Capstone 2: Data Science Job Skills

Problem Statement & Context

- Which skills should I focus on learning first, where should I focus my job search, and in which industry should I focus my job search in to increase my odds of getting a job as a Data Scientist or Data Analyst in 2024?

- Data Scientist and Data Analyst jobs require a specialized set of skills. I want to identify the most in demand skills in the Glassdoor job descriptions for a Data Scientist and Data Analyst, so I know which ones to focus on developing first to be a more highly rated candidate during my job search. Understanding where these jobs are located and in which industries will allow me to more efficiently focus my search in the appropriate state and industry to increase my odds of getting a job as a Data Scientist or Data Analyst.

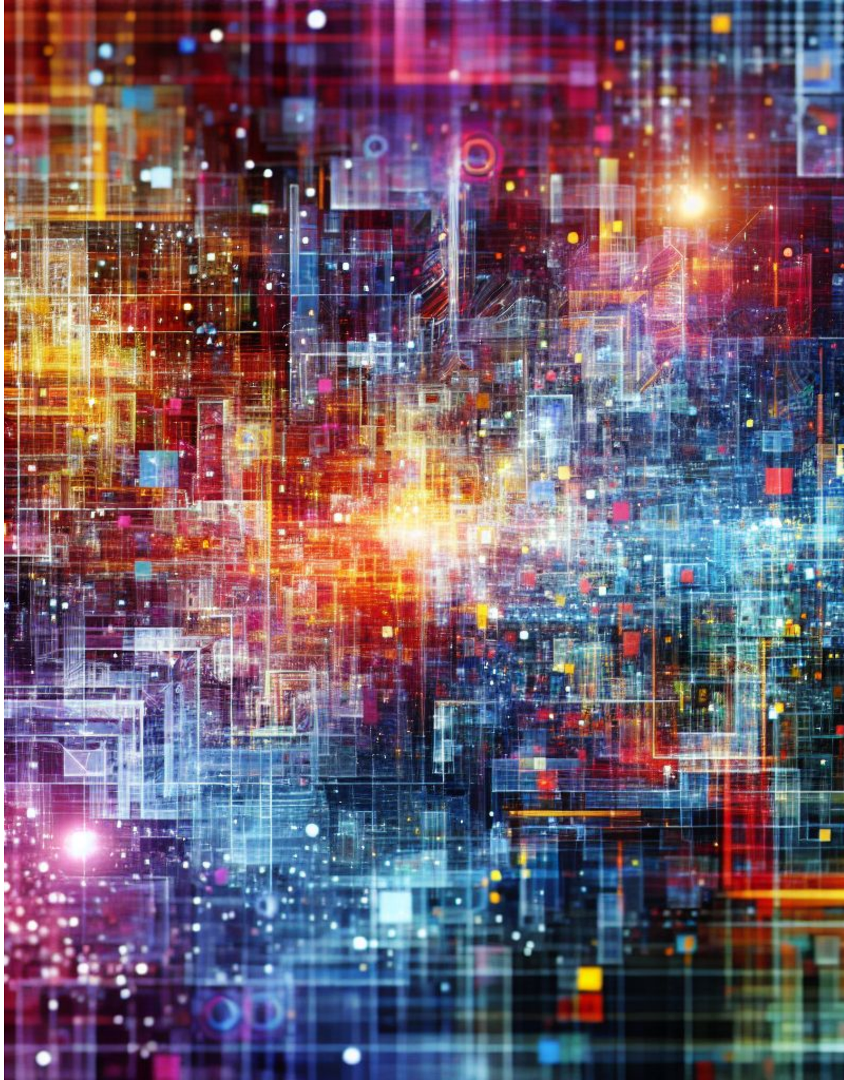
Criteria for Success

Identify the most common skills, location, and industry for a Data Scientist and Data Analyst job in the United States.

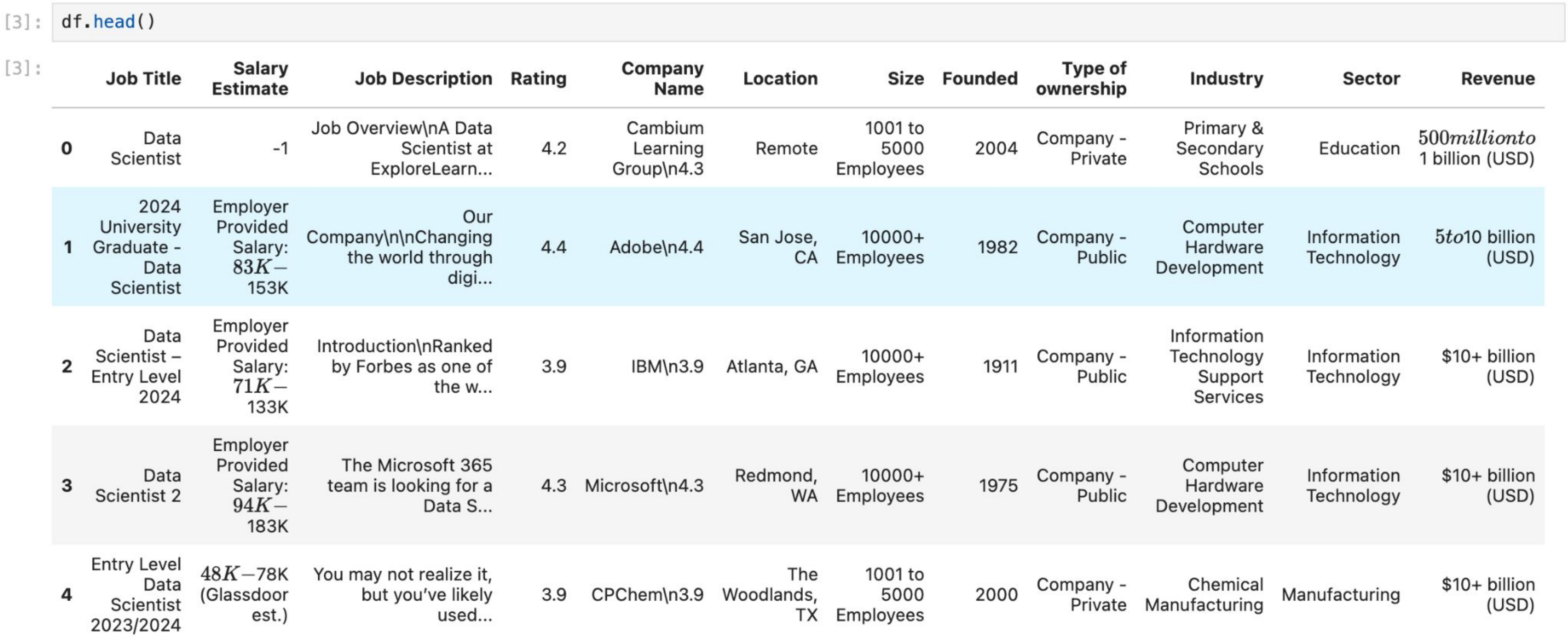
Data Collection

Data was gathered from Glassdoor's Data Science job listings using systematic web scraping to provide insights into essential job requirements and trends.

Glassdoor Data Science Job Listings



Data Sample



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[3]: df.head()
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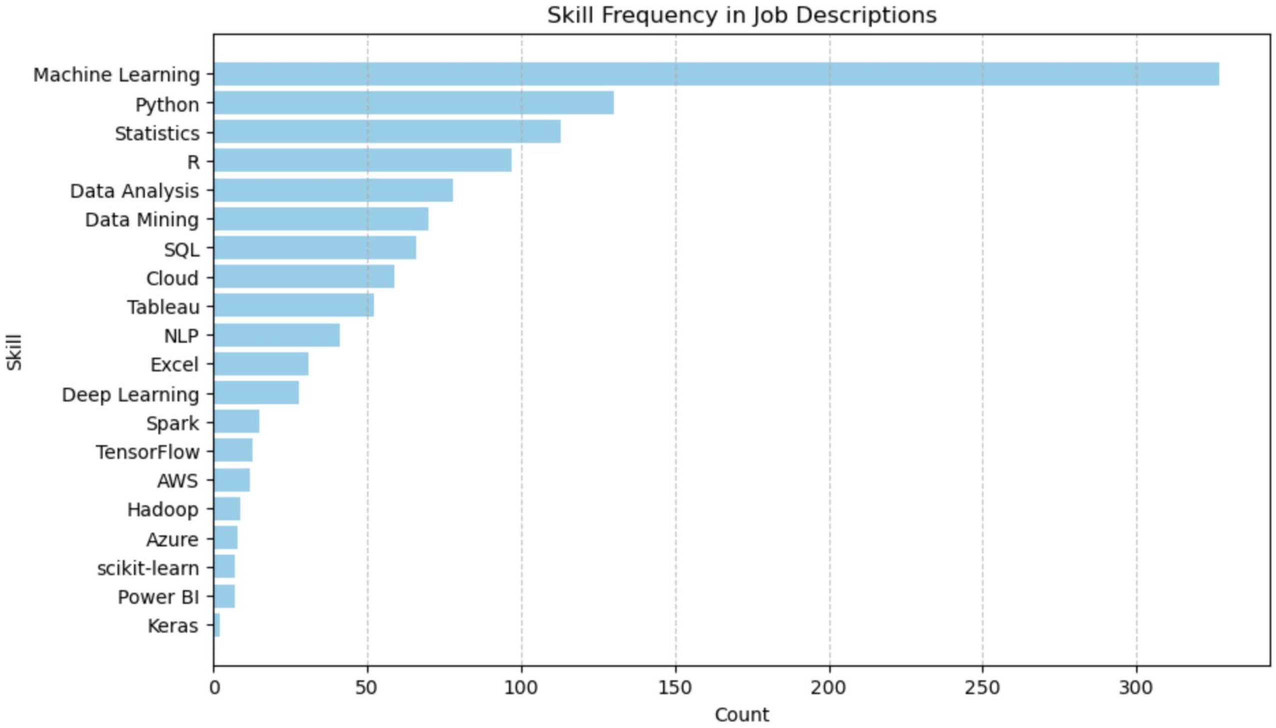
[3]:

	Job Title	Salary Estimate	Job Description	Rating	Company Name	Location	Size	Founded	Type of ownership	Industry	Sector	Revenue
0	Data Scientist	-1	Job Overview\nA Data Scientist at ExploreLearn...	4.2	Cambium Learning Group\n4.3	Remote	1001 to 5000 Employees	2004	Company - Private	Primary & Secondary Schools	Education	$500 millionto$ 1 billion (USD)
1	2024 University Graduate - Data Scientist	Employer Provided Salary: $83K-$ 153K	Our Company\n\nChanging the world through digi...	4.4	Adobe\n4.4	San Jose, CA	10000+ Employees	1982	Company - Public	Computer Hardware Development	Information Technology	$5 to$10 billion (USD)
2	Data Scientist – Entry Level 2024	Employer Provided Salary: $71K-$ 133K	Introduction\nRanked by Forbes as one of the w...	3.9	IBM\n3.9	Atlanta, GA	10000+ Employees	1911	Company - Public	Information Technology Support Services	Information Technology	$10+ billion (USD)
3	Data Scientist 2	Employer Provided Salary: $94K-$ 183K	The Microsoft 365 team is looking for a Data S...	4.3	Microsoft\n4.3	Redmond, WA	10000+ Employees	1975	Company - Public	Computer Hardware Development	Information Technology	$10+ billion (USD)
4	Entry Level Data Scientist 2023/2024	$48K-$78K (Glassdoor est.)	You may not realize it, but you've likely used...	3.9	CPChem\n3.9	The Woodlands, TX	1001 to 5000 Employees	2000	Company - Private	Chemical Manufacturing	Manufacturing	$10+ billion (USD)

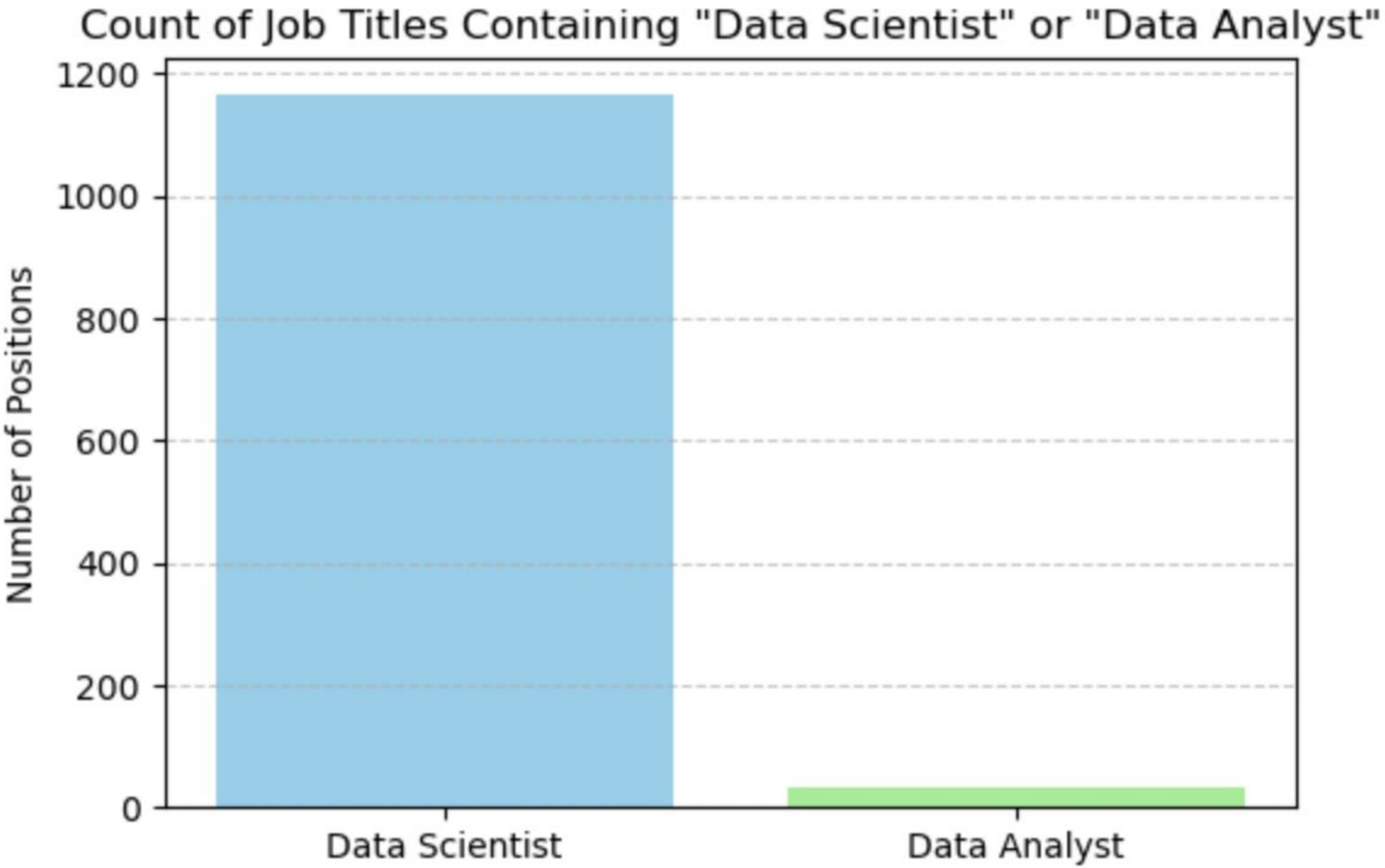
Exploratory Data Analysis



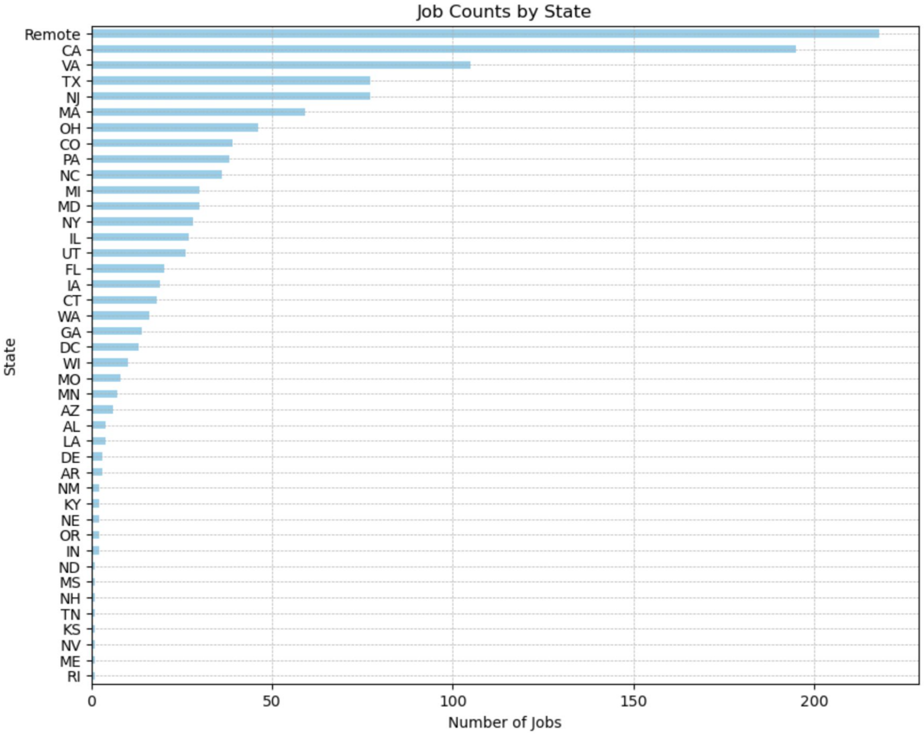
Most In-Demand Skills

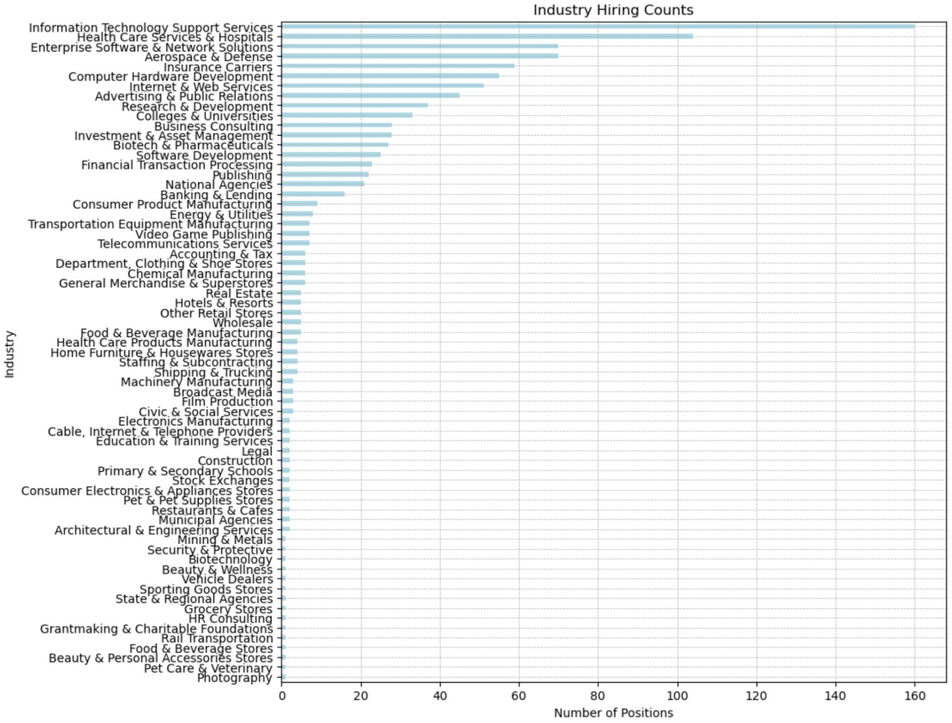
Top 15 Skills: Machine Learning, Python, Statistics, R, Data Analysis, Data Mining, SQL, Cloud, Tableau, NLP, Excel, Deep Learning, Spark, TensorFlow, AWS

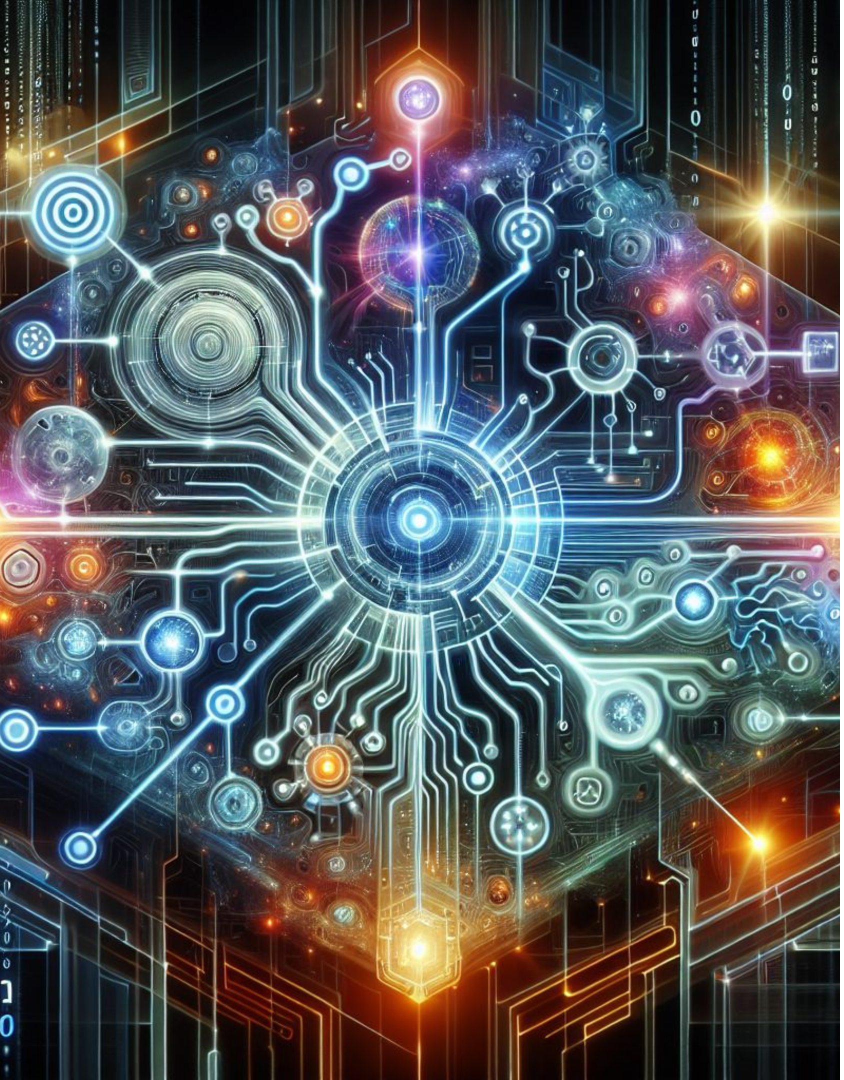
Exploratory Data Analysis



Exploratory Data Analysis


Job Counts by State


Industry Hiring Counts



Methodology

Three classification models were employed:

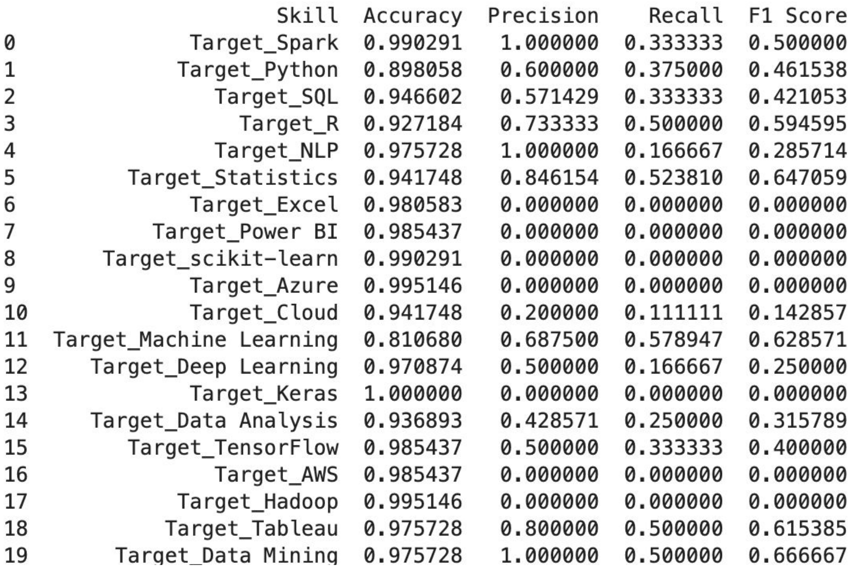
- Logistic Regression
- Random Forest
- Stacked Model combining LightGBM and XGBoost

Model Performance

- Random Forest was selected for its scalability, predictive power, and efficiency.

- Precision and recall scores indicated variability in how well different skills were predicted.

Base Model Results



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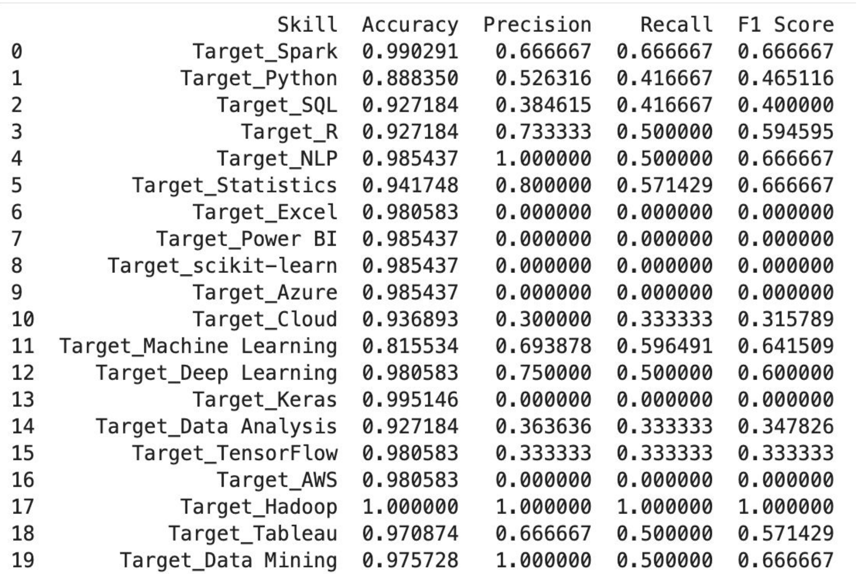
                    Skill  Accuracy  Precision    Recall  F1 Score
0            Target_Spark  0.990291   1.000000  0.333333  0.500000
1           Target_Python  0.898058   0.600000  0.375000  0.461538
2              Target_SQL  0.946602   0.571429  0.333333  0.421053
3                Target_R  0.927184   0.733333  0.500000  0.594595
4              Target_NLP  0.975728   1.000000  0.166667  0.285714
5       Target_Statistics  0.941748   0.846154  0.523810  0.647059
6            Target_Excel  0.980583   0.000000  0.000000  0.000000
7         Target_Power BI  0.985437   0.000000  0.000000  0.000000
8     Target_scikit-learn  0.990291   0.000000  0.000000  0.000000
9            Target_Azure  0.995146   0.000000  0.000000  0.000000
10           Target_Cloud  0.941748   0.200000  0.111111  0.142857
11 Target_Machine Learning  0.810680   0.687500  0.578947  0.628571
12   Target_Deep Learning  0.970874   0.500000  0.166667  0.250000
13           Target_Keras  1.000000   0.000000  0.000000  0.000000
14   Target_Data Analysis  0.936893   0.428571  0.250000  0.315789
15      Target_TensorFlow  0.985437   0.500000  0.333333  0.400000
16             Target_AWS  0.985437   0.000000  0.000000  0.000000
17          Target_Hadoop  0.995146   0.000000  0.000000  0.000000
18         Target_Tableau  0.975728   0.800000  0.500000  0.615385
19     Target_Data Mining  0.975728   1.000000  0.500000  0.666667
```

Final Model Results



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                    Skill  Accuracy  Precision    Recall  F1 Score
0            Target_Spark  0.990291   0.666667  0.666667  0.666667
1           Target_Python  0.888350   0.526316  0.416667  0.465116
2              Target_SQL  0.927184   0.384615  0.416667  0.400000
3                Target_R  0.927184   0.733333  0.500000  0.594595
4              Target_NLP  0.985437   1.000000  0.500000  0.666667
5       Target_Statistics  0.941748   0.800000  0.571429  0.666667
6            Target_Excel  0.980583   0.000000  0.000000  0.000000
7         Target_Power BI  0.985437   0.000000  0.000000  0.000000
8     Target_scikit-learn  0.985437   0.000000  0.000000  0.000000
9            Target_Azure  0.985437   0.000000  0.000000  0.000000
10           Target_Cloud  0.936893   0.300000  0.333333  0.315789
11 Target_Machine Learning  0.815534   0.693878  0.596491  0.641509
12   Target_Deep Learning  0.980583   0.750000  0.500000  0.600000
13           Target_Keras  0.995146   0.000000  0.000000  0.000000
14   Target_Data Analysis  0.927184   0.363636  0.333333  0.347826
15      Target_TensorFlow  0.980583   0.333333  0.333333  0.333333
16             Target_AWS  0.980583   0.000000  0.000000  0.000000
17          Target_Hadoop  1.000000   1.000000  1.000000  1.000000
18         Target_Tableau  0.970874   0.666667  0.500000  0.571429
19     Target_Data Mining  0.975728   1.000000  0.500000  0.666667
```

Conclusion and Future Work

- The analysis indicates variability in the model's ability to predict different skills accurately. Some skills are well predicted, while others are not detected at all.

- Improvements can be made by focusing on better feature representation, addressing class imbalance, optimizing model parameters, and utilizing more advanced NLP models. Emphasis should also be given to enriching the dataset to ensure that all skills are sufficiently represented.

Recommendations

1. Use the model to identify the most in demand skills in the job market for Data Scientist and Data Analysts by determining which skills are the most important.

2. This model can be used to help curate a training curriculum based on the most important skills to upskill individuals looking to work as a Data Scientist or Data Analyst.

3. Help understand which industries are hiring the most Data Scientists and Data Analysts and how the companies are rated (according to GlassDoor) to aid job seekers in focusing their job search.