Final Project Presentation

Team 2 - Section BE

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AI JOB MARKET & LLM GROWTH

Topic Introduction

- AI and large language models have grown rapidly in recent years (GPT-3, GPT-4, Claude, LLaMA, Gemini).

- Companies across all industries are adopting AI tools at a much faster rate.

- This growth may influence AI job demand and salary levels.

- Understanding these trends helps students, advisors, and job seekers make informed career decisions.

Data Description

1. Data Science, AI & ML Job Salaries in 2020 - 2025
   - Source: Kaggle
   - 151,445 job postings
   - Variables: Work year, Job Title, Salary in USD
   - Used to analyze salary and job demand trends

2. LLMs Data in 2018 - 2024
   - Source: Kaggle
   - 342 models released
   - Variables: Model, Company, Release Date
   - Used to track LLM growth over time

Research Questions

1. How does the growth in LLM model releases from 2020 to 2024 correlate with the number of AI-related job postings during the same period?
2. Are bigger AI models (more parameters) associated with more LLM releases in certain companies?
3. Which specific AI job titles (Machine Learning Engineer, Data Scientist, AI Engineer, Data Analyst) command the highest average salaries from 2020 to 2025?
4. Which countries pay the highest AI salaries, and how do the top countries compare when controlling for the same job role?

Methods

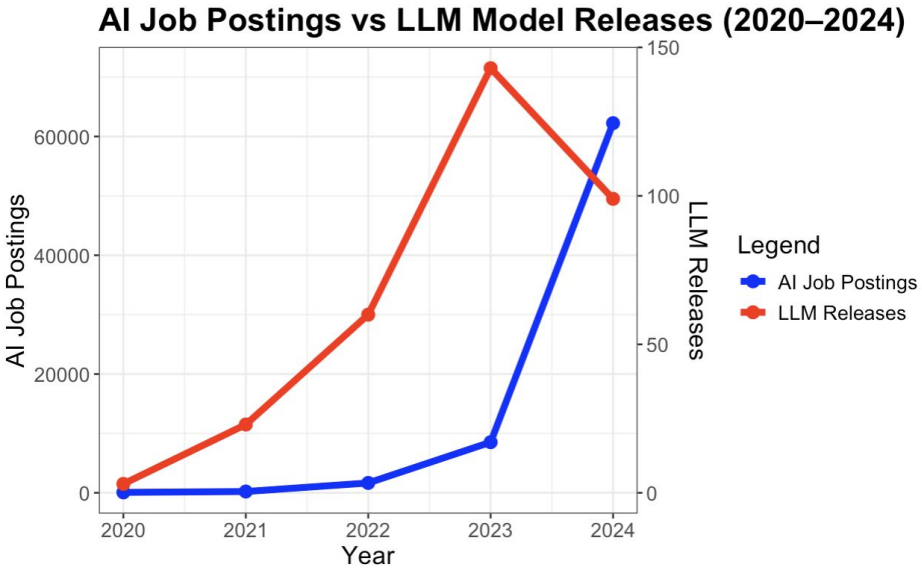
RQ1: How does the growth in LLM model releases from 2020 to 2024 correlate with the number of AI-related job postings during the same period?

- Filtered job_salaries to include only years 2020 to 2024.
- Filtered llm_data to include only years 2020 to 2024.
- Computed yearly counts of AI job postings and LLM releases.
- Performed a left join on work_year and year to create a single summary table for time series comparison.

Results

RQ1: LLM Releases vs AI Job Postings (2020–2024)

- Both LLM releases and AI job postings increased significantly from 2020 to 2024
- LLM releases rose sharply between 2021–2023
- AI job postings surged between 2022–2024
- Job demand spike occurred shortly after major LLM release growth



Conclusion:

- Strong association between LLM development and rising AI job opportunities

Methods

RQ2: Are bigger AI models (more parameters) associated with more LLM releases in certain companies?

- Cleaned Parameters into a numeric variable Parameters_num.
- Removed all rows where model size was missing.
- Computed average model size and number of releases per company.
- Sorted companies by largest average model size and by most total releases.
- Prepared two separate tables used for side by side comparison.

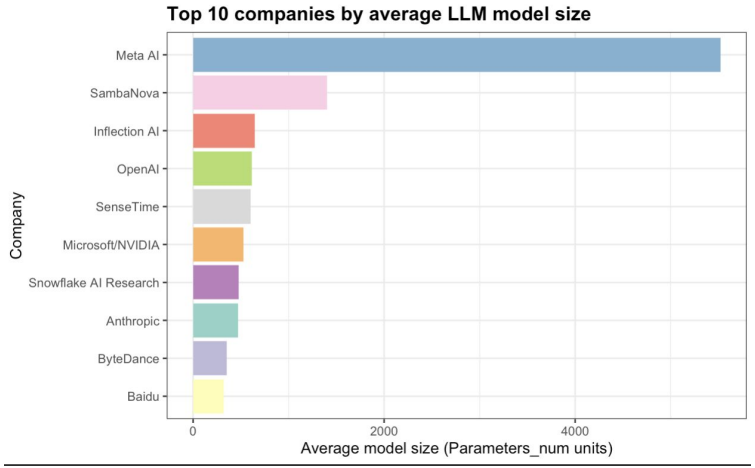
Results

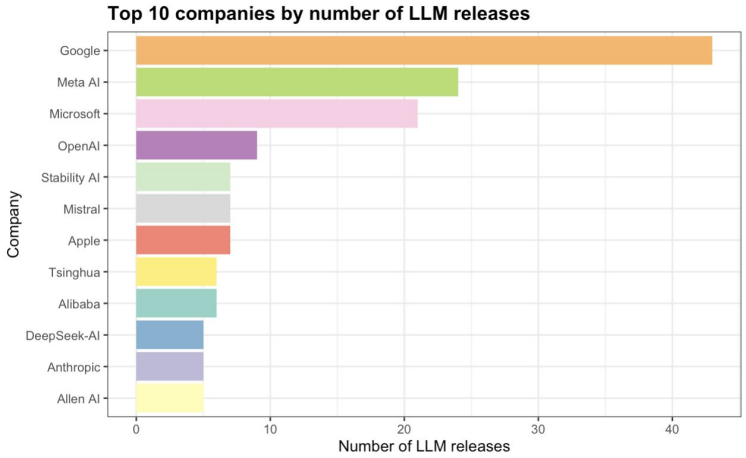
RQ2: Companies with Largest Models vs Companies with Most Releases

- Meta AI has the largest models by far
- SambaNova, Inflection AI, OpenAI, and SenseTime follow in model size
- Google leads in total LLM releases
- Meta AI and Microsoft also release many models

Conclusion:

- Companies with the biggest models are NOT the ones releasing the most
- Meta AI focuses on size, while Google and Microsoft focus on volume





Methods

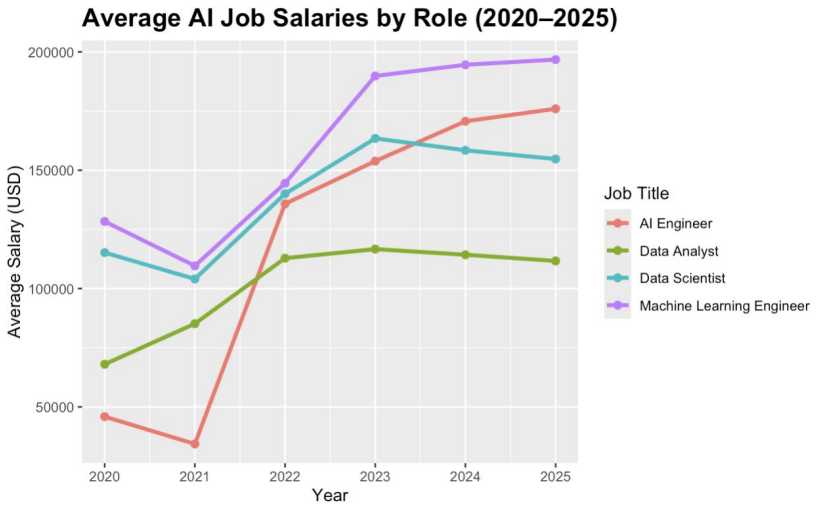
RQ3: Which specific AI job titles (Machine Learning Engineer, Data Scientist, AI Engineer, Data Analyst) command the highest average salaries from 2020 to 2025?

- Standardized job titles by detecting keywords (“machine learning”, “ai engineer”, “data scientist”, “data analyst”).
- Filtered only those titles to form consistent role categories.
- Grouped by year and job title, calculating average salary from 2020 to 2025.
- Prepared a clean summary table used to generate the multi line salary trend plot.

Results

RQ3: Highest Paying AI Job Titles

- Machine Learning Engineer consistently earns the highest salary
- AI Engineer had a huge spike in 2021 to 2022
- Data Scientist salaries remain strong but stable
- Data Analyst stays the lowest among the four roles
- All roles show significant growth from 2021-2022



Conclusion:

- Machine Learning Engineers earned the highest salaries every year
- Engineering-focused roles are receiving the highest compensation in the current AI job market

Methods

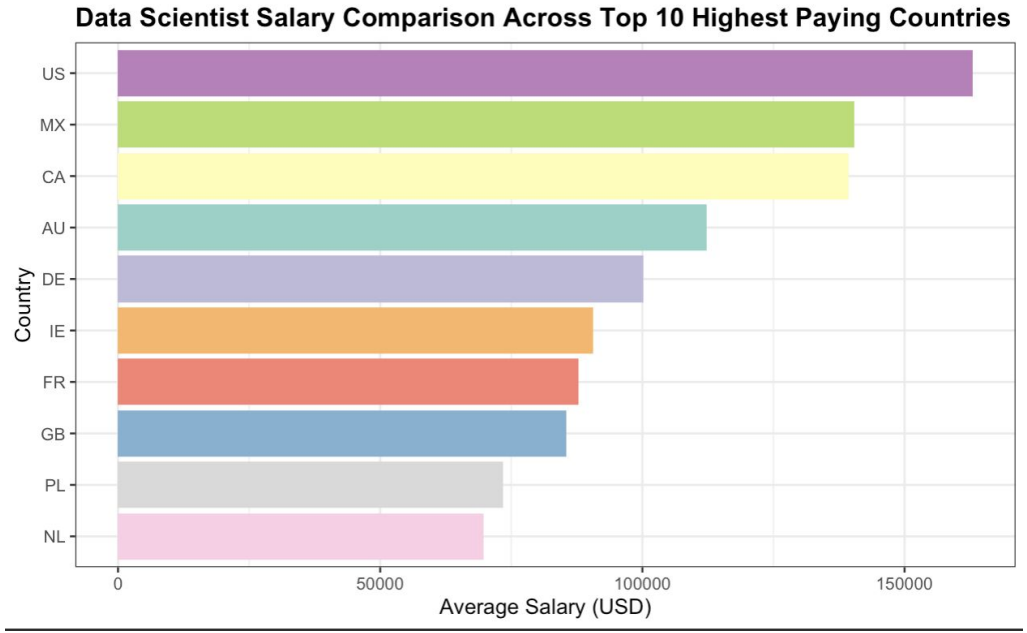
RQ4: Which countries pay the highest AI salaries, and how do the top countries compare when controlling for the same job role?

- Calculated overall average salaries by country and selected the top ten highest paying countries.
- Filtered the dataset to include only Data Scientist roles within these top ten countries.
- Computed average salary per country.
- Prepared the final comparison table used to generate the ranked bar chart.

Results

RQ4: Country Salary Comparison for Data Scientists

- United States offers the highest average salaries
- Mexico and Canada rank second and third
- Sharp drop in salary levels after the top three
- Clear ranking shown in the bar chart



Conclusion:

- The U.S. consistently pays the highest salaries
- Mexico and Canada also rank highly
- Geographic location strongly influences salary even within the same role

Limitations

- The two datasets cover different time periods (LLMs 2018–2024 vs. salaries 2020–2025), which limits long term comparisons.

- The data only shows patterns and not cause and effect. Outside factors like the economy, hiring freezes, or global events may also influence AI job trends.

- Data quality issues existed: non numeric LLM parameters, missing values, and inconsistent job titles required heavy cleaning.

- Aggregated averages (by year, country, role) may smooth out short term variations, reducing detail in the underlying patterns.

Conclusion

- LLM growth and AI job growth increased together, especially after 2022.
- Companies contribute differently: some build the largest models, while others release the most models.
- Engineering roles like Machine Learning Engineer and AI Engineer showed the strongest salary increases.
- Salary levels vary widely across countries, with the United States paying the most.
- These findings help students and early career professionals understand where opportunities are growing and most valuable in today’s AI job market.

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