Tech Salary Trends Analysis

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**Topic:**

This project analyzes global tech industry salaries to identify trends and disparities by experience level, job title, location, remote work adoption, and company size.

**Business Problem:**

Understanding salary trends in the tech industry is critical for job seekers, employers, and policymakers. This project aims to uncover key salary determinants, providing actionable insights for individuals negotiating salaries and companies formulating competitive compensation strategies.

* Research Questions:
  + What are the average salaries for different experience levels?
  + How do salaries vary by job title and location?
  + What is the impact of remote work and company size on salaries?
  + Are there significant differences in salaries across regions?
  + What trends can be observed over time (e.g., from 2023 to 2024)?

# Dataset:

The dataset contains comprehensive salary information for various roles in the data science field, collected globally. It includes data on work years, experience levels, job titles, salaries, and details on employment types, remote work ratios, and company sizes. The dataset is particularly well-suited for analyzing salary trends across different job roles, locations, and experience levels, helping to uncover insights into the data science job market.

Features:

* Work Year: The year when the salary data was collected (e.g., 2023, 2024).
* Experience Level: Employee experience levels are categorized as Entry-level (EN), Mid-level (MI), Senior-level (SE), and Executive-level (EX).
* Employment Type: The type of employment contract, such as Full-Time (FT).
* Job Title: Various data science roles, such as Data Scientist, Machine Learning Engineer, and Data Analyst.
* Salary: Reported salary in the specified currency.
* Salary Currency: The currency in which the salary is provided (e.g., USD, EUR, GBP).
* Salary in USD: Standardized salary amounts converted to USD for easier comparison.
* Employee Residence: The primary country where the employee resides.
* Remote Ratio: The percentage of remote work, categorized as 0% (On-site), 50% (Hybrid), and 100% (Fully Remote).
* Company Location: The country where the employer's office is located.
* Company Size: The size of the company, categorized as Small (S), Medium (M), or Large (L).

## Methods:

The project will begin with data cleaning and preprocessing to handle missing values and standardize salary figures to USD for consistency. Exploratory data analysis (EDA) will involve visualizing salary distributions by experience level, job title, and location, using bar charts, boxplots, and heatmaps to uncover patterns and disparities. Statistical analysis, including ANOVA and t-tests, will be used to assess significant salary differences across various groups. In contrast, correlation analysis will identify relationships between variables such as experience level, company size, and salary. Time permitting, machine learning models like Random Forest may be employed to predict salaries based on the dataset’s features and to identify the most influential factors affecting compensation.

### Ethical Considerations:

Respecting data privacy and ensuring anonymity is crucial throughout the project. The findings should focus on general trends rather than individual predictions to avoid reinforcing biases or perpetuating stereotypes. Results will be presented transparently and unbiased, highlighting the limitations of the dataset and analysis methods.

### Challenges/Issues:

One challenge involves addressing data sparsity in underrepresented job roles or regions, which could limit the reliability of insights. Additionally, comparing salaries across different years may require accounting for inflation and economic fluctuations. Another difficulty is distinguishing correlation from causation, as observed trends may result from confounding factors rather than direct relationships.

References

**Projects/Papers:**

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