

CS Master's Compass: The Grad School Comparison Tool

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October 2023

CS Master's Compass is an interactive graduate school comparison tool. Our application empowers prospective students to make informed decisions about their Computer Science Graduate education.

Here, at CS Master's Compass, we know that choosing the right graduate school can be a daunting prospect. So, we have built an application to help you compare Master's program in Computer Science. Learn how to use our tool below.

1 Installation

To use our interactive comparison tool, follow these steps:

- Access our source code by downloading the folder: B1_Group8
- Install required Python modules:

In addition to the modules that Anaconda provides, you will need to install other modules. The additional packages are outlined in 'requirements.txt' file. To install them, first navigate to the directory where the folder is stored, then run the 'pip install' command. The code below illustrates how to do this (please note that you need to update dir to your own directory)

```
cd dir
pip install -r requirements.txt
```

2 Running the Program

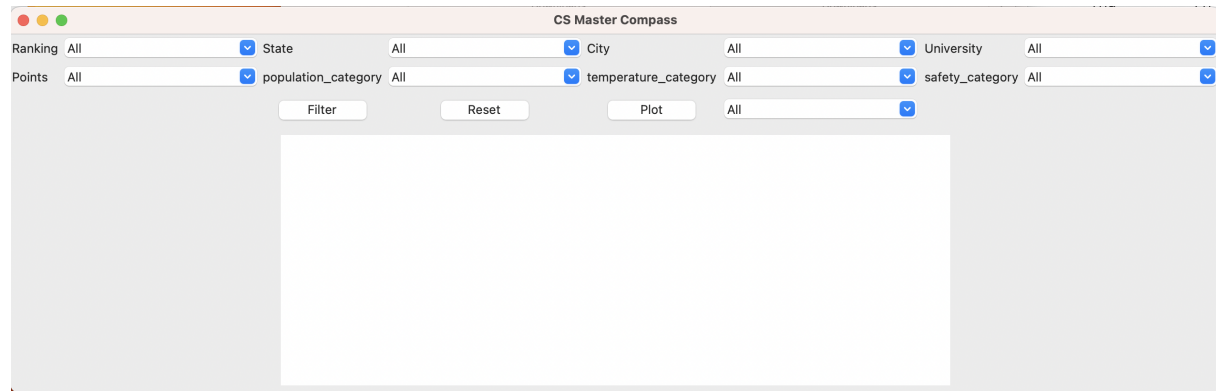
Our main file is cs_master_compass.py. We recommend running the cs_master_compass.py file on either:

- PyCharm; or
- On the terminal directly by running:

```
python cs_master_compass.py
```

CAUTION: We do NOT recommend running it on Spyder. Running it on Spyder might lead to the interactive map not being displayed properly. For best results, use Pycharm or the terminal.

A GUI window should pop up. The window should look like this:

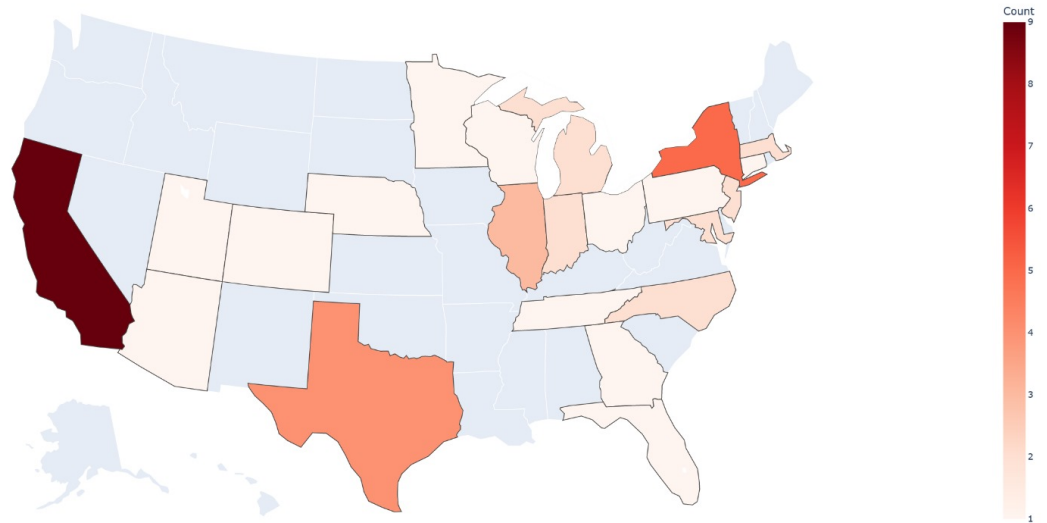


From here, you have multiple ways through which you can interact with the CS Master Compass tool.

2.1 Plot an Interactive Map

Where are the top CS Masters program located? Our choropleth map of the U.S. shows you the count of CS programs for each state that made it to the top 50 list. You can hover over each state and see the number of top-50 masters program in that state. To display the map, press plot directly; or choose "map" in the drop-down menu on the 3rd row, then press plot. A browser will pop-up with the map. The window should look like this:

CS Program Distribution Heatmap



You can hover on the map to see the count of universities in each state that made it to the top 50 CS MS programs. For example, if we hover on NY state, we can see that there are 5 universities.

2.2 Choose a program based on your criteria

Our filtering search engine allows you to pick from any of the following criteria and returns CS programs that meet your criteria:

- Ranking (Top 10, Top 20, Top 30 etc..)
- State
- City
- University
- Points (These are the points associated with the ranking : the higher the the points the higher the ranking)
- Population Category: Small, Medium, Large
- Temperature: Cold, Medium, Hot
- Safety: Medium, Low, High

You can filter to any combination you would like and then press "Filter".
Note: if you had a prior selection, please click on "Reset" first.

For example if I was interested in the CS Masters programs in New York State only and with in an area with a large population, I could filter to New York State and to a large population and I would get the following 2 universities as results:

The screenshot shows the 'CS Master Compass' application window. The filters are set to: Ranking: All, State: New York, City: All, University: All, Points: All, population_category: large, temperature_category: All, and safety_category: All. The results list two universities:

- University: Columbia University**
 Ranking: 9
 State: New York
 City: New York City
 Points: 33
 Tuition: in state tuition is \$49024, out state tuition is \$49024
 Population: relatively large size, number estimated in 2022 is 8335897
 Safety: relatively low risk of danger, total criminal count in 2021 is 0
 Temperature: cold, average value in 2022: spring is 8.18°C, summer is 20.71°C, fall is 10.81°C, winter is -4.0°C
 Description: Columbia University is a private Ivy League university located in New York City. Columbia offers a Master of Science in Computer Science with a number of tracks to choose from, including: computational biology, computer security, machine learning, natural language processing, software systems to graduate, students must complete one course from each of the following areas: AI and applications, systems, theory.
- University: New York University**
 Ranking: 22
 State: New York
 City: New York City

You can also scroll down to see further results:

This screenshot shows the same application window with the same filters. It displays the second result from the previous window, New York University, and includes the description for Columbia University from the previous window:

- including: computational biology, computer security, machine learning, natural language processing, software systems to graduate, students must complete one course from each of the following areas: AI and applications, systems, theory.
- University: New York University**
 Ranking: 22
 State: New York
 City: New York City
 Points: 24
 Tuition: in state tuition is \$34704, out state tuition is \$34704
 Population: relatively large size, number estimated in 2022 is 8335897
 Safety: relatively medium risk of danger, total criminal count in 2021 is 15
 Temperature: cold, average value in 2022: spring is 8.18°C, summer is 20.71°C, fall is 10.81°C, winter is -4.0°C
 Description: Located in New York City, New York University, or NYU, is a private research university with solid rankings in the computing field. NYU offers a flexible Master of Science in Computer Science. Students can choose from a diverse set of electives in topics such as: computer security, game design, information visualization, search engines.

Similarly, if I was interested in universities located in hot climates and that are part of the Top 10 programs, I would get the following window:

The screenshot shows a web application titled "CS Master Compass". It features a series of dropdown menus for filtering data. The "Ranking" dropdown is set to "Top10". The "State" dropdown is set to "All". The "City" dropdown is set to "All". The "University" dropdown is set to "All". The "Points" dropdown is set to "All". The "population_category" dropdown is set to "All". The "temperature_category" dropdown is set to "hot". The "safety_category" dropdown is set to "All". Below the dropdowns are three buttons: "Filter", "Reset", and "Plot". The "Filter" button is highlighted. Below the buttons, a text box displays the following information:

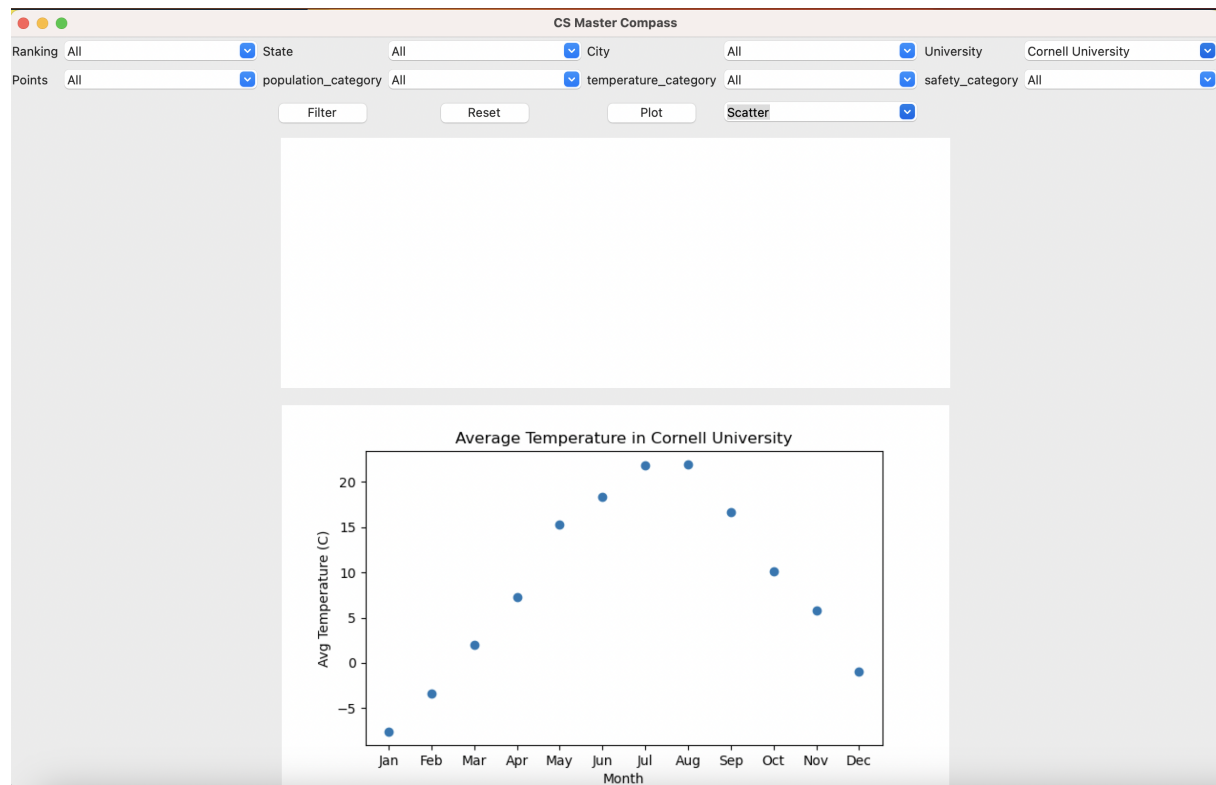
```

University: Georgia Institute of Technology
Ranking: 5
State: Georgia
City: Atlanta
Points: 36
Tuition: in state tuition is $14064, out state tuition is $29140
Population: relatively medium size, number estimated in 2022 is 499127
Safety: relatively low risk of danger, total criminal count in 2021 is 0
Temperature: hot, average value in 2022: spring is 18.14°C, summer is 26.71°C, fall is 17.83°C,
winter is 9.18°C
Description: Georgia Institute of Technology, more commonly known as Georgia Tech, is a public
university located in Atlanta, Georgia. The school's Master of Science in Computer Science is a
30-credit program with three options: course,project,thesisM.S. candidates select from a variety of
specializations, including: computational perception and robotics,interactive intelligence,modeling
and simulations,social computing.

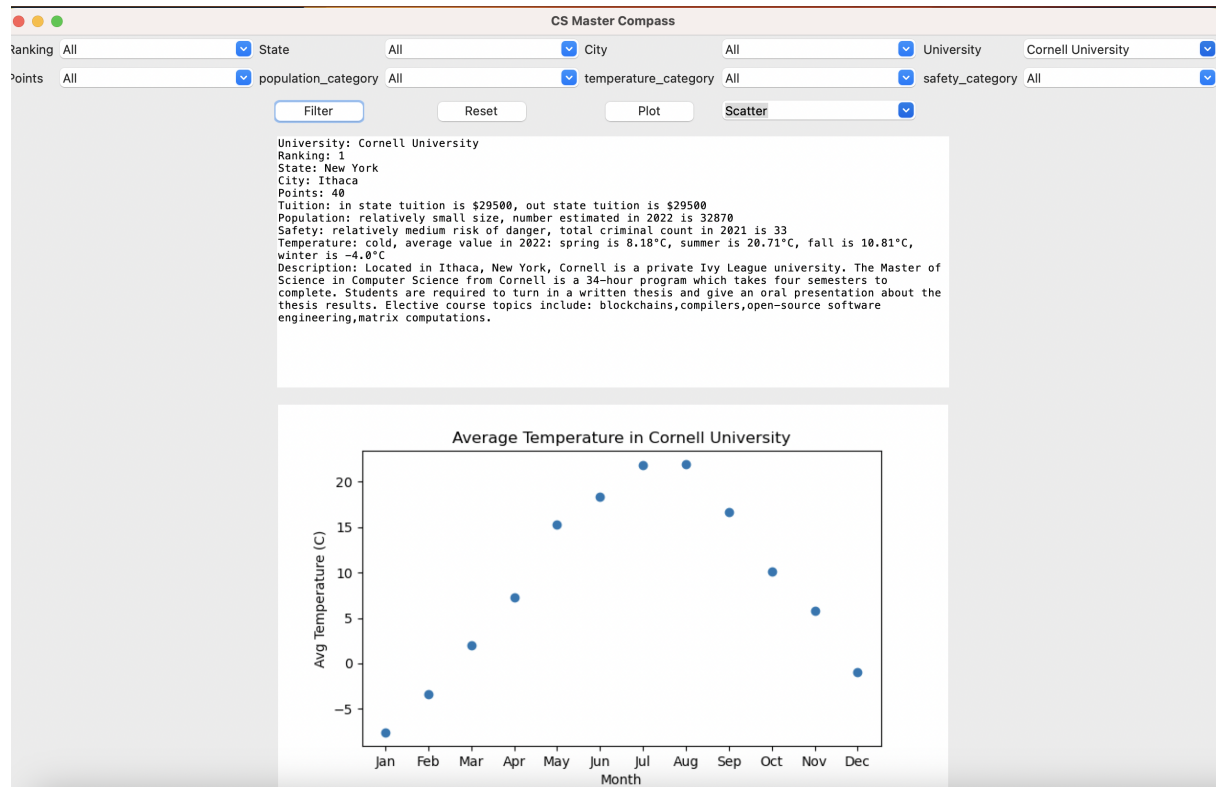
```

2.3 Visualize weather scatterplot

In addition to the map and text-based results, the user can also visualize the monthly average temperature in each university of their choosing. To do so, first click on "Reset", then choose a "University", then navigate to the dropdown menu on the third row and choose "scatterplot". This should display a scatterplot of the average temperatures for that university. For example, for Cornell we get the following window:



You can also display both the scatterplot and the description of the university by clicking on "Filter" in addition to "scatterplot". You should get the following results



3 Video

For an interactive walkthrough of our project being run, please watch this video linked here (if the hyperlink does not open, copy paste this link in your browser: <https://youtu.be/J6m6J-3Pfa0>)

Thank You!