



Applied Data Science Capstone

Comparing Ivy League Universities

Introduction: The Hypothetical Student

- Cluster and compare colleges based on details about the universities and attractions in the cities in which they are located
- The hypothetical student in this analysis wants to attend **an elite university** and **enjoys going to museums, attending live performances, and exploring nature**



Data



Data on the universities scraped from:

<http://blog.collegetuitioncompare.com/2015/05/ivy-league-2015-2016-estimated-tuition.html>

<https://www.collegetuitioncompare.com/best-schools/ivy-league/>



Location and venue data from
the Foursquare API

Key Data on Ivy League Universities

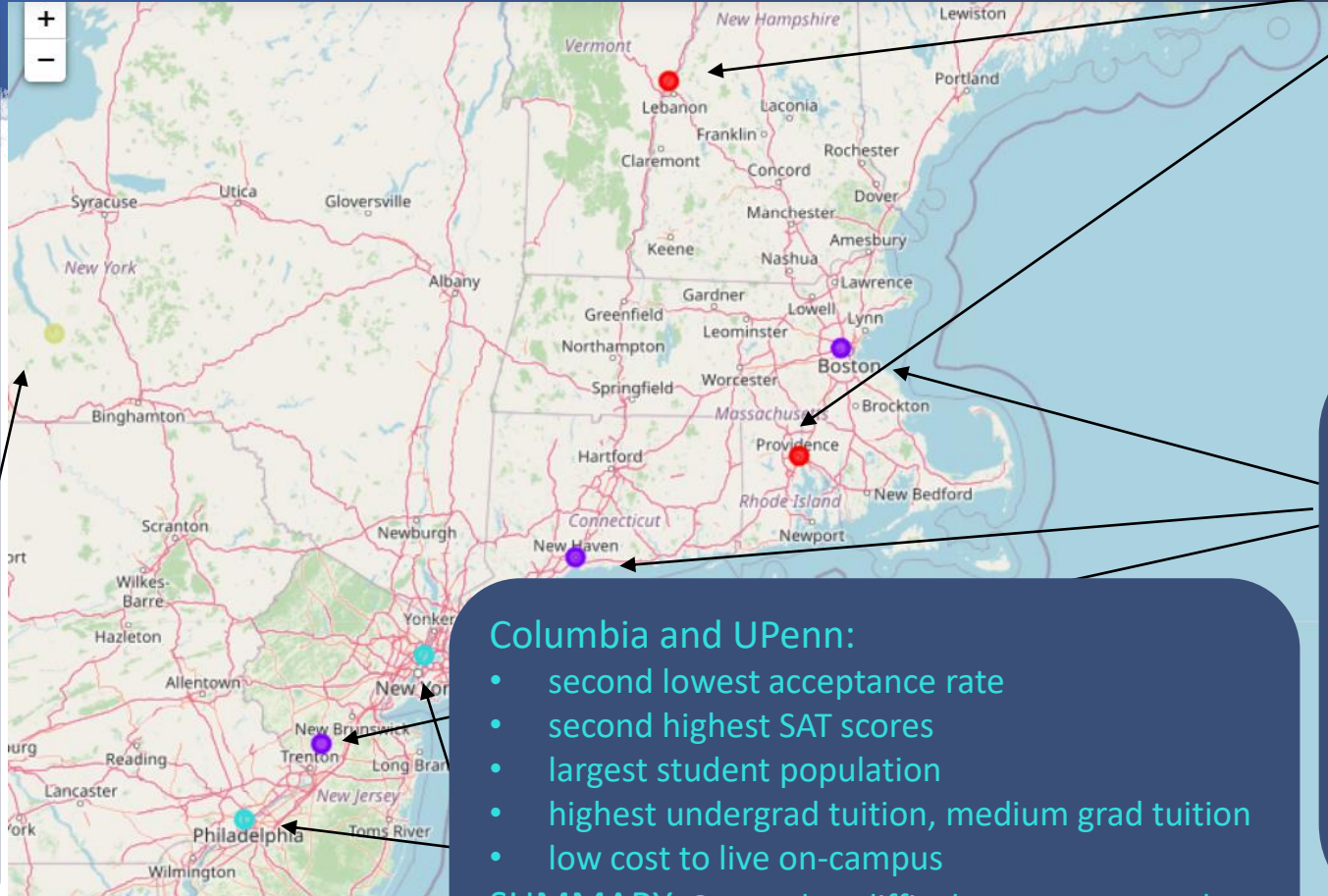
Name	Acceptance Rate	SAT Score	Graduation Rate	Population	Student-Faculty Ratio	City	Undergraduate Tuition & Fees	Graduate Tuition & Fees	Cost of Living (On-Campus)	Latitude	Longitude
Brown University	0.08	1485	0.95	10257	0.1667	Providence, RI	58404	58180	17454	41.826148	-71.404674
Columbia University in the City of New York	0.06	1505	0.96	31077	0.1667	New York, NY	61788	49968	16670	40.807619	-73.962367
Cornell University	0.11	1465	0.95	23600	0.1111	Ithaca, NY	57222	29585	18066	42.447505	-76.483603
Dartmouth College	0.09	1490	0.95	6572	0.1429	Hanover, NH	57638	55947	18414	43.703747	-72.289352
Harvard University	0.05	1520	0.98	31566	0.1429	Cambridge, MA	51925	49214	20875	42.373711	-71.117264
Princeton University	0.05	1505	0.96	8374	0.2	Princeton, NJ	52800	53770	20300	40.348158	-74.659310
University of Pennsylvania	0.08	1485	0.95	25860	0.1667	Philadelphia, PA	57770	40182	18136	39.952056	-75.195065
Yale University	0.06	1515	0.97	13433	0.1667	New Haven, CT	55500	43300	20095	41.311007	-72.926121

Initial K-Cluster Analysis

Cornell

- highest acceptance rate
- lowest SAT scores
- large student population
- lowest graduate tuition, fairly high undergraduate tuition
- fairly low cost to live on-campus
- worst faculty-student ratio

SUMMARY: Easiest to get accepted, good for students who need less personal attention from faculty, good financial option for graduate students



Brown and Dartmouth

- second highest acceptance rate
- second lowest SAT scores
- smallest student population
- high tuition for graduate and undergraduate students
- low cost to live on-campus

SUMMARY: Easier to get into, good if you like very small student bodies

Harvard, Yale, and Princeton:

- lowest acceptance rate
- highest SAT scores
- mixed student population (Harvard is large, Yale and Princeton are small)
- lowest tuition for both undergraduate and graduate students
- highest cost to live on-campus

SUMMARY: Most elite and difficult to get accepted at

Columbia and UPenn:

- second lowest acceptance rate
- second highest SAT scores
- largest student population
- highest undergrad tuition, medium grad tuition
- low cost to live on-campus

SUMMARY: Somewhat difficult to get accepted, good if you like large student bodies

Preferred Cluster

- The student would prefer to attend a college in the most “elite” cluster (Harvard, Princeton, and Yale)
 - lowest acceptance rate
 - highest SAT scores
 - highest graduation rate

Within-Cluster Analysis

Within a one-mile radius of campus:

- Harvard has 100+ food venues, 57 arts/entertainment venues, and 100+ outdoor/recreation venues
- Princeton has 72 food venues, 20 arts/entertainment venues, and 33 outdoor/recreation venues
- Yale has 100+ food venues, 38 arts/entertainment venues, and 43 outdoor/recreation venues

Most Common Food Venues

	University	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Harvard University	American Restaurant	Pizza Place	Bakery	Italian Restaurant	Café	Japanese Restaurant	Indian Restaurant	New American Restaurant	Burger Joint	Seafood Restaurant
1	Princeton University	Pizza Place	Mexican Restaurant	Sushi Restaurant	Sandwich Place	Chinese Restaurant	Italian Restaurant	Bakery	American Restaurant	New American Restaurant	Tapas Restaurant
2	Yale University	Pizza Place	American Restaurant	Italian Restaurant	Mexican Restaurant	Café	Deli / Bodega	Indian Restaurant	Thai Restaurant	Food Truck	Sandwich Place

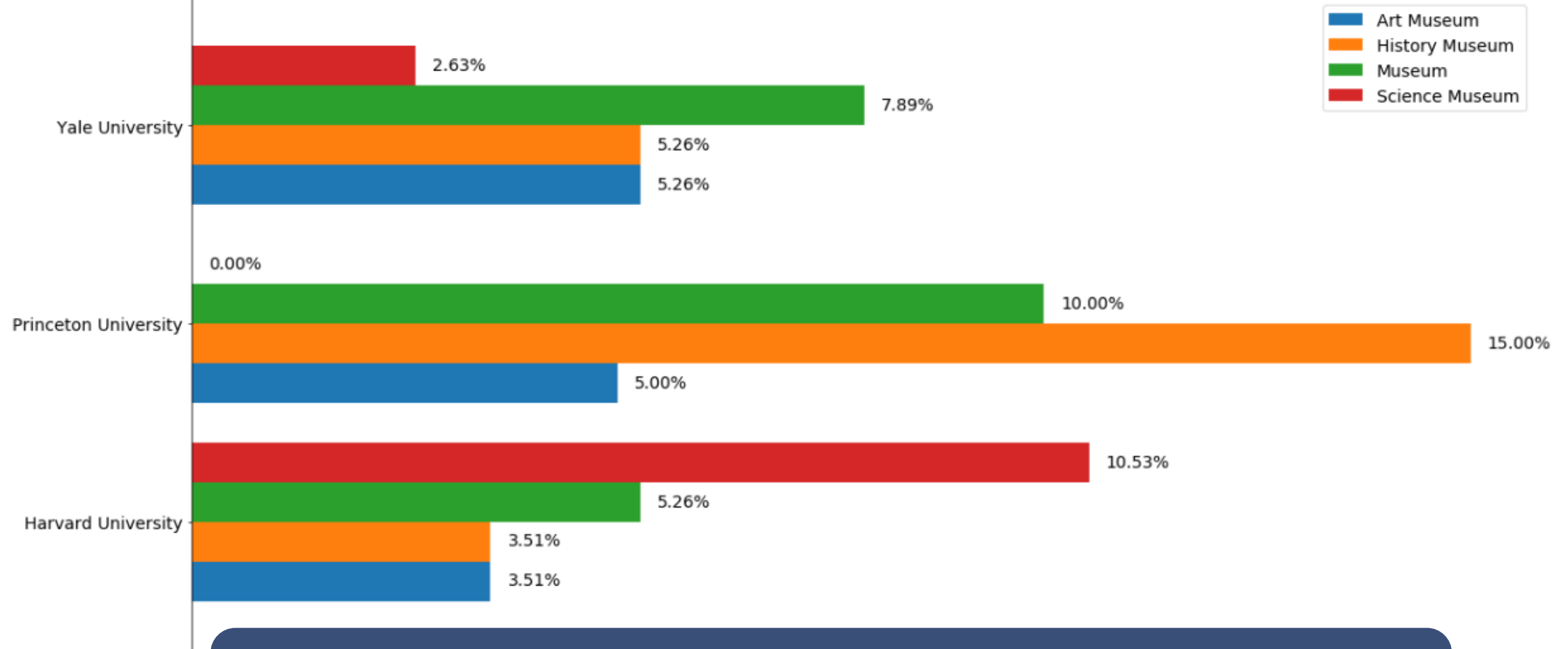
Most Common Live Performance Venues

	University	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Harvard University	Theater	Music Venue	Dance Studio	Art Gallery	Science Museum	Outdoor Sculpture	Museum	Comedy Club	Jazz Club	History Museum
1	Princeton University	Theater	History Museum	Museum	Concert Hall	Dance Studio	Art Gallery	Movie Theater	Indie Movie Theater	Outdoor Sculpture	Art Museum
2	Yale University	Theater	Music Venue	Concert Hall	Art Gallery	Museum	Rock Club	Movie Theater	History Museum	Dance Studio	Art Museum

Most Common Outdoor/Nature Venues

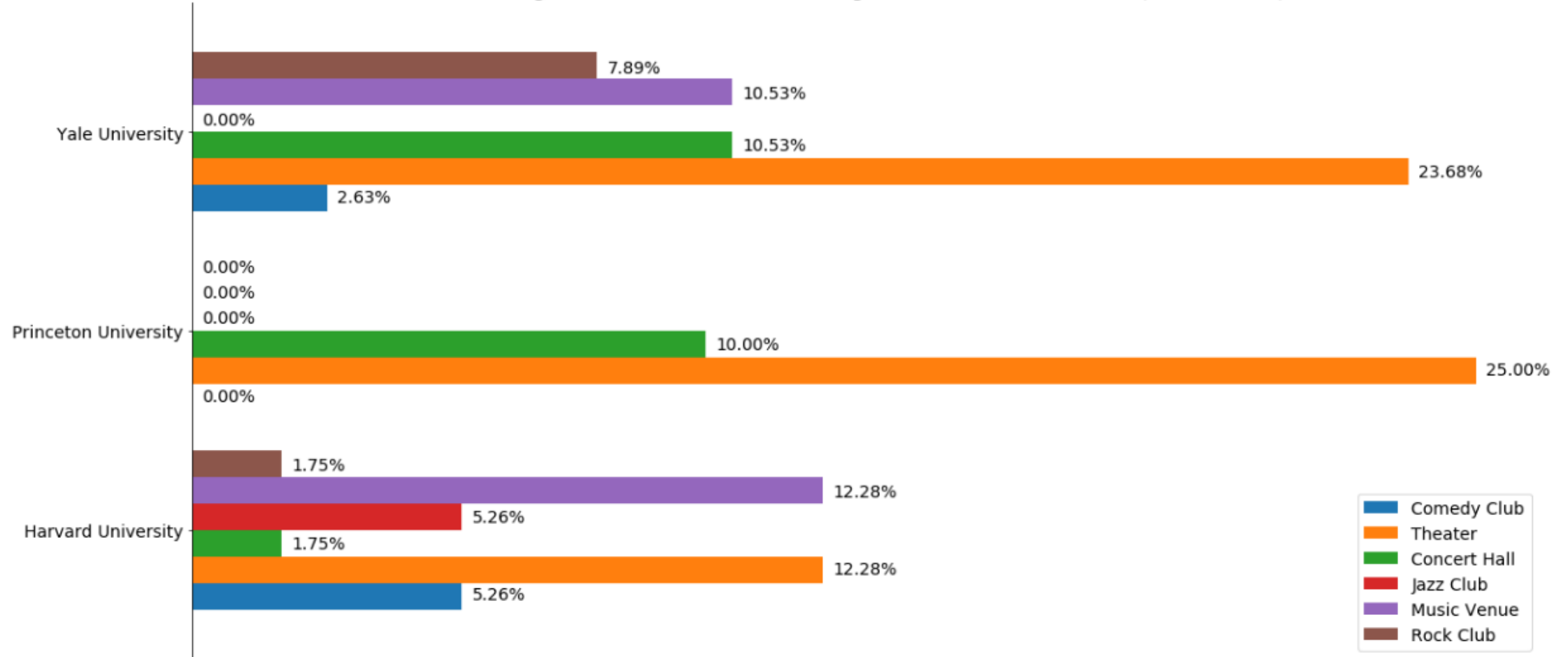
	University	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Harvard University	Park	Plaza	Gym	Yoga Studio	Gym / Fitness Center	Playground	Baseball Field	Athletics & Sports	Harbor / Marina	Skating Rink
1	Princeton University	Plaza	Yoga Studio	Park	Gym / Fitness Center	Athletics & Sports	Pool	Trail	Pedestrian Plaza	Baseball Field	Garden
2	Yale University	Gym	Plaza	Gym / Fitness Center	Yoga Studio	Park	Baseball Field	Squash Court	Cycle Studio	Sports Club	Sculpture Garden

Percentage of Museums among Arts/Entertainment Venues (1 Mile Radius)



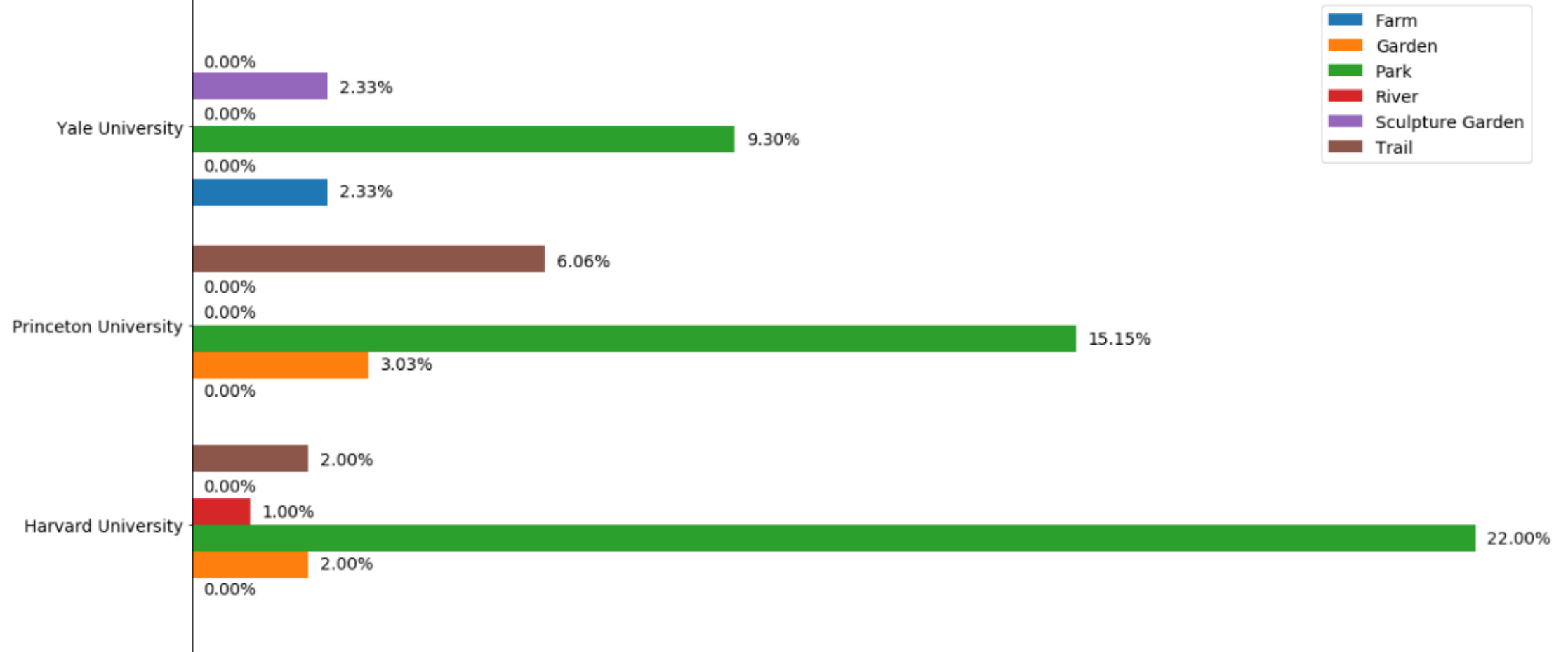
- Near Yale, 21.04%, of the 38 arts/entertainment venues are museums (**8 total**)
- Near Princeton, 30% of the 20 arts/entertainment venues are museums (**6 total**)
- Near Harvard, 22.81% of the 57 arts/entertainment venues are museums (**13 total**)

Percentage of Performance Venues among Arts/Entertainment Venues (1 Mile Radius)



- Near Yale, 55.36% of the 38 arts/entertainment venues are performance venues (**21 total**)
- Near Princeton, 35% of the 20 arts/entertainment venues are performance venues (**7 total**)
- Near Harvard, 38.58% of the 57 arts/entertainment venues are performance venues (**22 total**)

Percentage of Nature Attractions among Outdoor/Recreational Venues (1 Mile Radius)



- Near Yale, 13.96% of the 43 outdoor/recreation venues are nature venues (**6 total**)
- Near Princeton, 24.24% of the 33 outdoor/recreation venues are nature venues (**8 total**)
- Near Harvard, 27% of the 100 outdoor/recreation venues are nature venues (**27 total**)

Conclusion

- **According to this analysis, this hypothetical student should attend Harvard University**
 - Within “elite” cluster, Harvard has the lowest acceptance rate, highest SAT scores, and highest graduation rate (it the most elite)
 - Harvard has the most museums, performance venues, and outdoor/nature attractions in the surrounding area