

How are companies influencing Asian American students' interests in AI industries they may want to explore?

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ABSTRACT

“Abstract intelligence (AI) is a human enquiry of both natural and artificial intelligence at the reductive embodying levels of neural, cognitive, functional, and logical from the bottom up” (Wang). Over the last several years, AI has become one of the quickest growing and most talked-about industries in the world. As interest in AI increases, there has been an associated increase in the number of students in universities studying computer science, and specifically concentrating in AI. NLP and computer vision continue to be the most discussed; however, many smaller AI industries (but equally as profitable) have popped up in regards to financial, government, and pharmaceutical data. Computer science students tend to naturally gravitate towards companies that have NLP or computer vision as those are the most well-known fields, leaving it much harder for smaller AI companies to garner the same number of applicants from collegiate computer science students that larger, better marketed, companies.

In this study, I ask the question: “How are companies influencing Asian American students' interests in AI industries they may want to explore?”

I hypothesize that Asian American college students' interests in jobs after undergraduate education are heavily influenced by what companies they see in the media, and which company's products they recognize. Additionally, I hypothesize that more technically versed students have a more sophisticated understanding of their options.

INTRODUCTION

As described in the abstract, the goal of this study is to delve into the details of what influences Asian American students' interests in regards to AI for post-undergraduate job opportunities. My motivation for this research starts with an initial interest in computer science recruiting. From there, I researched what industries (especially with smaller companies) have the highest pain points in regards to the recruiting of computer science students in college. After user interviews and online research, it has been made clear that there is a large pain point to high-revenue AI companies that are not in NLP or computer vision, as students are not overtly knowledgeable in these specific fields. Therefore, these companies receive less organic applicants than larger/better-marketed AI companies, and deal with higher barriers of entry due to students not understanding their industry as well. Additionally, in regards to personal motivation, I am a large part of my local South Asian communities and therefore have focused this study on the Asian American college student demographic.

RELATED WORK & DIFFERENTIATION

Both computer science recruiting and the AI industry have seen lots of research done into them over the last several years. However, much of this AI research has focused in the NLP and computer vision industries, not other sectors of AI. Additionally, little is known about the overlap between computer science recruiting and all sectors of AI.

Firstly, what major sectors of AI exist besides NLP and Computer Vision?

AI Sector	Market Size* (in \$ billions)	CAGR**	Primary Generic Sector
AR/VR	28	31.4%	Private Sector
Chatbots	17.7	34.75%	Private Sector
NLP	10.7	26.8%	Private Sector
Predictive Analytics	10	36.0%	Private / Public Sector

Computer Vision	9.45	16.0%	Private Sector
Healthcare	6.1	48%	Public Sector / Academia
Autonomous Driving	1.64	31.3%	Private Sector
AI Drug Discovery	1	36.0%	Public Sector / Academia

**Market size is for 2021*

***CAGR = compound annual growth rate for time period 2022-2030*

From this chart, we see that some of the most discussed and researched AI sectors (such as Autonomous Driving) don't have the largest market sizes, and some other sectors (like predictive analytics, healthcare, or chatbots) are less talked about but have higher market sizes!

While studies have been done on these individual AI sectors, none has been done on how companies branding can affect computer science, Asian American student recruiting into these sectors. A quick Google Scholar search returns 2.2 million articles for AI, 1.2 million for university recruiting, nearly 400k for CS recruiting, 800k for Asian American CS students, and only 28k for the overlap that I am researching (see Exhibit A).

METHODS

High Level Experiment Breakdown

- Research Question
 - How are companies influencing Asian American students' interests in AI industries they may want to explore?
- Hypotheses
 - Companies have a high influence on Asian American students' interests
 - Asian American college students' interests for post-grad jobs are influenced by what companies and products they know

- More technically-versed students have a more sophisticated understanding of their options
- Variable Breakdown
 - *Independent*: Technical Experience with AI, Knowledge of AI Companies, AI Products Recognition
 - *Dependent*: AI Industries of Interest
 - *Moderator*: Major
- Target Demographic
 - Asian American college students

To gather data from my target demographic, I created a survey in the form of a Google Form. (See Exhibit B) I was able to get 64 total responses within my target demographic. In this survey, I asked users for the following:

1. Generic Information about their experience with AI (qualitative and quantitative)
2. To rank their familiarity with 11 of the largest companies from different AI sectors
3. To rank their familiarity with 11 of the largest AI products associated with these 11 companies
4. Both qualitative and quantitative questions on their experience in undergrad with AI courses. Additionally, I quizzed their knowledge on which technical skills are most valuable for the AI industry
5. Industry-focused questions about past internships and work experience, as well as their opinion 3 major generic sectors (Academia, Public, and Private sectors)
6. Demographic information

Specifically for sections 2 and 3, I designed the questions to show me users' recognition of popular AI companies OR associated products, as to see whether certain AI companies were identifiable by just their name, their products, or both. Question 4's skill set quiz was used as a method of splitting up users into more or less knowledgeable groups for statistical analysis.

FINDINGS

I tackled 2 main kinds of analyses when looking through this data, exploratory and statistical.

Firstly, I cleaned the data and created some calculated fields in Python. I computed 4 new columns: Quiz Score, Quiz Score Group, Avg Company Familiarity, and Avg Product Familiarity. Avg Company Familiarity and Avg Product Familiarity were computed within Excel itself by computing the average of each entry's responses to the 11 company rankings and 11 product rankings, respectively.

For quiz score, I assigned a matrix of correct answers to the responses:

	Don't Know What This Is	No Relevance	Low Importance	High Importance	100% Crucial
[Python]	0	0	0.3	0.6	1
[Javascript]	0	0.3	1	0.3	0
[Java]	0	0.3	1	0.3	0
[SQL]	0	0	0.3	1	0.3
[R]	0	0	0.3	1	0.3
[C++]	0	0.3	1	0.3	0
[Shell Scripting]	0	0.3	1	0.3	0
[K Cluster Analysis]	0	0	0.3	1	0.3
[Signal Processing]	0	0.3	1	0.3	0
[Deep Learning]	0	0	0.3	1	0.3
[Calculus]	0	1	0.3	0	0
[Probability and Statistics]	0	0	0.3	0.6	1
[Linear Algebra]	0	0.3	1	0.3	0
[Graph Analysis]	0	0.3	1	0.3	0

A score of 1 represents the correct answer, meaning that the best score anyone could get was a 14.0. In Python, I systematically calculated their sums, and created a new column for quiz scores. I also created a new categorical column representing above_50 or below_50 (above 50% on the quiz or below, which was determined by whether someone's quiz score was above or below 7/14).

```
list_of_columns = [python, javascript, java, sql, r, cplus, shell, kcluster, signal, deeplearn, calc, probstats, linear]

idk = "Don't Know What This Is"
nr = "No Relevance"
low = "Low Importance"
high = "High Importance"
crucial = "100% Crucial"

for list in list_of_columns:
    list.replace(idk, 0)

# scores has 4 values
def replace_values(li, scores):
    li = li.replace(nr, scores[0])
    li = li.replace(low, scores[1])
    li = li.replace(high, scores[2])
    li = li.replace(crucial, scores[3])
    return li

python = replace_values(python, [0, .3, .6, 1])
javascript = replace_values(javascript, [.3, 1, .3, 0])
java = replace_values(java, [.3, 1, .3, 0])
sql = replace_values(sql, [0, .3, 1, .3])
r = replace_values(r, [0, .3, 1, .3])
cplus = replace_values(cplus, [.3, 1, .3, 0])
shell = replace_values(shell, [.3, 1, .3, 0])
kcluster = replace_values(kcluster, [0, .3, 1, .3])
signal = replace_values(signal, [.3, 1, .3, 0])
deeplearn = replace_values(deeplearn, [0, .3, 1, .3])
calc = replace_values(calc, [1, .3, .3, 0])
probstats = replace_values(probstats, [0, .3, .6, 1])
linearalg = replace_values(linearalg, [.3, 1, .3, 0])
graphanalysis = replace_values(graphanalysis, [.3, 1, .3, 0])
```

**Note: Full Python code can be found in Jupyter Notebooks in Github repositories shown in Exhibit C.*

In terms of exploratory analysis, I loaded the data in Tableau to calculate my demographics, explore interesting company/product associations, and breakdown majors by the quiz score groups. See exhibit D for these figures.

In terms of demographics, the study had 64 respondents with an average age of 21.30 and average graduation year of 2022.27. Approximately 30% were software or engineering majors, and sex was a 50% split between male and female. 100% were Asian (as per target market).

In terms of familiarity, our figure shows us that for most companies the familiarity of the company name and associated product are roughly equivalent. A few stood out:

AWS (4.6) → Snowflake (2.7)

GM (4.3) → Cruise (2.3)

IBM (4.3) → Watson (2.4)

Tomorrow.io (1.6) → Weather.com (4.5)

Weather.com is the only product/partner that had more familiarity than its associated company.

For statistical analysis, I ran a multitude of T and Z tests. Quite a few resulted in not being statistically significant, but two primary ones were.

Firstly, I compared the mean product familiarity scores between the 2 quiz score groups, above_50 and below_50. A 2 Sample T test is an appropriate test here as the variances across both groups are equal, the distribution is roughly normal,

- [2 Sample T Test](#), 2 tailed, with Alpha level .05
- h_0 = College students who are NOT as knowledgeable in AI technical skills are equally as familiar with major products in various AI industries as college students who ARE knowledgeable in AI technical skills
- h_1 = College students who are MORE knowledgeable in AI technical skills are more familiar with major products in various AI industries than those who are NOT

The results were a T Stat of 2.10 and a **P Value 0.04**, therefore we reject the null hypothesis.

This means that college students who are more knowledgeable in AI technical skills are more familiar with major products in various AI industries than those who are NOT as knowledgeable in AI technical skills.

The second analysis I looked into was comparing what generic industries (Public, Private, Academia) did respondents think were the lowest barrier of entry between 2 groups. These 2 groups were split on which had product familiarity scores above average, and which did not. A [2 proportion Z test](#) is the appropriate test here as the groups are mutually exclusive, the test characteristic is singular and categorical, the data is normally distributed, and data points are independent.

- 2 prop Z test, 2 tailed, with alpha level .05
- h_0 = College students who are MORE familiar with major products in various AI industries consider corporate jobs to be equally as easy to break into as non-corporate jobs, as compared to college students who are LESS familiar with major AI products
- h_1 = College students who are MORE familiar with major products in various AI industries consider corporate jobs to be EASIER to break into than non corporate jobs, as compared to college students who are LESS familiar

The results were a Z stat of 3.8062 and a **P Value of 0.00014**, therefore we reject the null hypothesis. This means that college students who are MORE familiar with major products in

various AI industries consider corporate jobs to be EASIER to break into than non corporate jobs, as compared to college students who are LESS familiar with major products in various AI industries.

**Note that all statistical calculation work can be found on Exhibit C Jupyter notebooks on Github.*

DISCUSSION

In terms of implications of the data above, I was able to pull 4 main conclusions. Firstly, when it came to major consumer products, I was able to find that the biggest products were not necessarily all made by well-known consumer brands. In some cases, the product spoke for itself and the company behind them wasn't as recognizable. This shows that it is not necessary for a product to be made by a well-known name for it to be popular. Secondly, in terms of forward thinking with AI careers, I was able to find that software majors were much more prepared to be successful in that field. This was expected, but the data shows it strongly – their breadth of opinions on AI were much stronger. Thirdly, in terms of actual knowledge of the AI industry, the information is not solely taught through the news – an individual must actually take the time to learn the skills to be successful. This shows that there are no shortcuts to preparing our Asian American youth for the AI industry without a proper understanding of the applications of AI skill sets. Finally, when it comes to job prospects after undergraduate education – individuals that are most knowledgeable of the AI industry are prone to be less intimidated by the prospect of job opportunities in the industry. By strengthening the AI knowledge of our Asian American youth, we will decrease the perceived barriers of entry into industry.

Looking forward to future work, my recommendations are to increase exposure and options to Asian American students so they are not just following the companies that they see in the news or media. If we are able to give them tools, we enable them to figure out what they actually want or love. For recruiters and employers, an increased retention rate from increased job satisfaction would be an ideal outcome. Increasing applicants to lesser known companies would allow exposure. These companies also pay the same amount of money, if not more. Additionally, expanding research to not just be about Asian Americans, obtaining enough data to

run analysis based on majors, running technical proficiency tests when quizzing users, and overall just collecting more data about education and internships would significantly scale the impact of this research.

Finally, in terms of limitations of my project there were a few data pitfalls. The sample size, for starters, was mostly from BU or Northeastern students, and was smaller than I would have liked. To gather more data, including more responses from other regions and schools would be helpful. There was also a lack of resources, in terms of money, time, and the amount of people working on this project, which could be fixed in future iterations of the project.

CONCLUSION

It is unarguable that Artificial Intelligence is one of the hottest topics of our generation and will continue to grow over the next several years. While it is true that it has been studied extensively, there are new breakthroughs (both technologically and otherwise) in the industry. By empowering Asian American youth with the tools and knowledge to succeed in the AI space, we enable them to confidently enter the workforce after undergraduate education. Moreover, proper AI education in curriculums about the vast spectrum of specializations besides NLP and computer vision will allow for growth of some of the most impactful AI sectors, such as finance, healthcare, and pharmaceuticals drugs. With stronger AI start-ups and a stronger young AI workforce, the already-booming growth of the AI industry will see even more exponential increases over the next few years, or even decades.

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Exhibit A

artificial intelligence industry	university recruiting
About 2,220,000 results (0.08 sec)	About 1,250,000 results (0.07 sec)
computer science recruiting	asian american computer science students
About 363,000 results (0.03 sec)	About 803,000 results (0.10 sec)
asian computer science ai students recruiting	
About 28,300 results (0.14 sec)	

Exhibit B

Name *

Nikhil Tekwani

On a high level, please rank your familiarity with AI as an industry *

1 2 3 4 5

Never heard of it ☐ ☐ ☐ ☐ ☒ Very familiar, have used it a lot in work or school

If you would like, please describe your experience with AI or knowledge surrounding it

Your answer

Next Page 1 of 6 Clear form

Company Familiarity

Please rank your familiarities with the listed companies, based off their names.

Alphabet (Google) *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

General Motors *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

IBM *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Palantir Technologies *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Meta (Facebook) *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Johnson & Johnson *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Novartis *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Tomorrow.io (ClimaCell) *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Amazon *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Apple *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Amazon Web Services *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Product Familiarity

Please rank your familiarities with the listed products, based off their names. Please only select 5 if you have specifically used the product before.

Google Assistant *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Cruise Vehicles *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Watson NLP *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Apollo Software Deployment *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Oculus VR *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Neutrogena *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Cosentyx Drug *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Weather.com *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Alexa *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Siri *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Snowflake *

12345

Never Heard of Them

☐☐☐☐☐

Very Familiar

Undergraduate Courses and AI

Just some quick questions on your undergraduate experience and questions about AI! You're almost done with the survey!

How many semesters of college have you completed? *

Include the current semester if you are still in school

Your answer

About how many classes have you taken in undergrad specifically focused on AI or ML? *

Your answer

About how many classes have you taken in undergrad that discussed AI or ML, but were not necessarily focused on AI or ML? *

Your answer

Based on your experience, how important are these skill sets to go into AI jobs? *

	Don't Know What This Is	No Relevance	Low Importance	High Importance	100% Crucial
Python	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Javascript	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Java	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
SQL	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
R	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C++	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shell Scripting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
K Cluster Analysis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Signal Processing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Deep Learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Calculus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Probability and Statistics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Linear Algebra	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Graph Analysis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Are you familiar with these industry domains? If so, how much do you think they pay? *

	Not Familiar	Lowest Pay	Decent Pay	Highest Pay
New Drug Discovery	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Natural Language Processing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Computer Vision	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Autonomous Driving	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Weather Forecasting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sentiment Classification	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facial Recognition	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Virtual Reality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Predictive Analytics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Time Series Analysis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chatbots and Virtual Assistants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Crowd Sourcing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stock Prediction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Do you feel that your computer or data science undergraduate education has properly prepared you for a career in AI? *

- ☐ Yes
- ☐ No
- ☐ Unsure
- ☐ Not a computer or data science major

Please expand on the previous question if you are a CS, DS, IS, or Cybersecurity major

Your answer

Regardless of major, do your undergrad courses discuss job opportunities/industries that you can explore with the tools that course/your major teaches you? *

- ☐ Yes
- ☐ No
- ☐ Unsure

Please expand on the previous question, regardless of major

Your answer

Back

Next

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Clear form

Work Experience

Some quick questions about your Thank you so much for your time :)

How many internships/co-ops have you done in undergrad? *

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4+

How many of these were in data science, data analytics, AI/ML, or a similar field? *

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4+

If you are a computer or data science major, do you feel that your courses properly prepared you for your internship? *

- ☐ Yes
- ☐ No
- ☐ Unsure
- ☐ NA - CS major, but no internships
- ☐ NA - Not a CS Major

If applicable, please expand on the previous question

Your answer

If you had to choose one industry to work in, which would you choose? *

- ☒ Corporate (Private Sector)
- ☐ Academia/Research
- ☐ Government (Public Sector)

Which industry excites you the most? *


- ☐ Corporate (Private Sector)
- ☐ Academia/Research
- ☒ Government (Public Sector)

Which industry do you think pays the most? *

- ☒ Corporate (Private Sector)
- ☐ Academia/Research
- ☐ Government (Public Sector)

Which industry do you think has the lowest barrier of entry? *

- ☒ Corporate (Private Sector)
- ☐ Academia/Research
- ☐ Government (Public Sector)

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Demographic Information

Last section, just some demographic information :) If you would like to be submitted for the Amazon gift card raffle, please leave your email. If not, that information is not necessary!

University *

☐ Northeastern

☐ BU

☐ Other: _____

Major *

☐ Computer Science

☐ Data Science

☐ Cybersecurity

☐ Business (Finance)

☐ Business (Other)

☐ Economics

☐ Computer Engineering

☐ Electrical Engineering

☐ Mechanical Engineering

☐ Engineering (Other)

☐ Math

☐ Other: _____

Age At Time Of Taking this Survey *

Your answer _____

Undergrad Graduation Year *

- ☐ 2026
- ☐ 2025
- ☐ 2024
- ☐ 2023
- ☐ 2022
- ☐ 2021
- ☐ 2020
- ☐ 2019
- ☐ 2018

Sex *

- ☐ Male
- ☐ Female
- ☐ Prefer not to say
- ☐ Other: _____

Ethnicity *

- ☐ Not hispanic or Latino
- ☐ Hispanic or latino

Race *

- ☐ White
- ☐ African American
- ☐ American Indian
- ☐ Asian
- ☐ Pacific Islander
- ☐ Other: _____

Exhibit C

https://github.com/nikhil-tekwani/is4800_final_project

Public Github repo contains Jupyter notebooks containing all data processing/cleaning information and all statistical tests.

Exhibit D

Total

64

Grad Year

2,022.27

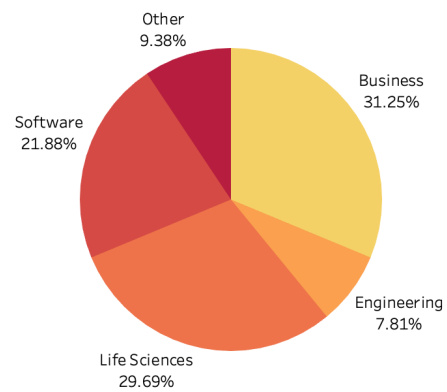
Age

21.30

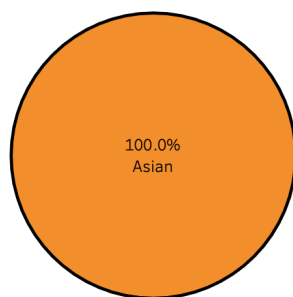
Region

Boston	40
Midwest	8
South	7
New England	5
California	2
DMV	2

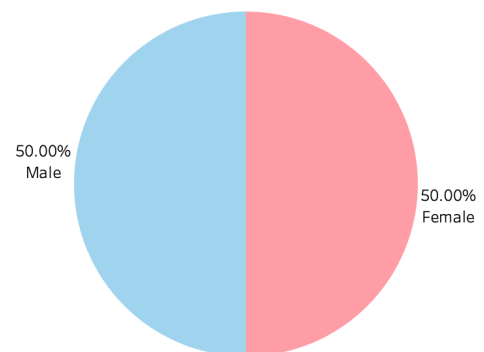
Major

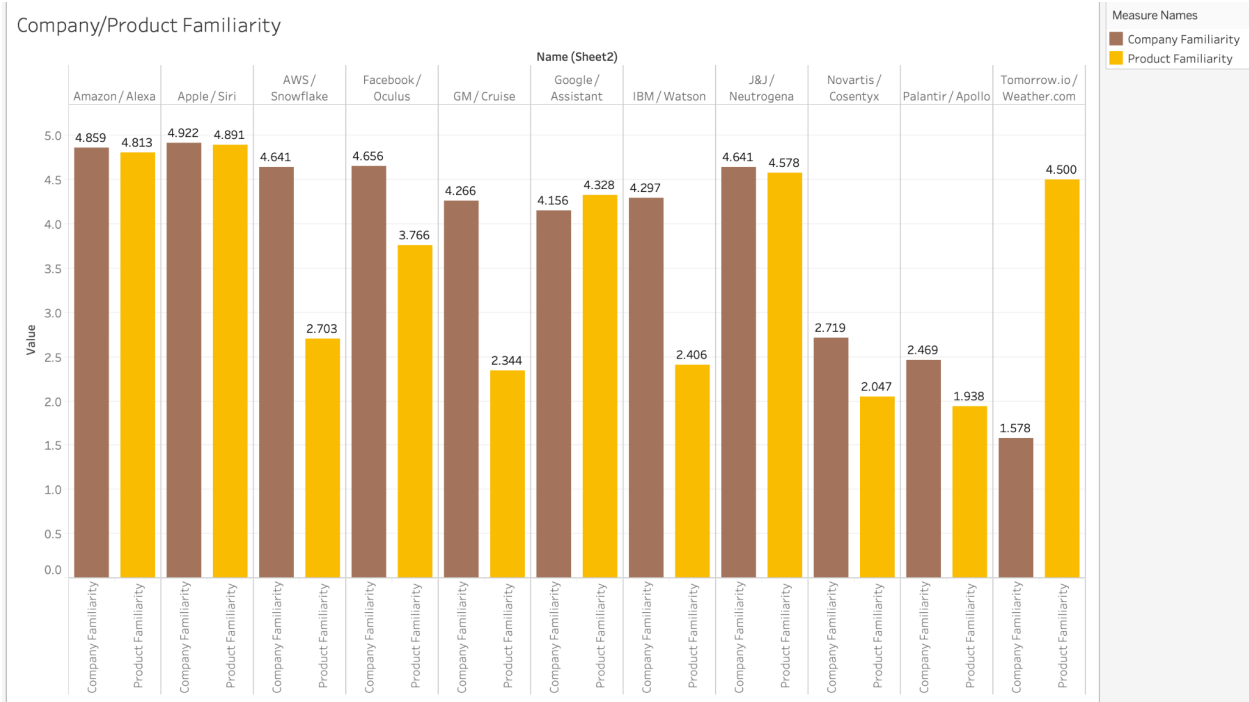


Race



Sex

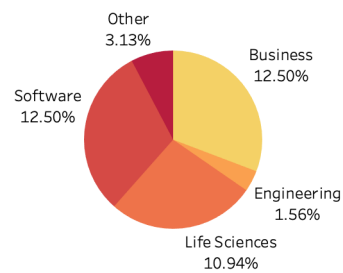




Major by Quiz Score Group

Quiz Score Group

above_50



below_50

