AI and the Job Market: Disruption, Evolution, and Insights

Github: https://github.com/shrenik-jain/ai-powered-job-market

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Problem Statement

With AI growing, its impact on our work varies by industry and job. Understanding how AI impact jobs and workload distribution is crucial for companies and employees to adapt effectively.

Motivation:
As AI continues to transform industries, our data enables us to:

1. **Analyze AI's impact on different industry** – From automation potential to shifts in responsibilities.
2. **Will AI adoption affect our salary?** - Examining wage trends and the value of human with the help of AI
3. **Will our job be replaced by AI?** – identifying automation potential in different career and the core skills in different jobs

Data Overview

AI-Powered Job Market Insights

- Key features: Industry, salary, remote friendly, AI adoption level, key skills,etc.
- https://www.kaggle.com/datasets/uom190346a/ai-powered-job-market-insights/data

AI impact on Jobs

- Key features: Job titles, number of AI models, and the ratio of AI workload.
- https://www.kaggle.com/code/unclepablo/ai-impact-on-jobs/notebook

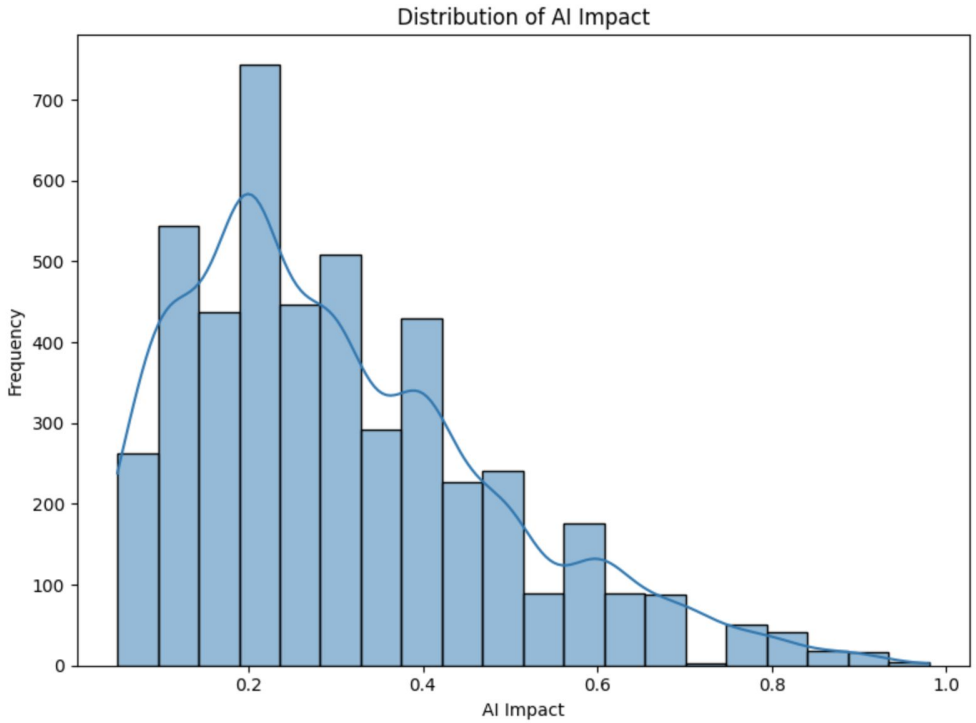
Methodology & Tools

- **Data Cleaning**: Performed using **pandas** to handle missing values, and data inconsistencies.
- **Data Visualization**: Utilized **matplotlib** and **seaborn** to analyze trends, distributions, and relationships within the dataset.
- **Salary Prediction**: Implemented **Regression models** to estimate salary based on relevant features.
- **Automation Risk Prediction**: Employed **Classification and Regression** to assess the likelihood of job automation.

Distribution of AI impact

The distribution appears **right-skewed**, meaning most jobs have a lower AI impact, while fewer jobs have a high AI impact.

Despite the rapid evolution of AI, human labor remains indispensable for many tasks



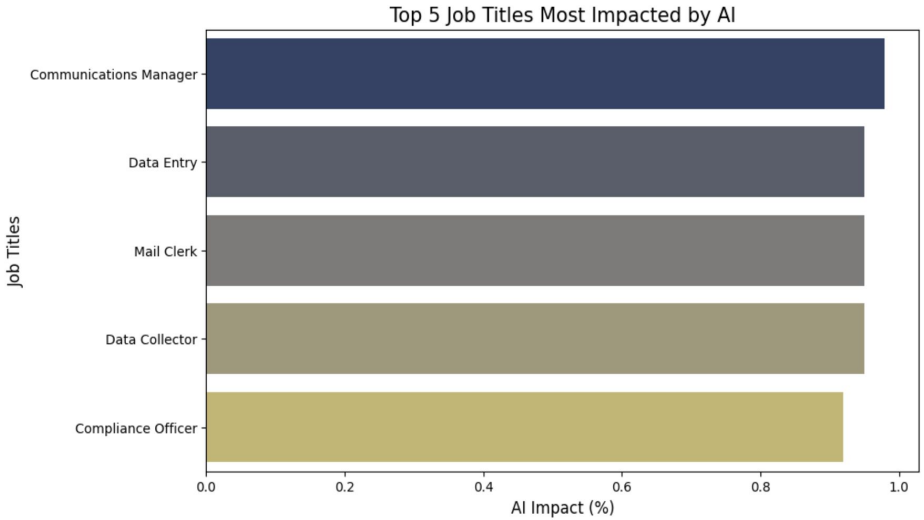
Top 5 AI Impacted Jobs

Data Entry and Administrative Roles: These roles are among the most impacted due to AI's ability to automate repetitive and structured tasks.

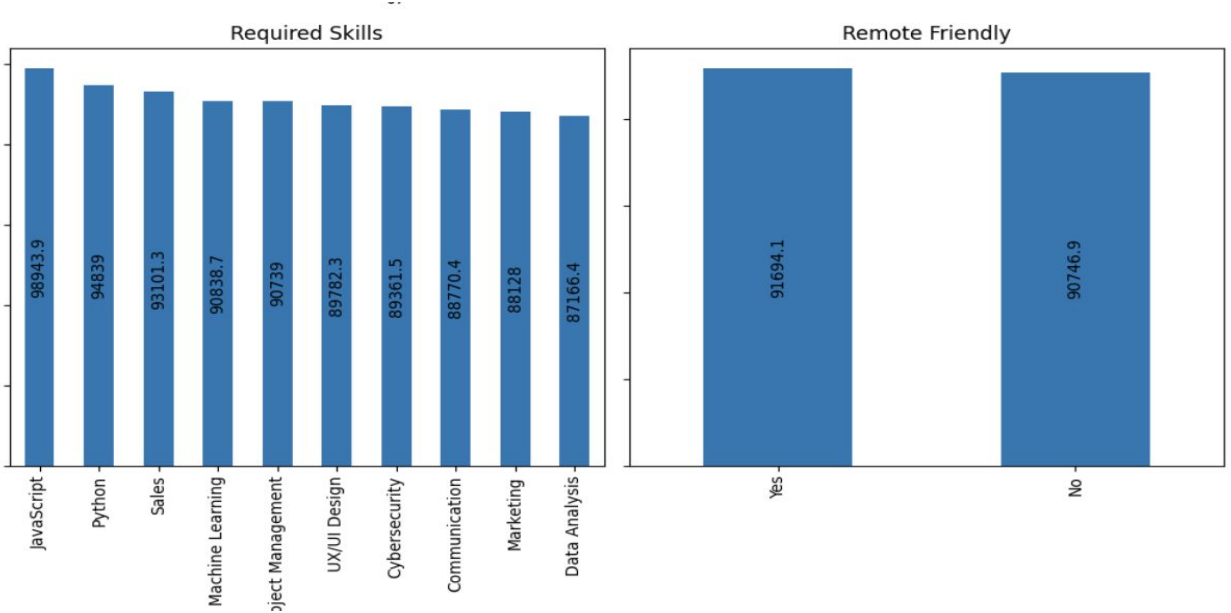
Communication-Based Jobs: Even managerial roles like **Communications Manager** are vulnerable, likely due to AI-powered chatbots, automated content generation, and data-driven decision-making tools.

Clerical and Compliance Work: Positions like **Mail Clerk, Data Collector, and Compliance Officer** face AI disruption as AI-driven document processing, data management, and regulatory compliance tools reduce human intervention.

Implications: The increasing AI impact in these fields highlights the need for **reskilling and adapting to AI-driven workflows** to stay relevant in the evolving job market.



Average Salary



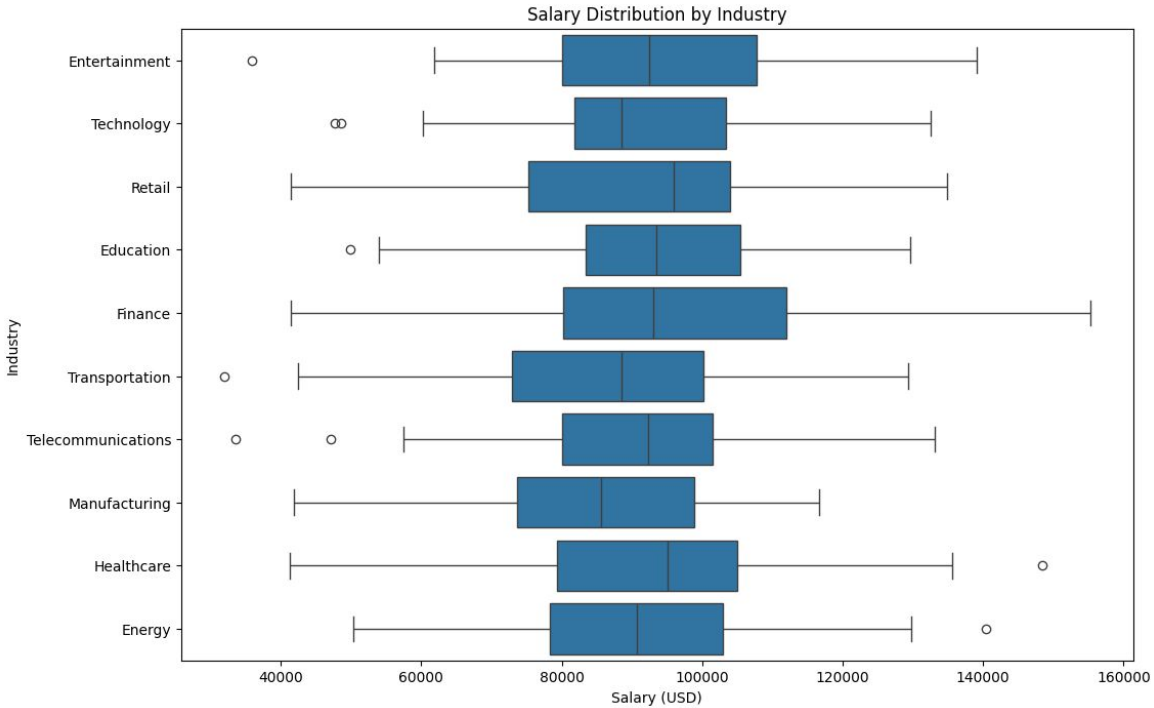
Proficiency in coding is a crucial factor in achieving a high salary.

Remote friendly does not have a significant impact on salary

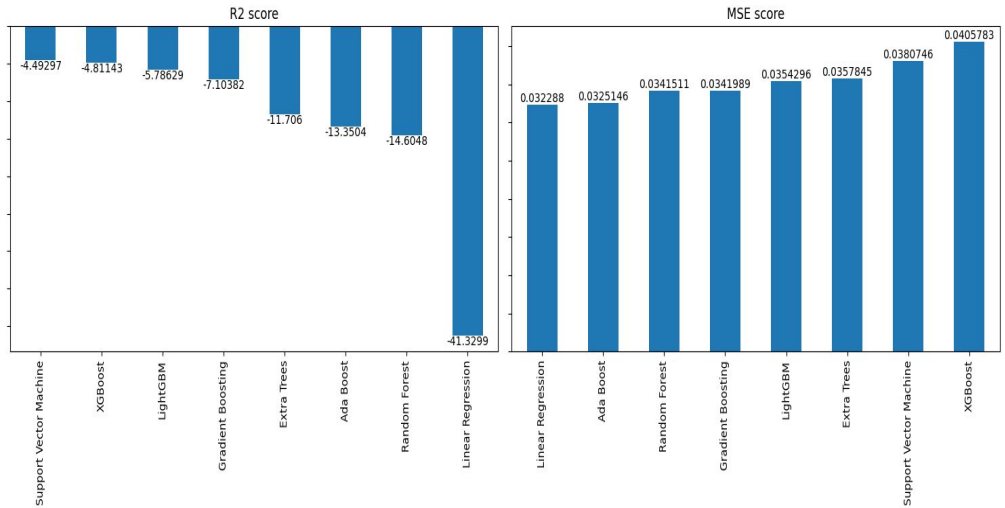
Salary Distribution

The salary distribution across various industries reveals that the **Financial**, **Technology** and **Entertainment** sectors offer the highest salaries,

The **Manufacturing** and **Transportation** are among the lower-paying industries.



Salary Prediction



R2 Score: The worst model is Linear Regression (-41.32), while Support Vector Machine (-4.49) performs the best among bad models.

MSE score: Models ranked based on error. Linear Regression has the lowest MSE (0.0322), but since it's R^2 score is terrible, it still doesn't generalize well.

Insights

- None of the models seem to be predicting well, as negative R^2 indicates poor fit.
- More feature engineering or better model selection (e.g., deep learning) might improve results.
- More data would be required for better prediction

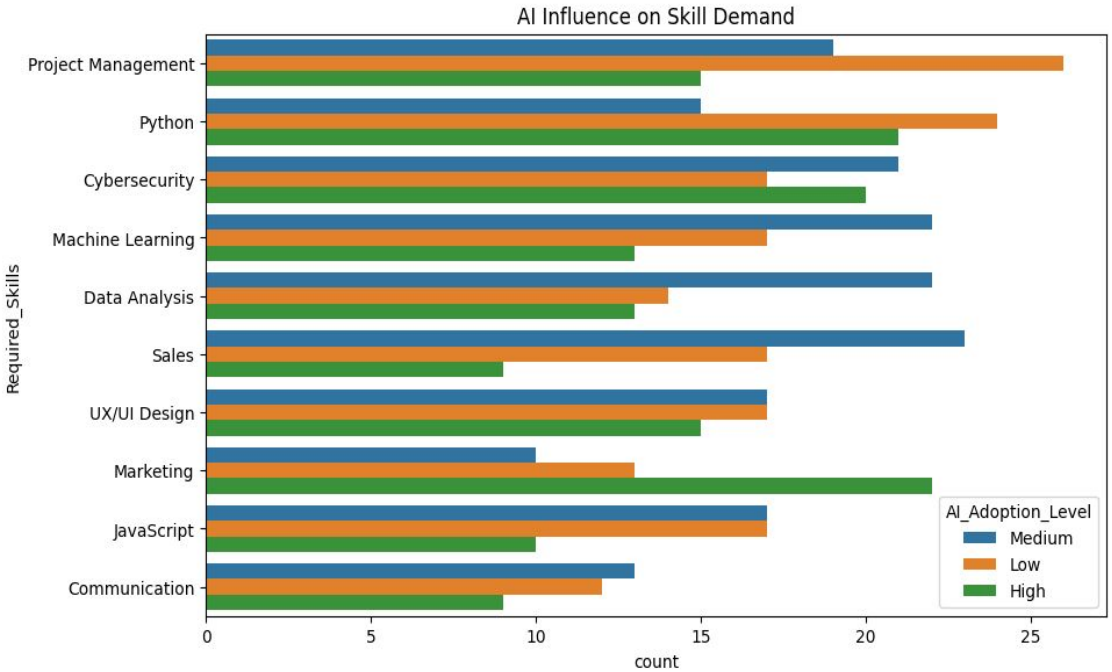
Skill Requirements According to AI Influence

- **Python** show high demand across all AI adoption levels, particularly in environments with **High AI adoption**.

- **Machine Learning**, **Data Analysis**, and **Cybersecurity** are also in high demand, which aligns with the increasing role of AI in data-driven decision-making and security.

- **Sales, UX/UI Design, and Marketing** have relatively varied demand, with **Sales showing strong demand under Medium AI adoption**.

- **Communication and JavaScript skills** show moderate demand.



Predicting the Risk of AI Automation

- **Precision** (how many predicted positives are actually correct)
- **Recall** (how many actual positives were correctly predicted)
- **F1-score** (harmonic mean of precision and recall)
- **Support** (number of actual instances per category)

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Automation Risk Prediction Accuracy: 0.4514285714285714

              precision    recall  f1-score   support

        High       0.38      0.44      0.41        57
         Low       0.47      0.32      0.38        59
      Medium       0.50      0.59      0.54        59

    accuracy                           0.45       175
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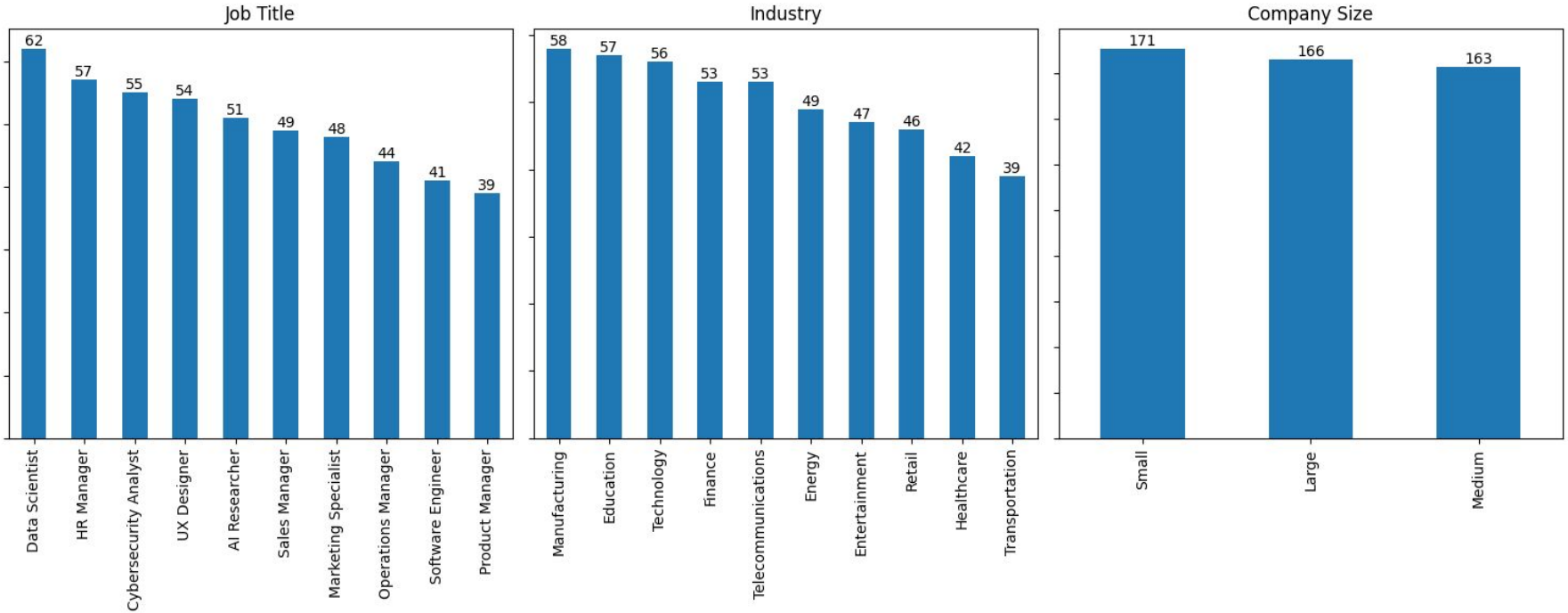
Reasons for Lower Performance

- **Low Accuracy**: The features may not have enough predictive power
- **Inadequate Data:** We do not have enough data for training the mode (Only 500 data points)

Demographics

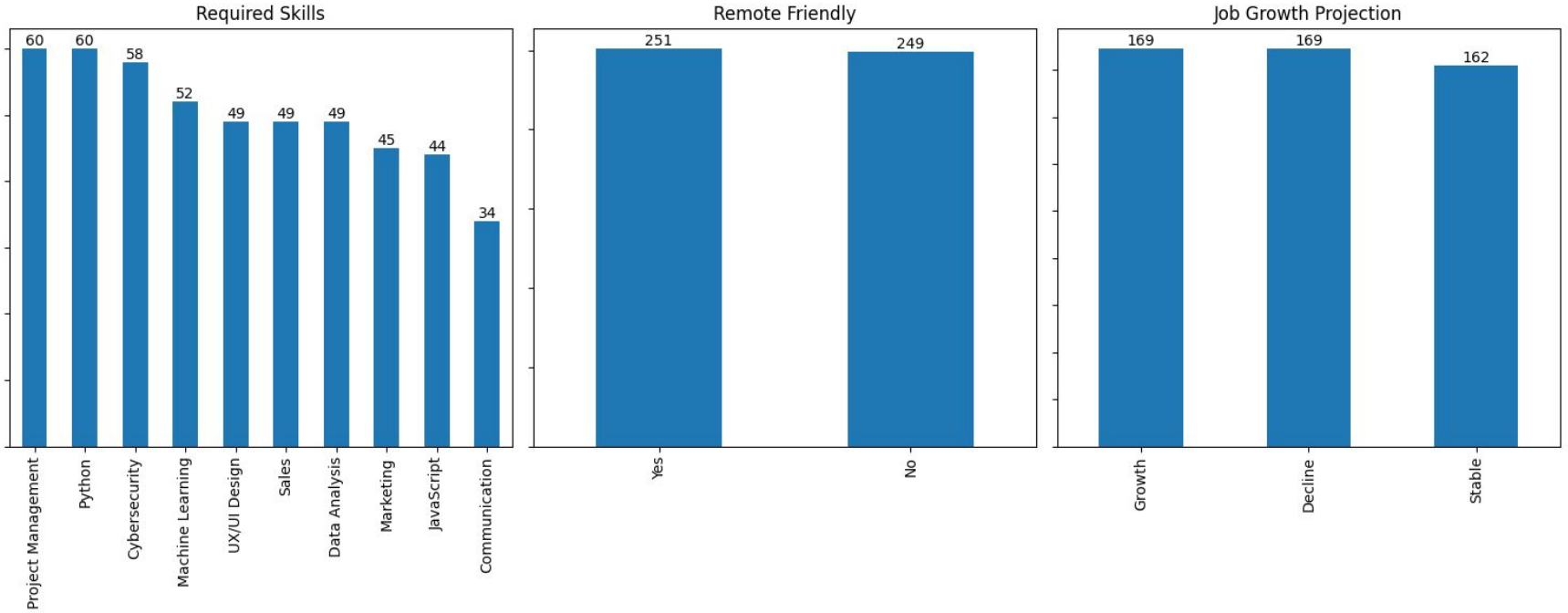


Required Skills: Highlights the most in-demand skills, with Project Management and Python tied at the top.

Remote Friendly: Compares the number of remote-friendly vs. non-remote jobs, showing an almost equal split.

Job Growth Projection: Depicts projected job trends, with growth and decline having equal numbers, slightly higher than stable jobs.

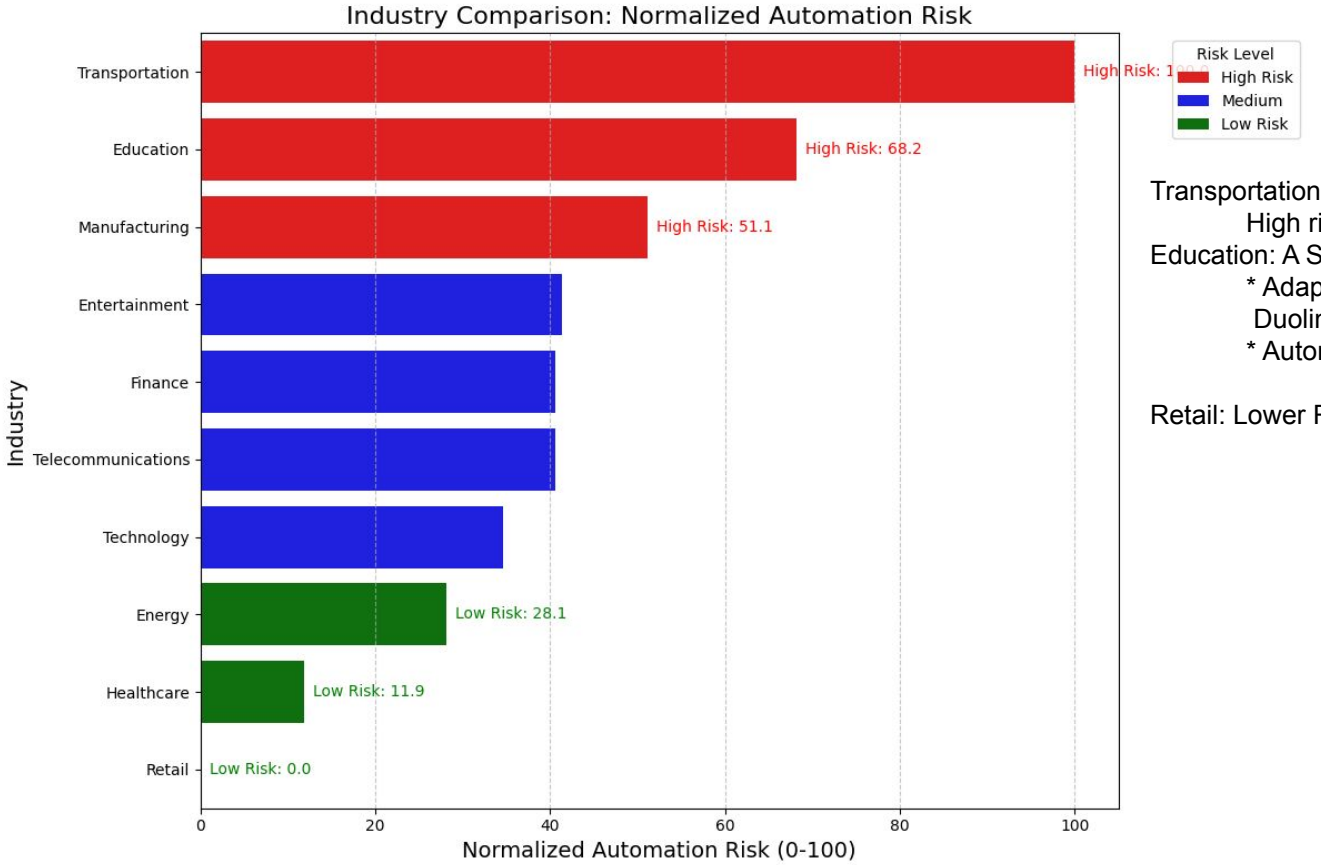
Demographics



Job Title: Shows the number of employees in various roles, with Data Scientist being the most common.

Industry: Represents the number of employees in different industries, with Manufacturing leading.

Company Size: Displays the distribution of employees in small, medium, and large companies, with small companies having the highest count.



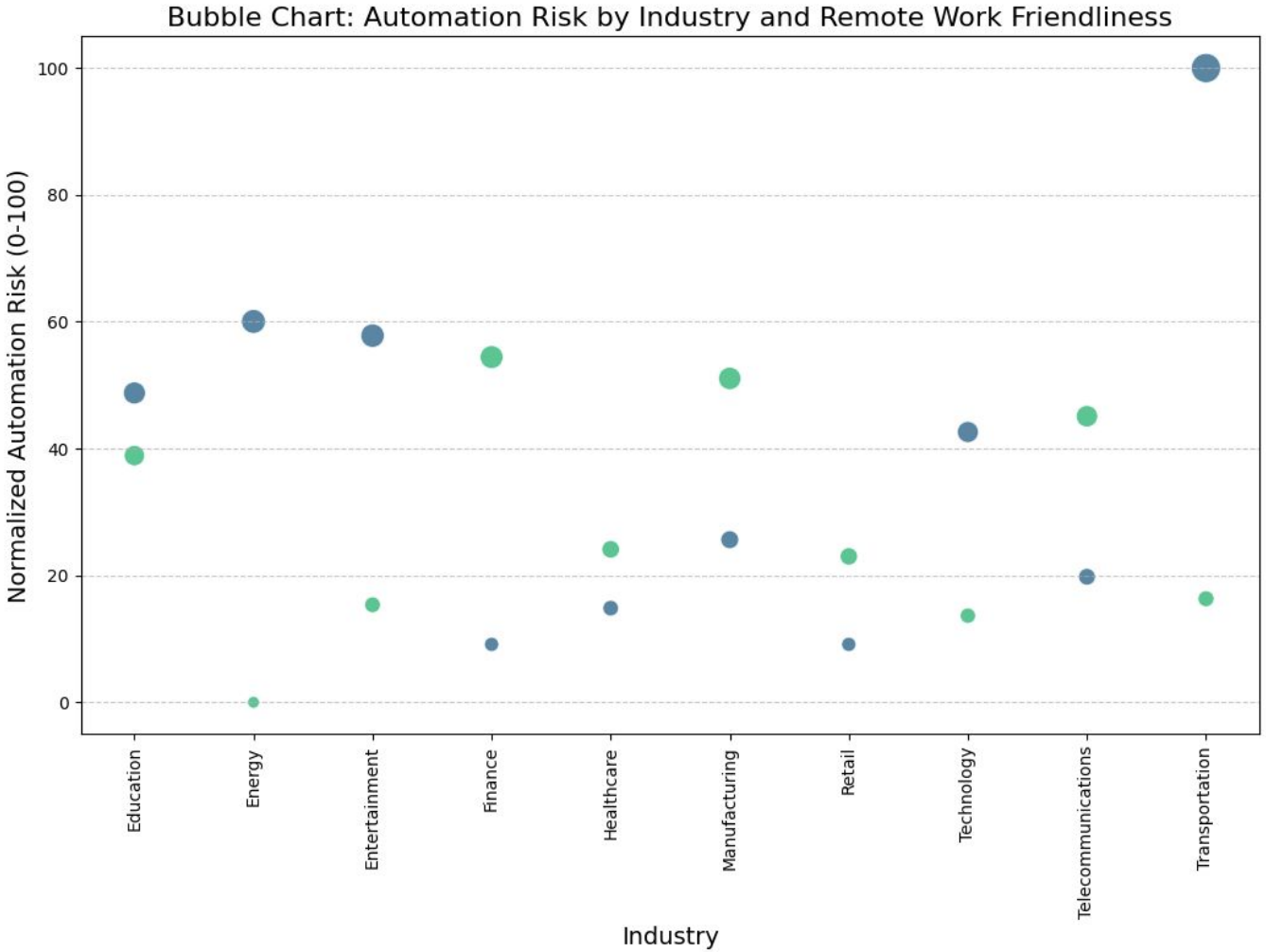
Transportation

High risk? (*Self driving cars)

Education: A Surprising High-Risk Industry?

* Adaptive learning platforms (e.g., Duolingo, Coursera)
* Automated grading

Retail: Lower Risk Due to Customer Interaction

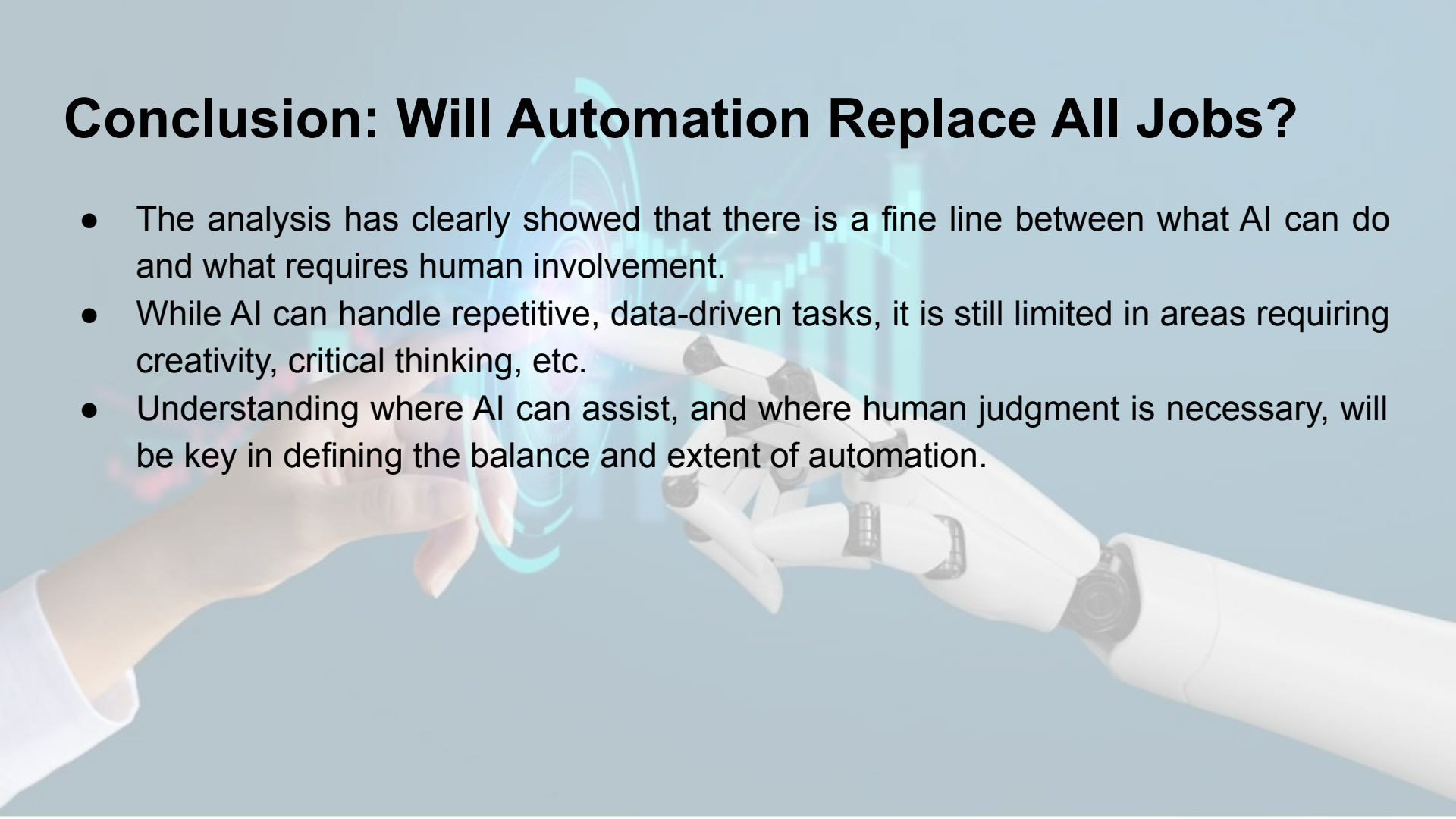


This analysis gives us insights into how different industries face automation risks while also considering their suitability for remote work.

Key takeaway here is that Remote-friendly industries have a higher chance of transitioning workers into digital roles.

Conclusion: Will Automation Replace All Jobs?

- The analysis has clearly showed that there is a fine line between what AI can do and what requires human involvement.
- While AI can handle repetitive, data-driven tasks, it is still limited in areas requiring creativity, critical thinking, etc.
- Understanding where AI can assist, and where human judgment is necessary, will be key in defining the balance and extent of automation.



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References

[1] Cuervo, A. (2023, December 12). *AI impact on jobs*. Kaggle. https://www.kaggle.com/code/unclepablo/ai-impact-on-jobs

[2] Tharmalingam, L. (2023). *AI-powered job market insights*. Kaggle. https://www.kaggle.com/code/laksika/ai-powered-job-market-insights

Q&A