Analysis of Cybersecurity Job Salaries: A Detailed Exploratory Data Analysis and Visualization

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Overview

- **Purpose of Analysis**:

To understand the factors influencing salaries in the cybersecurity industry, including experience, remote work, company size, and geographic location.

To provide insights that help professionals and organizations make informed decisions about career advancement, recruitment strategies, and compensation planning.

- **Objective**:

To identify patterns and correlations in cybersecurity salaries using rich dataset attributes and exploratory data analysis.

To empower stakeholders with actionable insights to navigate the evolving cybersecurity job market effectively.

Dataset Description

•**Source**: Sourced from Kaggle – *Cyber Security Salaries*

•**Key Attributes**:
Work Year, Experience Level, Employment Type, Job Title, Salary, Salary Currency, Employee Residence, Remote Ratio, Company Location, Company Size.

•**Significance:**
•Allows analysis of compensation determinants and comparisons across roles and regions.
•Helps understand salary trends and patterns in the cybersecurity industry.

Column Header	Dtype
work_year	int
experience_level	string
employment_type	string
job_title	string
salary	int
salary_currency	int
salary_in_usd	int
employee_residence	string
remote_ratio	int
company_location	string
company_size	string

Hypothesis Development

- **Experience Level & Salary**
  Hypothesis: Higher experience levels lead to higher salaries.
  Insight: Senior and executive roles command higher pay.
- **Remote Work vs. In-Office**
  Hypothesis: Remote jobs pay more than in-office jobs.
  Insight: Fully remote roles offer higher salaries than on-site; hybrid positions fall in between.
- **Company Size & Compensation**
  Hypothesis: Larger companies pay higher salaries.
  Insight: Bigger firms offer competitive pay due to more resources.
- **Location & Salary**
  Hypothesis: Location impacts salary, with larger cities paying more.
  Insight: Developed regions like the US and Germany offer higher salaries compared to developing markets.

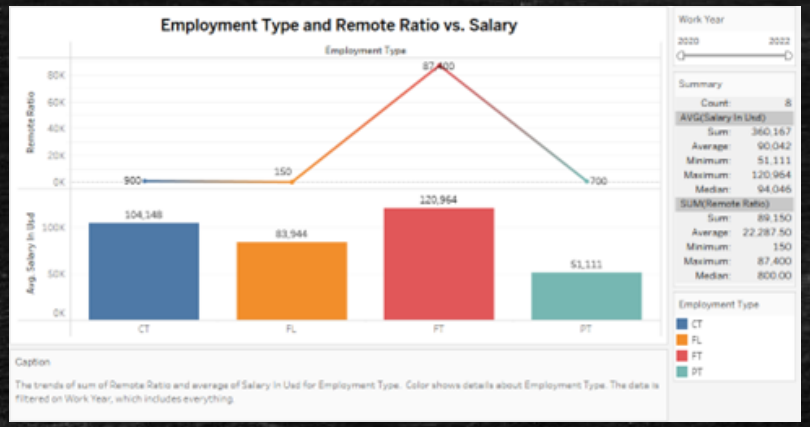
Exploratory Data Analysis (EDA)

- **Experience Level Analysis:**
- Salaries increase with experience level. Senior and executive roles have significantly higher salaries, emphasizing the value of expertise and leadership in cybersecurity.
- **Remote Work & Salary:**
  Fully remote jobs tend to offer higher salaries compared to on-site and hybrid roles.
  Indicates demand for flexibility and the global talent pool companies are willing to invest in.
- **Company Size & Compensation:**
  Larger companies offer better salaries due to greater resources. Medium-sized firms pay well but not as much as large firms. Small firms have lower compensation due to financial constraints.
- **Geographic Distribution:**
- Salary differences based on location, with higher salaries in advanced economies (e.g., US, Germany).Emerging markets (e.g., India) show lower salaries due to economic conditions and industry maturity.
- **Job Title-Specific Insights**:
- Roles like CISO and Cybersecurity Engineer have higher salaries due to specialized skills and strategic importance. Specialized positions, such as Penetration Testers, also command higher pay.
- **Outliers**:
- High executive salaries show greater variability and may reflect unique company practices or strategic compensation packages.

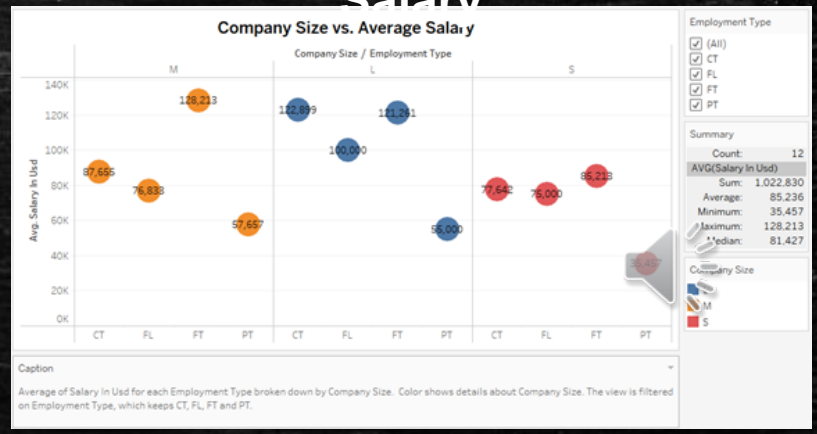
Data Visualization

Visualization 1:
Experience Level vs. Salary

Visualization 2:
Employment Type & Remote Ratio vs. Salary

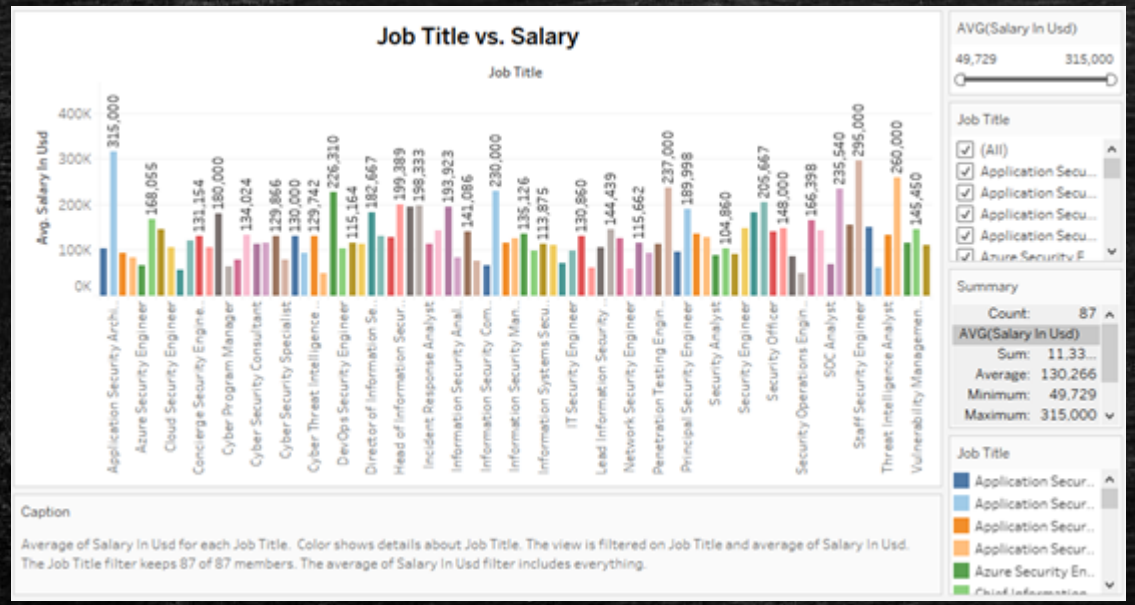


Visualization 3:
Company Size vs. Average Salary

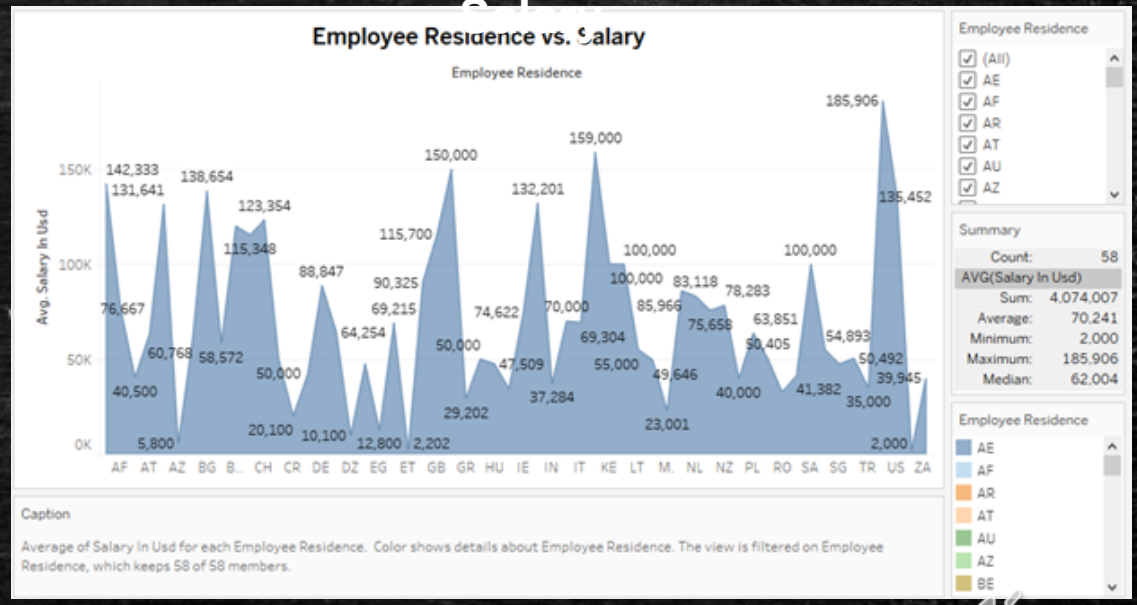


Data Visualization

Visualization 4:
Job Title vs. Salary



Visualization 5:
Employee Residence vs. Salary



Questions Developed From Analysis

What question did you look into?

The primary question was: **"What are the factors influencing salary levels in the cybersecurity industry?"**

This question was broken down into more specific hypotheses:

- How does the level of experience affect the salary in the cybersecurity field?
- What is the impact of employment type (full-time, part-time, contract, freelance) on salary?
- How do geographic location and remote work ratio influence salary levels?

Why are you interested in this question?

- **Relevance:** Growing demand for cybersecurity professionals in the digital era.
- **Benefits for Job Seekers:** Insights into maximizing earning potential.
- **Benefits for Employers:** Develop competitive compensation packages to attract talent.
- **Remote Work Impact:** Understanding how remote work affects cybersecurity salaries.

Questions Developed From Analysis

- **Where did you get the dataset?**
- **Source**: Obtained from Kaggle, titled *Cybersecurity Job Salaries*.
- Survey organized by salaries.infosec-jobs.com.
- **What kind of preprocessing have you done with the data?**
- **Preprocessing Steps**:
- **Data Cleaning**: Removed records with missing/inconsistent values.
- **Transformation**: Converted all salaries to USD for consistency.
- **Encoding**: Categorical variables were encoded.
- **Filtering**: Handled outliers to maintain analysis accuracy.
- **Normalization**: Standardized numeric variables for comparison.

Questions Developed From Analysis

- **Introduce the visualizations you created.**
- Experience Level vs. Salary, Employment Type vs. Salary, Geographic Location & Remote Work vs. Salary
- **Explain your ideas about the visualization design.**
- Bar chart of average salaries by experience level (Entry, Mid, Senior, Executive).
- Bar chart comparing average salaries by employment type (Full-time, Part-time, Contract, Freelance).
- Scatter plot with location on the x-axis, remote ratio on the y-axis, and salary represented by bubble size and color.

Questions Developed From Analysis

- **How to interpret the visualizations?**
- Highlights how salaries increase with experience, showing executive roles have the highest pay.
- Compares salaries based on employment type to identify the highest-paying roles.
- Shows regional salary trends and the influence of remote work on salary.
- **What do you find out with the dataset?**
- Significant salary growth with higher experience levels.
- Full-time and contract positions offer higher salaries compared to part-time and freelance roles.
- Salaries vary by location, with higher pay in certain regions; roles with higher remote work ratios offer competitive salaries.

Questions Developed From Analysis

- **What do you learn from this project?**

•**Experience & Salary**: Strong correlation between experience level and salary; senior and executive roles have the highest pay.

•**Employment Type**: Full-time and contract roles offer higher salaries than part-time and freelance positions.

•**Geographic & Remote Work Trends**: Salary varies by region, with some areas offering higher pay. Remote work roles often come with competitive salaries, reflecting a shift to flexible work arrangements.

•**Skills Gained**: Enhanced data cleaning, preprocessing, EDA, and Tableau visualization skills. Practical experience in interpreting data for insights.

•**Industry Insights**: Deeper understanding of salary influencers in cybersecurity, valuable for career and strategic planning.

Conclusion

The *Cybersecurity Salaries* dataset from Kaggle was chosen for its comprehensive coverage of salary trends across roles, experience levels, and locations in the cybersecurity industry.

This dataset allowed us to analyze key factors influencing salaries, revealing that higher experience levels lead to higher pay, with executive roles like CISOs earning the most.

Remote work positions were found to offer higher salaries, reflecting the value placed on flexible work. Larger organizations provide more competitive compensation, and geographic location impacts salary, with developed regions offering more pay.

These findings provide valuable insights for professionals, employers, and organizations to navigate the cybersecurity job market effectively.

THANK YOU