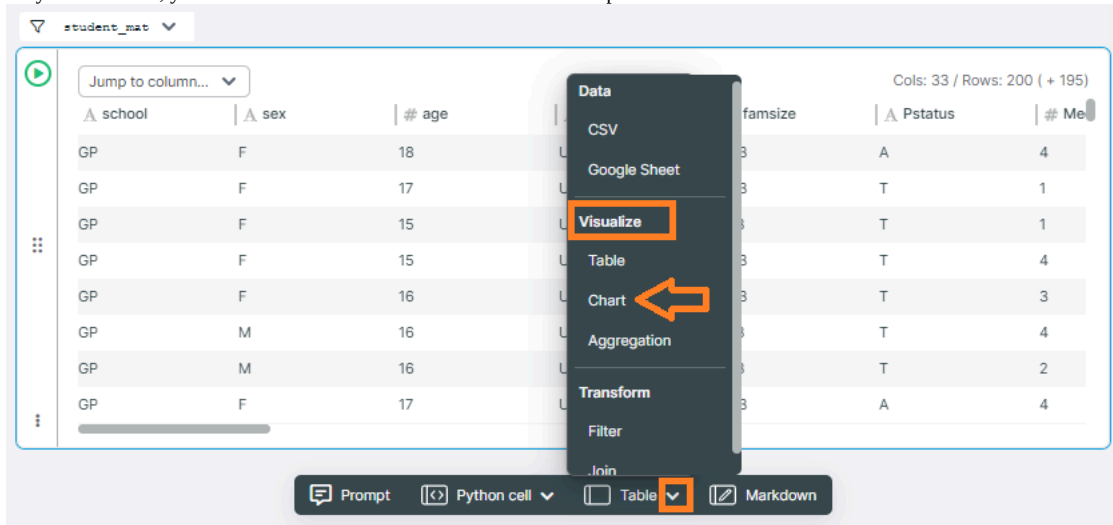


You can download this code file as .py or .ipynb. Click the three vertical dots, then select 'Export' and choose the Python extension you want to download the code.

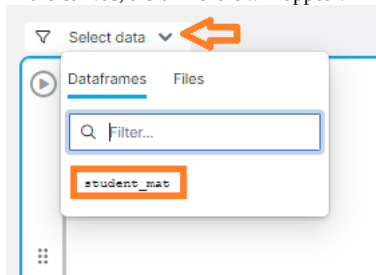


Task 5: Generating a chart with three attributes from the data set, 'Walc,' 'Dalc,' and 'famrel,' to know the effect of family relation on the drinking tendency of students (both on weekends and weekdays)

As you did earlier, you need a blank chart on the canvas. Click the drop-down arrow on 'Table' and select 'Chart' in the Visualize section.



In the canvas, a blank chart will appear. If "student-mat.csv" is not selected for the chart, click the 'Select data' drop-down arrow and click 'student_mat.'



You will select a 'Line chart' and for the X-axis, select the 'Walc' attribute with 'Average' as 'Binning/Aggregation'.

Chart type

Line

X-axis

Y-axis

Color

Axis controls

Swap X and Y axes

Suggestions

- A bin is recommended for a numerical/time series x axis on a line chart
- Define a Y axis

Rows displayed

200

Clear

For the y-axis, pick 'famrel' as shown below:

Chart type

Line

X-axis

Y-axis

Color

Axis controls

Swap X and Y axes

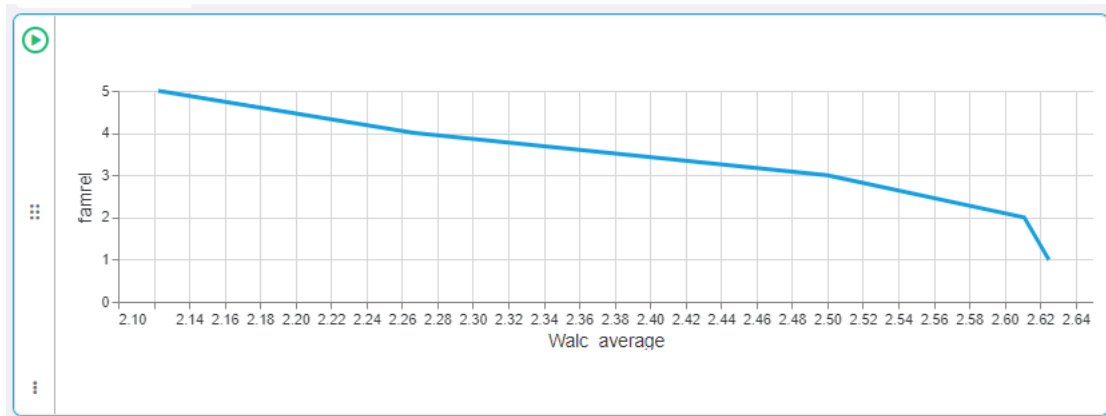
Suggestions

- A bin is recommended for a numerical/time series x axis on a line chart
- A aggregation is recommended for the y axis on a line chart

Rows displayed

Clear

A line chart is generated as below:



You can switch to 'Bar chart' and use color to include the third attribute (Dalc). Choose the values below in the right-hand panel for 'Color.'

Chart configuration panel showing settings for a bar chart.

Data | Appearance

Column: **# Dalc**

Binning / Aggregation: **Average**

Sort: **Ascending**

Color scheme: **Blues**

Include zero: ☐

Stacking options: **Stack**

Clear

Chart

Run (CTRL + R)

Dependencies (1)

Schedules

Chart type: **Bar**

X-axis

Y-axis

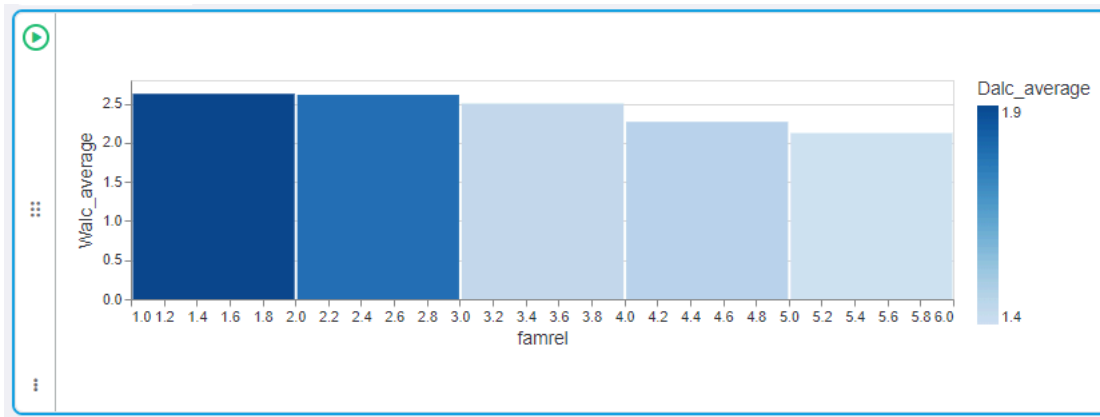
Color (indicated by an orange arrow)

Axis controls

Swap X and Y axes

Rows displayed: 200

Now click "Swap X and Y axes" in the Axis control, and the chart is generated with the color legend for 'Dalc_average.'



Task 6: Creating a heatmap to display the effect on grade (G3) of mean alcohol level consumption in workday alcohol consumption and Pstatus (parent status—single or together)

As you did earlier, you need a blank chart on the canvas. For this task, select 'Heatmap' as the chart type for the x-axis, select 'Dalc' with equiwidth binning, in the y-axis, select 'G3' with equiwidth binning, and for color, select 'Pstatus' as shown below:

Chart type: Heat map

X-axis: # Dalc

Y-axis: G3

Color: Pstatus

Axis controls: Swap X and Y axes

Suggestions: A aggregation is recommended for the color axis on a heat map

Rows displayed: 200

Include zero: ☐

Clear

The image displays two screenshots of a chart configuration interface, likely from a data visualization tool, showing settings for a heatmap.

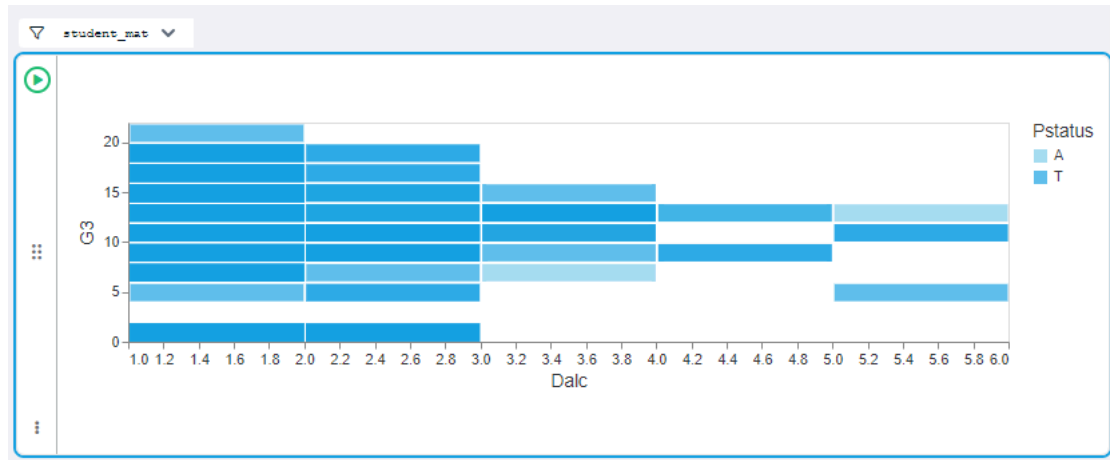
Top Screenshot (Data Tab):

- Chart type:** Heat map
- X-axis:** (empty)
- Y-axis:** (highlighted with an orange arrow)
- Color:** (empty)
- Axis controls:** ☒ Swap X and Y axes
- Suggestions:** A aggregation is recommended for the color axis on a heat map
- Rows displayed:** 200
- Data Tab Settings:**
 - Column:** # G3
 - Binning / Aggregation:** EquiWidthBinning
 - Sort:** None
 - Include zero:** ☐
 - Clear:** (button)

Bottom Screenshot (Appearance Tab):

- Chart type:** Heat map
- X-axis:** (empty)
- Y-axis:** (empty)
- Color:** (highlighted with an orange arrow)
- Axis controls:** ☒ Swap X and Y axes
- Suggestions:** A aggregation is recommended for the color axis on a heat map
- Rows displayed:** 200
- Appearance Tab Settings:**
 - Column:** Pstatus
 - Binning / Aggregation:** None
 - Sort:** None
 - Color scheme:** Default
 - Stacking options:** Stack
 - Clear:** (button)

The heatmap will be generated as below:



Conclusion

In this lab, you learned how to use generative AI to generate various charts and graphs on the given data set.

Author:

[Dr. Pooja](#)



Skills Network