**Data Science Market Insights Dashboard - Final Report**

**Authors:** Sri Deepthi Vootla (0981088) & Jayakishan Minnekanti

**Course:** Information Visualization

**Project Title:** Data Science Market Insights Dashboard

**Overview**

The **Data Science Market Insights Dashboard** provides a comprehensive analysis of the global data science job market. The project explores salary trends, workforce distributions, and employment patterns to uncover critical insights into the data science industry. Leveraging an extensive dataset and Tableau's powerful visualization capabilities, the dashboard presents actionable insights for data professionals, employers, and policymakers.

The dataset used in this project captures essential information such as work year, experience level, employment type, job titles, salaries, company locations, and employee residences.

**Objectives**

The primary goals of this project are as follows:

1. Analyze salary trends across years, job roles, and geographic regions.
2. Understand workforce composition by experience level, employment type, and location.
3. Identify geographic salary disparities and their impact on global hiring patterns.
4. Visualize the organizational structure of companies hiring data science professionals.
5. Provide a centralized, interactive dashboard for exploring these insights.

**Data Overview**

The dataset, ds\_salaries.csv, comprises the following key fields:

* **Work Year:** The year when the salary data was recorded.
* **Experience Level:** The seniority level of the role (Entry-level, Intermediate, Senior, Expert).
* **Employment Type:** Type of employment (Full-time, Part-time, Freelance, or Contract).
* **Job Title:** The specific title held by the professional (e.g., Data Scientist, ML Engineer).
* **Salary in USD:** Annual salary converted to USD for global comparison.
* **Company Location:** The location of the hiring company.
* **Employee Residence:** The employee's country of residence.

The dataset is cleaned and preprocessed to ensure accuracy in visualizations and insights.

**Key Visualizations**

**1. Salary Trends Over Years**

* Chart Type: Line Chart
* Objective: Track how salaries for data science roles have evolved over time.
* Insights: Salaries exhibit a steady rise over recent years, highlighting the growing demand for data science professionals globally.

**2. Top Employee Residences**

* Chart Type: Vertical Bar Chart
* Objective: Identify the top 10 countries where data science professionals reside.
* Insights: The United States leads significantly, followed by the UK, India, and Canada.

**3. Companies by Size and Location**

* Chart Type: Donut Chart
* Objective: Examine the distribution of hiring companies by size (Small, Medium, Large) and geographic region.
* Insights: Medium-sized companies dominate the hiring landscape, showcasing agility in adapting to data-driven decision-making.

**4. Average Salary by Job Title and Experience Level**

* Chart Type: Table
* Objective: Highlight salary variations across job roles and seniority levels.
* Insights: Senior roles such as Machine Learning Scientist and Lead Data Scientist command the highest salaries, with significant gaps compared to entry-level roles.

**5. Average Salary by Employment Type**

* Chart Type: Donut Chart
* Objective: Explore how salaries vary for Full-Time, Part-Time, Freelance, and Contract roles.
* Insights: Full-time roles dominate the market, offering higher salaries compared to part-time and freelance jobs.

**6. Map of Average Salary by Country**

* Chart Type: Geospatial Map
* Objective: Visualize global salary disparities by country.
* Insights: Countries like the US, Canada, and Switzerland exhibit higher average salaries, while developing economies show comparatively lower compensation.

**7. Average Salary in USD by Experience Level and Employment Type**

* Chart Type: Scatter Plot
* Objective: Analyze salary variations by combining experience level and employment type.
* Insights: Senior professionals in full-time roles receive the highest compensation, while part-time and freelance roles generally offer lower salaries.

**8. Final Dashboard**

* Objective: Combine all individual visualizations into an interactive Tableau dashboard, enabling seamless exploration of data.

**Key Insights**

1. **Geographical Trends:**

* The United States has the largest concentration of data science professionals, with significantly higher average salaries compared to other regions.
* Developing economies like India offer opportunities but at comparatively lower salaries.

1. **Salary Trends:**

* Senior roles such as Machine Learning Scientist and Lead Data Scientist command top salaries.
* Salaries for data science professionals have steadily increased over recent years.

1. **Employment Patterns:**

* Full-time roles dominate the data science market, accounting for 97% of employment types.
* Part-time and freelance roles provide flexibility but come with lower average compensation.

1. **Company Composition:**
2. Medium-sized companies are leading in data science hiring, while small companies are lagging.
3. **Global Disparities:**
4. Significant differences in salaries across countries highlight the need for a more balanced global talent distribution.

**Tools and Technologies**

1. Data Processing: Python (Pandas, NumPy)
2. Visualization: Tableau, Matplotlib, Seaborn
3. Geospatial Mapping: Tableau Mapbox Integration
4. Reporting: Microsoft Word, Markdown

**Challenges**

1. Data Cleaning: Preprocessing the dataset to ensure consistency and eliminate errors.
2. Geographic Representation: Mapping global salaries accurately required significant data transformations.
3. Interactive Design: Creating an intuitive Tableau dashboard to allow seamless exploration of complex data.

**Conclusion**

The Data Science Market Insights Dashboard successfully encapsulates a comprehensive analysis of the data science job market. It highlights key trends, workforce distributions, and salary dynamics, offering valuable insights for professionals, recruiters, and organizations. By leveraging this dashboard, stakeholders can make informed decisions about hiring, career planning, and industry trends.

This project underscores the value of information visualization in simplifying complex datasets and making insights accessible to a broad audience.

**Future Enhancements**

1. Dynamic Dataset Integration: Automate data updates to keep the dashboard relevant with real-time insights.
2. Additional Metrics: Include industry-specific metrics such as skill demand and remote work trends.
3. Custom Filters: Enable users to apply more granular filters, such as job sector and specific skills.