

In the market for a job post-grad? Our analysis of LinkedIn's most in-demand job skills in the current market may prove to help you out...

Outline

1. Motivation
2. Data
3. Data Analysis Plan
4. Results
5. Next Steps

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DS 4002 09/27/23

Why is this relevant?

- *Context:* We are all players in the job market– most of us are in the thick of the job search right now. We wanted to give all of you a competitive advantage by analyzing the most in-demand skills in said current job market.
- *Research Question:* What are the most in-demand skills in the current job market based on LinkedIn job postings in 2023?
- *Hypothesis:* The IT, sale, and management skills are the most in demand in the current job market because they have the most frequent appearances in LinkedIn job descriptions and their high associated salary.
- *Model Approach:* We initially planned to analyze skill frequency in job descriptions by counting the occurrences of specific skills using text analysis. This analysis was conducted in two different ways, utilizing word frequency and entity recognition for cross-reference. Additionally, we aimed to apply linear regression to assess the relationship between skill frequency and salary, defining "in-demand" as both frequently requested and high paying. If time permitted, our final objective was to predict salary ranges based on individuals' skill sets using a categorical prediction model, possibly involving DecisionTree algorithms.

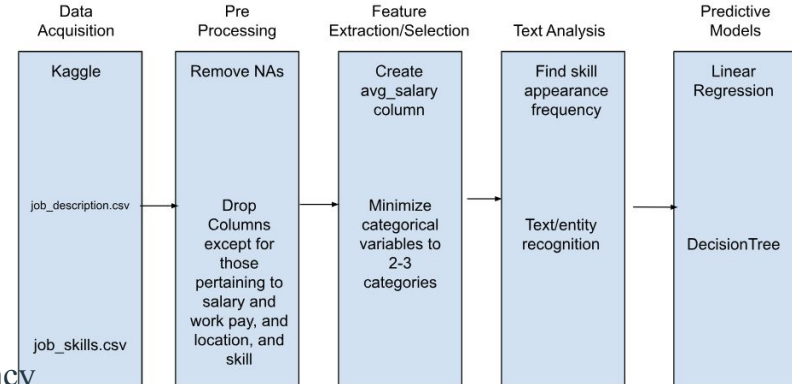
Data Acquisition & Explanation

- Data set from Kaggle titled ["LinkedIn Job Postings - 2023"](#)
- The original dataset consisted of 8 CSV files, which were subsequently consolidated into two: "job_postings" and "job_skills." The "job_postings" CSV contained information such as salary details, location, job descriptions from LinkedIn, and a total of 10,956 unique job titles and 13,856 unique job descriptions. Meanwhile, the "job_skills" CSV contained 15,886 rows with 27 columns, and it had 128,213 missing values. Notably, the "median_salary" feature had the highest number of missing values, prompting the need to create a new feature from the available data. Additionally, concerns were raised about the "pay_period" column, where 41% of values were either "YEARLY" or unspecified, with the remaining 59% being null. Furthermore, the "work_type" column was adjusted by combining "full_time" and "contractor" categories into one.
- Included is the data dictionary in which we explored the different variables within the data set.

Feature Name	Description
job_id	Job ID as defined by LinkedIn
description	Job Description
max_salary	Maximum Salary
med_salary	Median Salary
min_salary	Minimum Salary
pay_period	Pay Period
currency	Currency of Salary
compensation_type	Compensation Type
skill_abr	Abbreviation of skill from the skills CSV
work_type	Type of Work
title	Job Title
avg_salary	Average salary based on given maximum and minimum

Analysis Plan & Justification

- Ensure data consistency, handling exceptions where needed.
- Create an "average salary" column combining min and max salaries to replace median.
- Compile a skills database for machine learning training, matching job_skills CSV.
- Train an entity recognition model to extract skills from job descriptions (Model 1).
- Calculate skill frequency across the dataset using recognized skills (Model 2).
- Use linear regression to gauge skill demand based on frequency and wage.
- Predict wages using a DecisionTree model with three randomly generated skills.



Tricky Analysis Decision!

- Skills (ex. traits, job-skills) versus numeric data (ex. salary) or descriptors (ex. “job description”)
 - Categorical vs. numeric vs. textual variables and showing that relationship
- Lots of missing values; create new feature from remaining values and pre-existing values
- Combine work_type column with two categories full_time and contractor into one

Bias & Uncertainty Validation

- Handling missing data
- Jobs only include *paid* jobs; this may leave out skills geared towards student internships that are unpaid
- Risk of overfitting
- Outliers are present in our results
- Use of synonyms that indicate a similar meaning in regards to skills, jobs, or other relevant variables

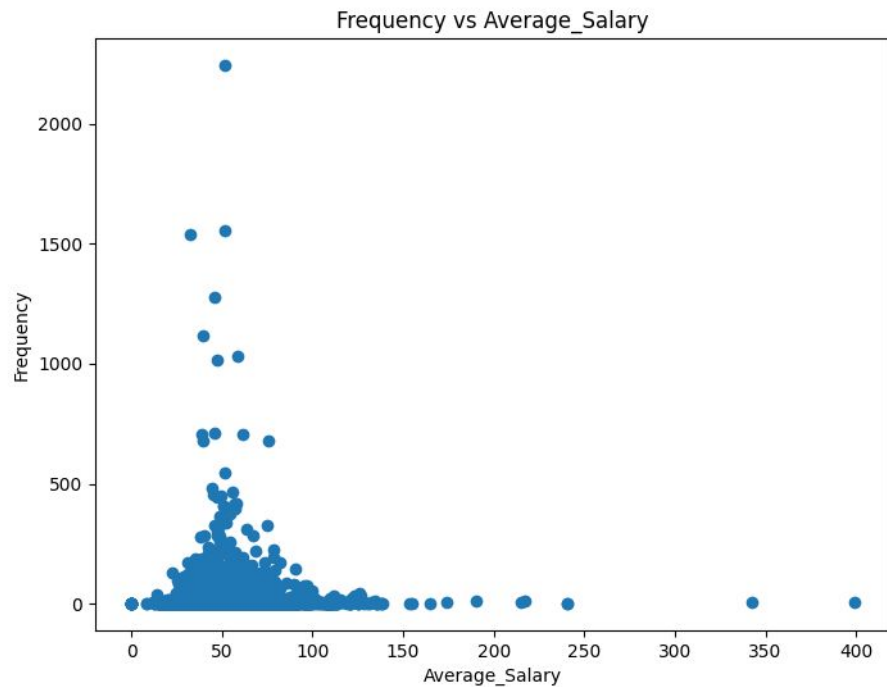
Results & Conclusions

Named Entity Recognition

• support and resolve **help desk** (Certification) issues tickets by **gathering information** (Soft Skill) to identify needs security and **industry** (Hard Skill) **best practice** (Hard Skill) solutions • and deploys pc server hardware and software including **operating system** (Hard Skill) applications and patches – possible nights and weekend work to support and **maintain** (Hard Skill) throughout haco us • supports troubleshoots repairs and **maintains** (Hard Skill) server issues and security for enterprise and large **scale** (Hard Skill) applications • provides **ac** (Soft Skill) **directory** (Hard Skill) **management** (Soft Skill) assistance to staff in **managing** (Soft Skill) user and computer **accounts** (Hard Skill) • troubleshoots reviews and resolves blocked website related to web **web management** (Hard Skill) **web filter** (Hard Skill) **management** (Soft Skill) manages **manages** (Soft Skill) configures and maintains **maintains** (Hard Skill) in a virtualized environment • actively **actively monitor** (Hard Skill) **monitor systems** (Hard Skill) **monitor systems** (Hard Skill) networks diagnose and resolve complex software and networking issues • tasks • provides support for device **device management** (Hard Skill) image **image** (Hard Skill) intune mobile **mobile device** (Soft Skill) **mobile device management** (Hard Skill) **device man** application **application packaging** (Hard Skill) installs **installs** (Hard Skill) and server hardware and components such as disks memory and other components **components models** (Hard Skill) **test environment** (Hard Skill) implementing them on production **production system** (Hard Skill) supports haco us directory **directory service** (Hard Skill) **infrastructure** (Soft Skill) hardware group architecture account **account** (Hard Skill) and mfa **mfa** (Hard Skill) **authentication** (Hard Skill) network **network access** (Hard Skill) creates and maintains **maintains** (Hard Skill) and v written technical documentation **technical documentation** (Hard Skill) standards reports and other documents as assigned • evaluates systems and alternate solutions; **alternate** (Hard Skill) standards **functional specification** (Hard Skill) for hardware and software purchase and design **purchase** (Hard Skill) ensure optimum system and end user performance; make recomr additional services • provides **additional** (Hard Skill) networking and other technical support as needed **technical support** (Hard Skill) and maintains various records and **maintains** (Hard Skill)

	Word	Frequency
0	com	2243
1	problem solve	1557
2	customer service	1540
3	job description	1275
4	microsoft office	1115
5	project management	1030
6	write communication	1013
7	reach	709
8	organizational skill	708
9	San	703
10	computer science	679
11	time management	677
12	Act	543
13	verbal communication skill	481
14	process improvement	466
15	detail orient	457
16	self starter	449
17	customer experience	442
18	employee benefit	420
19	act	416
20	analytical skill	413
21	supply chain	408
22	management system	405
23	business development	397
24	decision make	375
25	diversity and inclusion	366
26	CRM	350
27	mental health	337
28	financial service	336
29	employee assistance program	331

Further Inquiry...



Next Steps...our recommendation!

Improvements:

- Removing outliers or influential observations
- Control for other predictors in the linear regression (such as job location, experience level, education level, etc.)

New Questions:

- Why did frequency and average salary diverge in that pattern?
- How does LinkedIn recognize skills?

Become well-equipped with these skills:

- Problem solving
- Communication
- Organization
- Customer service
- Microsoft Office
- Computer Science



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Skills

Demonstrate skills

...

+

All

Industry Knowledge

Tools & Technologies

Interpersonal

Problem Solving

Mc

Project Manager at McKesson

Customer Service

Mc

Project Manager at McKesson

Microsoft Office

Mc

Project Manager at McKesson

Communication

Mc

Project Manager at McKesson

References & Resources

Anas Aito. 2022. Skill Ner. Github. <https://github.com/AnasAito/SkillNER>

<https://github.com/ajzorn/DS4002Project1/tree/main>