



Job Matching Algorithm

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25-01-2025



Project Overview

► Objective:

Use NLP to match job seekers with relevant job opportunities based on skills, qualifications, and experience.

► Key Features:

Analyze job descriptions and applicant profiles.

Extract key features (skills, experience, etc.) from text data.

Provide personalized, accurate job recommendations.

► Benefits:

Job seekers receive better job matches.

Employers find more relevant candidates efficiently.



Business Understanding

- Traditional keyword-based job search systems often fail to match job seekers with relevant opportunities based on their full profile, including skills, experience, and preferences.
- This project aims to develop an **NLP-based recommendation system** that provides personalized, accurate job recommendations by analyzing job descriptions and applicant profiles, improving the hiring process for both candidates and employers.
- The goal is to help **job seekers** find the right roles quickly, **employers** streamline candidate shortlisting, and **recruitment platforms** enhance user engagement.
- By mapping skills to job titles and considering factors like location, salary, and work type, the system will deliver more precise matches and improve overall recruitment efficiency.



Research Questions

- How can NLP techniques be optimized to improve the accuracy of job recommendations based on an applicant's profile?
- What are the key factors (skills, experience, location, etc.) that most influence the relevance of job recommendations for users?
- How does the performance of a machine learning-based job recommendation system compare to traditional keyword-based matching in terms of user satisfaction and job match quality?
- What role do user preferences (such as salary, location, and job type) play in improving job recommendation relevance?

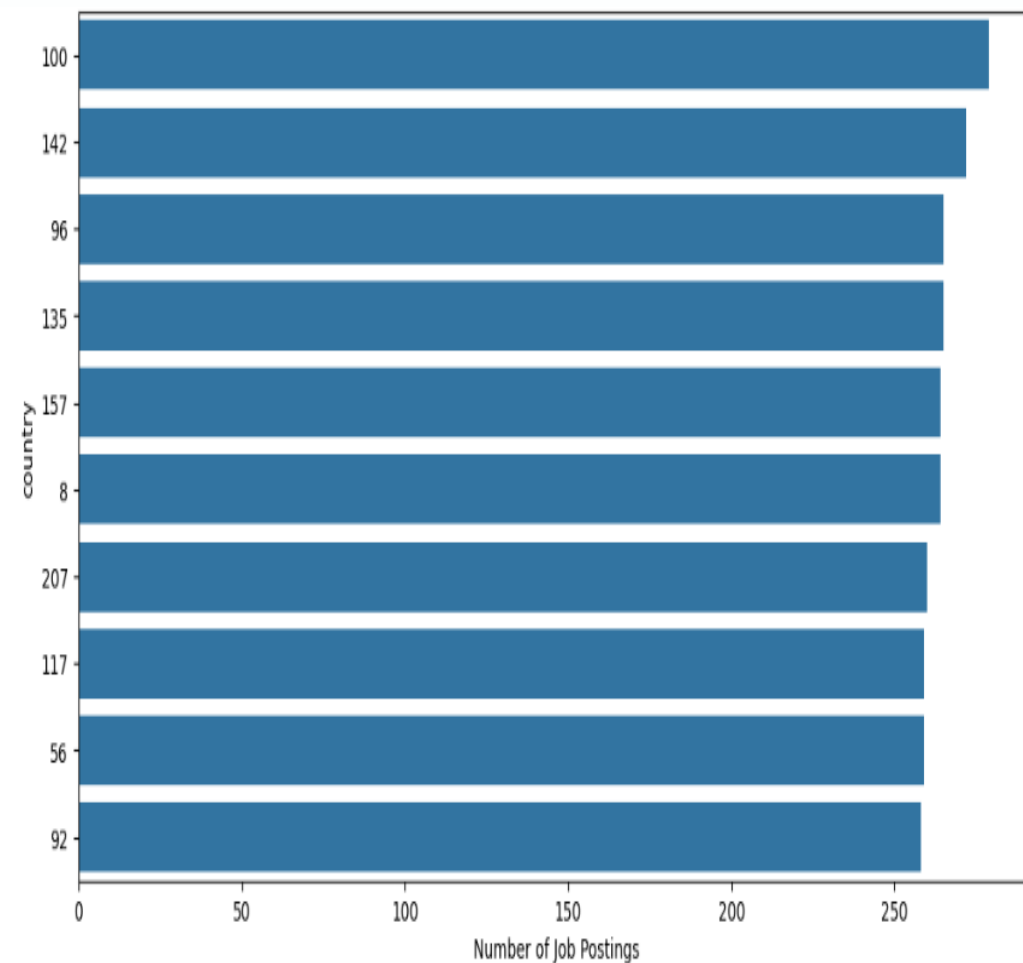


Data Understanding

- We sourced our dataset from Kaggle, which contained over 1.6 million rows and 23 columns.
- To make it manageable, we reduced it to 50,000 rows and retained 16 relevant columns.
- Categorical columns were label-encoded into numerical values, and there were no missing values.

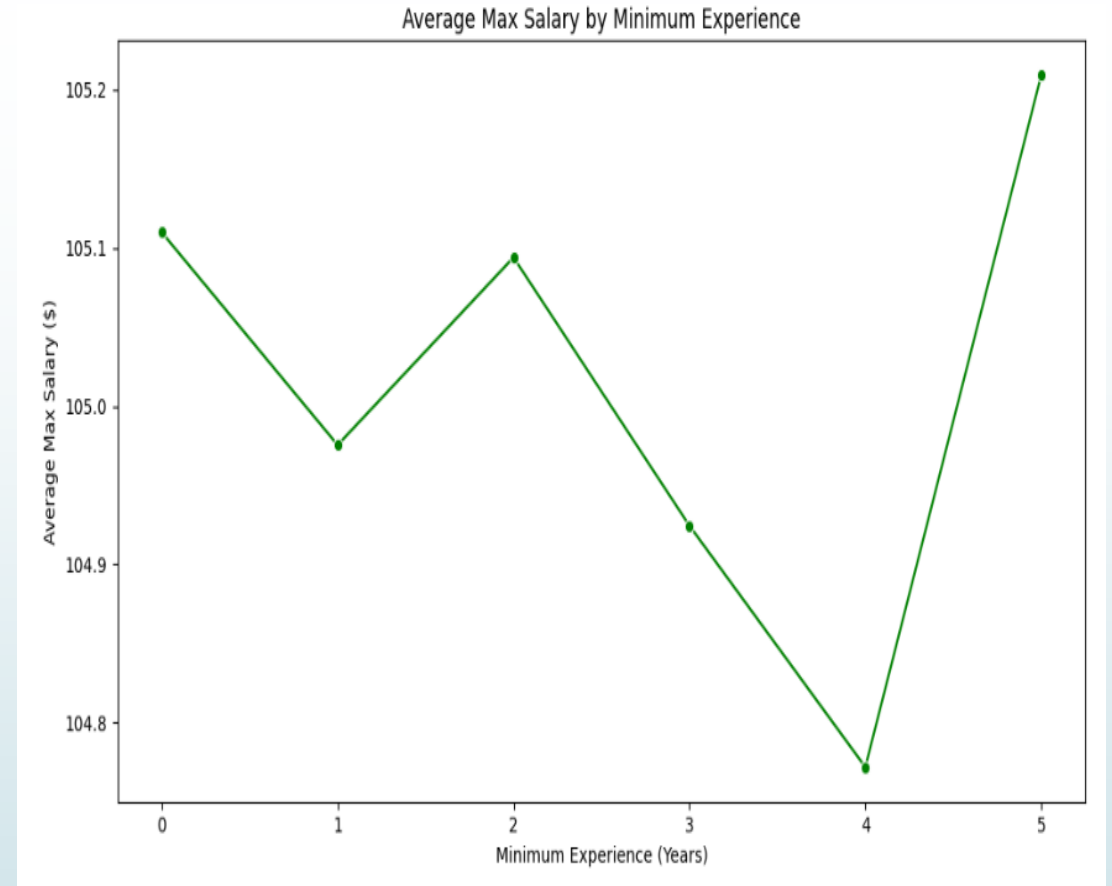
EDA: Job Postings by Top 10 Countries

The chart displays the top 10 countries with the most job postings, highlighting the distribution of job opportunities across these regions. The x-axis shows the number of postings, while the y-axis represents the countries, offering insights into where the highest concentrations of job opportunities are located.



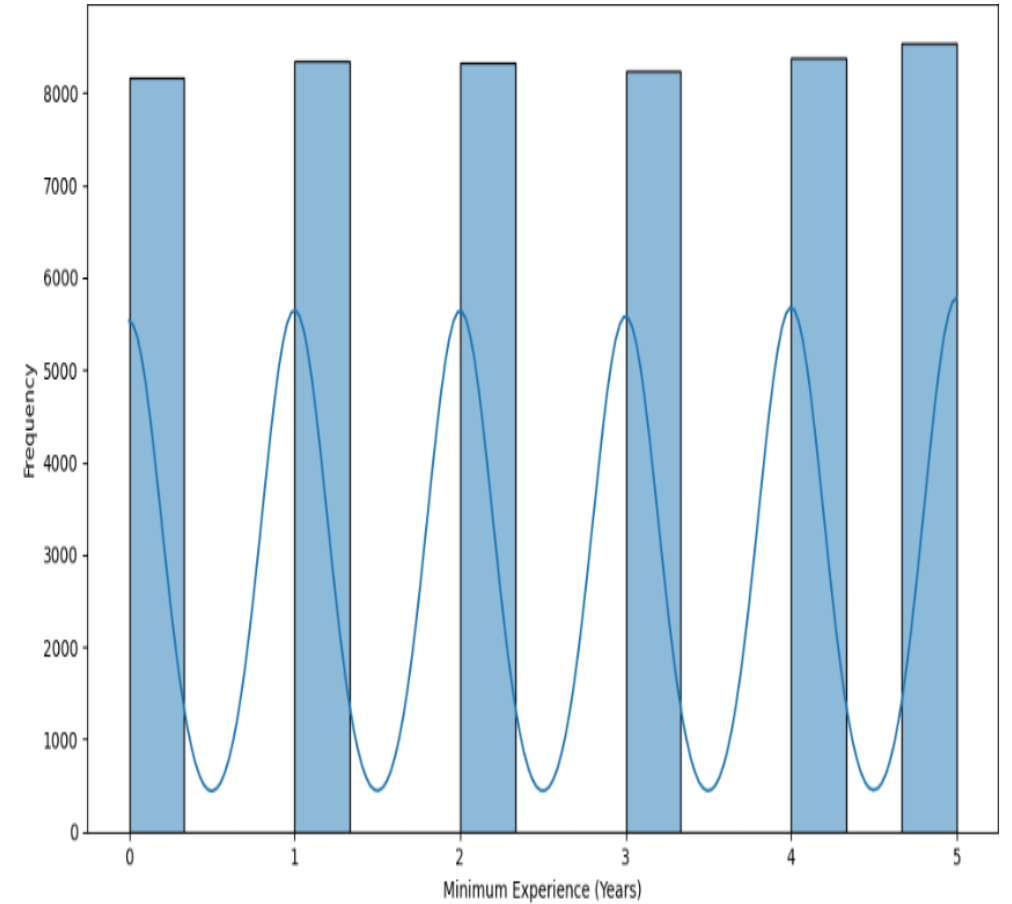
Average maximum salary by minimum experience

The plot illustrates the relationship between the minimum years of experience required and the average maximum salary offered. Each point on the line plot represents an experience level and its corresponding average maximum salary. This visualization helps to identify trends in salary based on experience, highlighting how salary expectations increase with more years of experience.



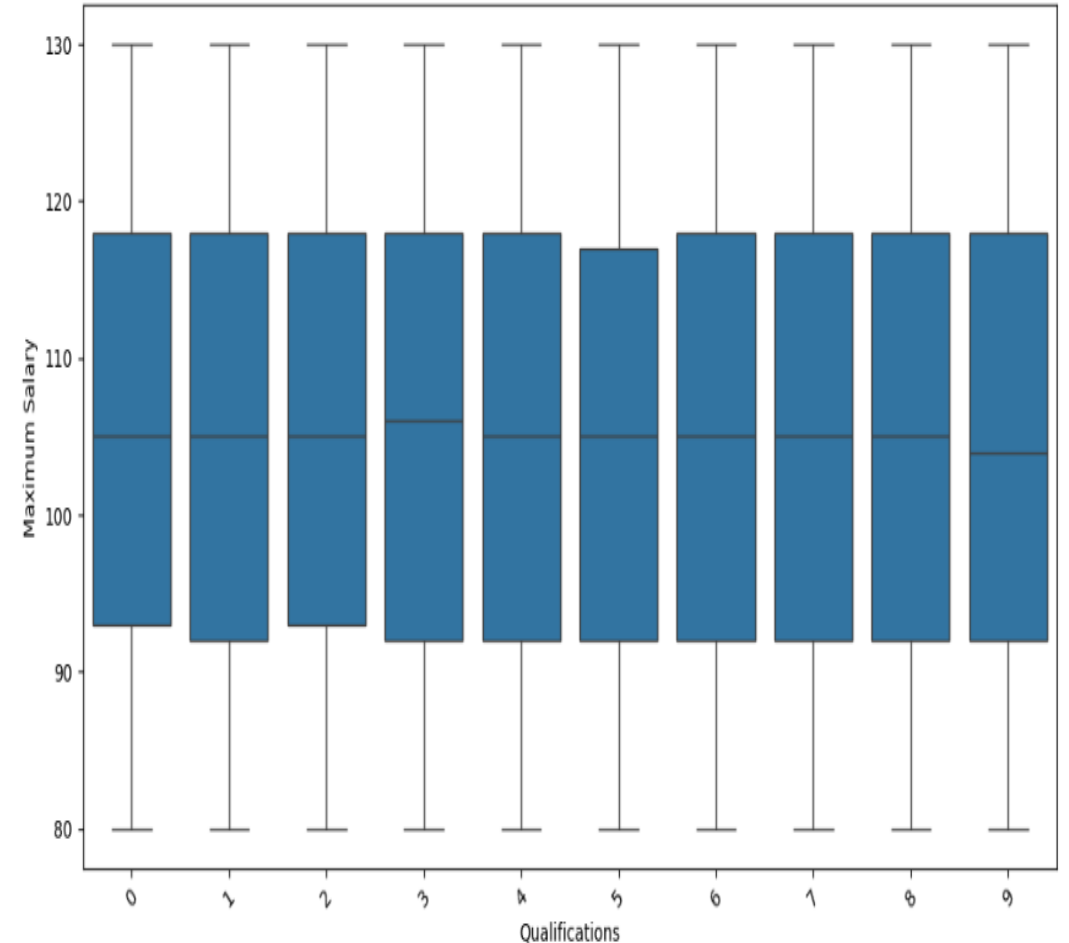
Distribution of minimum experience required

This histogram shows the distribution of experience required for the different job postings. Provides insight into how common certain levels of experience are for different job roles.



Salary Range by Qualifications

The box plot presents the distribution of maximum salaries across different qualification levels. This visualization provides insights into the salary range associated with various qualifications, highlighting the spread and central tendency of salaries for each qualification category.





Web Framework

- The Django-based job recommendation system allows users to submit their previous job details via an interactive form.
- The system processes this input using NLP to fetch the top 5 relevant job recommendations, displayed in a structured table.
- The app includes templates for user interaction, job details, results, and admin controls, with a CSS file for styling.
- Admins can also add job postings and receive confirmation on success.



Why Django?

- We chose **Django** for its powerful features that streamline web development, including its built-in admin interface, seamless database integration, and rapid development capabilities.
- Django's robust security features, scalability, and easy-to-use template system made it the perfect choice to build a dynamic and secure job recommendation system.
- Additionally, its structured design allows for easy maintenance and expansion of the app over time.

Representation of how the website looks like

Job Recommendations

Show

10

entries

Search:

ID	Experience	Qualification	Salary Range	Location	Country	Latitude	Longitude	Work Type	Company Size	Joining Date	Availability
101	5+ years	Bachelor's in Computer Science	\$80,000 - \$100,000	New York	USA	40.7128	-74.0060	Full-time	100-500	2025-01-01	Immediate Joining

Previous

1

Next

SUBMIT YOUR PREFERENCES

Experience:

Preferred Location:

Skills:

Preferred Salary:

SUBMIT



Preprocessing

- We use **text preprocessing** to clean and prepare the data for analysis.
- We then apply **lemmatization** to transform words into their base form, making the text more consistent and easier to analyze.
- Next, we use the **mapping function** to apply this preprocessing operation to a specific column in our dataset.
- This function creates a new column in the dataframe with the cleaned text, preserving the original data while making it easier to work with for analysis and recommendation tasks.



Vector Processing

- This process begins by converting job-related text data into numerical representations, making it possible to compare the job details of applicants with available job postings.
- The system then measures how similar each applicant's profile is to the job postings, with smaller values indicating closer matches.
- Based on these similarities, the system identifies and selects the top job recommendations for each applicant. These recommendations are organized in a clear format, making it easy to review.
- Lastly, the system allows users to view job recommendations specifically tailored to their profile, based on their unique identifier, ensuring they receive the most relevant opportunities.



Demonstration

- In our demo, we will showcase how the job recommendation system generates personalized job suggestions for applicants based on their experience.
- We have two sample applicants, each with a unique set of skills and job experience.
- The system processes their information and compares it against a dataset of job postings to identify the top job recommendations. For each applicant, the system returns the most relevant job matches.
- This demonstration will show how the recommendation engine works in real-time, providing personalized job opportunities in under 20 seconds.



Any Questions?

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<https://github.com/Daisy96494>

<https://github.com/vkigen>

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<https://github.com/bonifacemutwiri17>