

Machine Learning Is Important, But Programming Skills Rank Higher in Data Science Job Demand

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Outline:

Motivation & research Question -> Data Acquisition -> Analysis -> Ranking
Results -> Skill Intensity -> Conclusion and & Implications



Overview

- **Motivation:** With rise to AI/ML programs, we wanted to see if this translated to skills needed for jobs in this market especially since we are college students potentially looking for jobs in Data Science within the next couple of years.
- **Hypothesis:** *The top three requested skills for data scientist job postings in the United States will be machine learning or AI (ML/AI) oriented.*
- **Research Question:** Which skills are most frequently requested in recent data science job postings, and do machine learning/AI skills rank highest among them?
- **Modeling Approach:** Analyzed 2025 data science job postings, extracted and standardized key technical skills, identified AI-related skills using rule-based methods, computed AI skill prevalence across roles, built a fully reproducible R workflow



Data Acquisition

- **Initial challenge/decision:** Not being able to use INDEED data
- **Source:** Provided 2025 data science job postings dataset
- **Format:** Structured tabular data (CSV file)
- **Unit of Observation:** One row per job posting
- **Key Variables:** Job title, company, location,, skill fields
- **Size:** 944 postings
- **Acquisition:** Secondary dataset (no scraping performed)
- **Ethics & Licensing:** Public job posting data; no personal or sensitive information



Analysis Plan + Justification

Workflow

Dataset → Cleaning → Skill Extraction → AI /ML Classification → Results

Challenges

- Limiting amount of data to work with
- Inconsistent formatting

Validation

- Manual spot-checks
- Frequency diagnostics
- Fully reproducible R script

Results & Conclusion



Rank <int>	skill <chr>	Frequency <int>	Percentage_of_Postings <dbl>
1	python	375	50.47
2	r	306	41.18
3	machine learning	219	29.48
4	sql	202	27.19
5	aws	198	26.65
6	pytorch	148	19.92
7	spark	147	19.78
8	pandas	76	10.23
9	numpy	60	8.08
10	git	56	7.54

AI_Skill_Count <dbl>	Number_of_Postings <int>	Percentage_of_Postings <dbl>
0	345	46.43
1	315	42.40
2	77	10.36
3	6	0.81



Next Steps

- Expand analysis to compare AI/ML skill demand by specific role, location, and/or company
- Improve skill extraction with more advanced NLP methods
- Refine skill dictionary to capture emerging technologies/methods



References

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<https://github.com/yxs4yt/MRR--Project-1>

Distribution of ML/AI Skill Ratio in Data Science Job Postings

