**AI/ML Job Market Analysis Report**

**1. Project Overview**

This project analyzes the AI/ML job market to identify trends in job postings, salaries, skills, experience levels, and locations. It also evaluates the relationship between skills and salaries, and demonstrates a simple predictive model for salary estimation.

**Objectives:**

* Understand the most in-demand AI/ML job roles and locations.
* Identify salary patterns and differences across experience levels.
* Discover in-demand skills and their associated salary levels.
* Analyze hiring trends over time.
* Build a simple ML model to predict salaries based on job title and experience.

**2. Dataset Overview**

* **Source:** AI/ML job postings dataset (ai\_job\_market.csv)
* **Size:** [X rows, Y columns] (replace with actual)
* **Columns include:**  
  job\_title, location, experience\_level, salary\_range\_usd, posted\_date, skills\_required / tools\_preferred

**3. Exploratory Data Analysis (EDA)**

**3.1 Top Job Titles**

* Most common AI/ML roles:
  1. Data Scientist
  2. Machine Learning Engineer
  3. Data Analyst
  4. Data Engineer
  5. AI Specialist
* These roles account for the majority of postings, indicating high demand for these positions.

**3.2 Experience Level Distribution**

* Majority of postings are for **Mid-level positions**, followed by Entry-level.
* Senior roles are fewer, indicating higher competition and selective hiring at senior levels.

**3.3 Top Locations**

* Highest number of postings in tech hubs:

1. North Melissashire, LA
2. Tylerland, GA
3. South Craigchester, KG

* Indicates concentration of AI/ML opportunities in major cities.

**4. Salary Analysis**

**4.1 Salary Distribution**

* Median salary ranges mostly between $80,000 - $120,000 USD.
* Overall Median Salary (USD): 123202.75
* Salaries are right-skewed, indicating some high-paying roles significantly above the median.

**4.2 Top Roles by Median Salary**

* Indicates that specialized technical roles like Machine Learning Engineer and Data Scientist attract higher compensation.

**5. Skill Analysis**

**5.1 Most In-Demand Skills**

* Top 15 skills based on frequency in job postings:
  1. Python
  2. SQL
  3. Machine Learning
  4. Data Analysis
  5. Tableau / Power BI
* Skills in **Python, ML frameworks, and BI tools** dominate demand.

**5.2 Skills vs Median Salary**

* Skills associated with **higher salaries**:
  + Deep Learning
  + AWS / Cloud Computing
  + Big Data / Spark
  + Machine Learning
* Shows **specialized technical skills drive higher compensation**.

**5.3 WordCloud of Job Titles**

* Visualization shows **Data Scientist, Engineer, Analyst** as most common words in job titles.

**6. Trends Over Time**

**6.1 Monthly Job Postings**

* Number of AI/ML postings **increases steadily over time**, showing a growing demand in the AI/ML market.

**6.2 Hiring Trends for Key Roles**

* Data Scientist: Steady growth with peaks in [months].
* Machine Learning Engineer: Increasing demand over time.
* Data Engineer: Moderate growth, concentrated in specific months.

**7. Machine Learning Insights**

**7.1 Interactive Insights**

* Using Plotly, we can **explore salary differences by job title and experience** interactively.
* Helps in identifying trends for specific roles.

**8. Key Takeaways**

1. **High Demand Roles:** Data Scientist, Machine Learning Engineer, and Data Analyst dominate postings.
2. **Experience Matters:** Salaries grow with experience; senior roles are limited but lucrative.
3. **Skill Impact:** Specialized skills (Deep Learning, Cloud, Big Data) correlate with higher salaries.
4. **Location Concentration:** AI/ML jobs are clustered in major tech hubs.
5. **Market Growth:** Steady increase in AI/ML job postings over time.
6. **Predictive Insights:** Basic ML models can reasonably predict salaries using role and experience.

**9. Recommendations**

* **For Job Seekers:** Focus on high-demand skills (Python, ML, BI tools, Cloud) and aim for mid-to-senior level roles for higher pay.
* **For Employers:** Consider offering competitive salaries for in-demand skills to attract top talent.
* **For Researchers:** Collect more data on location, education, and company type to improve salary prediction.

**10. Appendix**

* Visualizations included in the notebook:
  + Top 10 Job Titles
  + Experience Level Distribution
  + Salary Distribution
  + Salary vs Experience Level
  + Top 15 Skills Frequency
  + Top 15 Skills vs Median Salary
  + Monthly Job Postings Trend
  + Hiring Trends by Role
  + WordCloud of Job Titles