CYBER SECURITY SALARIES

Project #1 - Muhaymin Raza

Overview

- With the increasing shift towards online, the role of cybersecurity is just as important

- The cost of cybercrime increases year by year ($8T in 2023) and the importance of cybersecurity is ever present

- This project will display the monetary aspect of a career in cybersecurity based on certain variables

Variables

Variables in the dataset are as follows:

- Year
- Employment Type
- Experience Level
- Job Title
- Employee Residence
- Remote Ratio
- Company Location
- Company Size

There will be a larger focus on the employment type, experience., remote ratio and company size as some of these are often overlooked factors when considering salary and I wish to see some of the effects of COVID-19 on the industry (by studying year and remote ratio).

Employment Type

employment_type	Mean Salary	Median Salary	St Dev. Salary	Variance Salary
CT	104148.272727	80000.0	52625.014258	2.769392e+09
FL	83944.333333	76833.0	13934.787273	1.941783e+08
FT	120963.746122	111775.0	70458.475048	4.964397e+09
PT	51110.750000	53160.5	29668.912218	8.802444e+08

The highest average salaries are earned by Full-time, Contract, Freelance and Part-time respectively.

Employment Type

Average Salary based on the Employment Type

Employment Type

The reasoning for the results is as follows:

- Full-time employees likely work far more hours
- Contract employees usually complete their assignments for payments that are decided prior to work and they may be hired by private companies
- There may be a lack of time for a freelance cybersecurity professional as they may have another job/commitments etc.

Therefore, it can be concluded that more hours worked does lead to a higher average salary and therefore the employment type does have a positive effect on salary.

Experience Level

experience_level	Mean Salary	Median Salary	St Dev. Salary	Variance Salary
EN	63579.474419	63000.0	31450.467313	9.891319e+08
EX	200706.082192	195316.0	95147.864868	9.053116e+09
MI	103377.080097	99925.0	49291.579666	2.429660e+09
SE	144560.239488	135600.0	70199.336654	4.927947e+09

The highest average salaries are earned by Executives, Senior level, Mid-level and entry-level.

Experience Level

Average Salary based on the Experience Level

Experience Level

The reasoning for the results is as follows:

- The longevity of a career results in experience and therefore, the most experienced professionals will receive higher salaries.

It is clear that the higher the experience level the higher the salary.

Similarity of Job Titles

| job_title	Mean Salary	Median Salary	St Dev. Salary	Variance Salary
Application Security Analyst	104805.250000	55110.5	102827.848684	1.057357e+10
Application Security Architect	315000.000000	315000.0	NaN	NaN
Application Security Engineer	94778.125000	79905.0	69668.381859	4.853683e+09
Application Security Specialist	85000.000000	85000.0	NaN	NaN
Azure Security Engineer	65858.666667	60000.0	10147.508331	1.029719e+08
...	...	...	...	...
Threat Intelligence Analyst	132799.928571	128400.0	43671.022976	1.907158e+09
Threat Intelligence Response Analyst	260000.000000	260000.0	56568.542495	3.200000e+09
Vulnerability Analyst	115000.000000	115000.0	31424.512725	9.875000e+08
Vulnerability Management Engineer	145450.000000	130000.0	61643.742586	3.799951e+09
Vulnerability Researcher	110000.000000	110000.0	35355.339059	1.250000e+09

Similarity of Job Titles

- **Though some job titles are very similar, this is NOT reflective of salary**

- **Often job titles have differences in seniority and/or location positions, leading to the difference in pay**

- **For example: Application Security Analyst is only one title amongst 86 others and has a significantly higher salary ($315,000)**

Company Size

company_size	Mean Salary	Median Salary	St Dev. Salary	Variance Salary
L	120989.183463	106282.0	76872.847236	5.909435e+09
M	127317.229167	130000.0	57236.105739	3.275972e+09
S	83724.662921	70569.0	47110.913467	2.219438e+09

The highest average salaries are earned by by medium business, large-sized business and small-sized business respectively.

Company Size
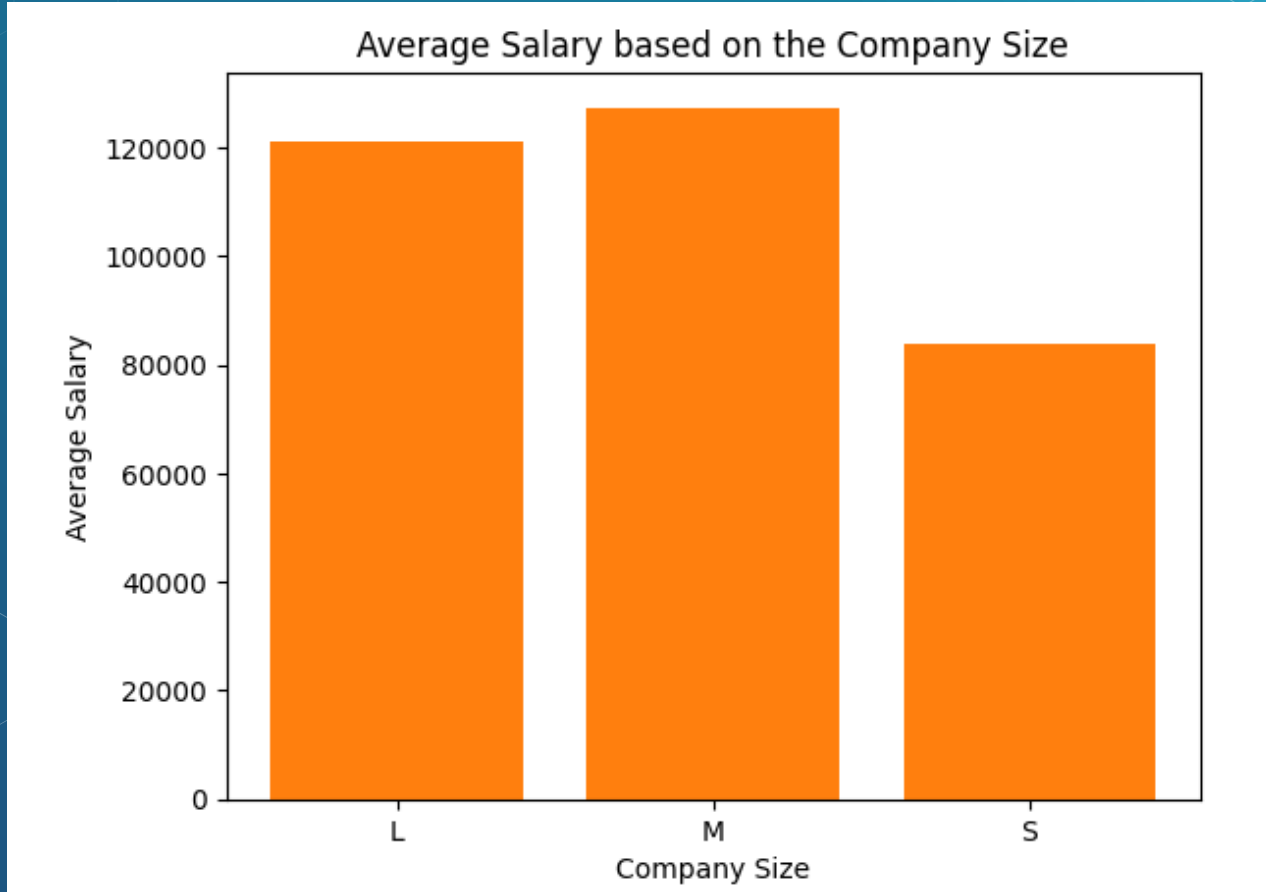
Company Size

The reasoning for the results is as follows:

- Hypothesis that larger company size would equate larger salaries was wrong as middle sized companies actually had highest average salary

- This may be due to more defined roles and for professionals to reach relatively senior positions faster

- Leads to easier career advancement as employees that have not been tenured for too long reach senior & executive positions

Currency

Average Salary based on Currency - Graph 1
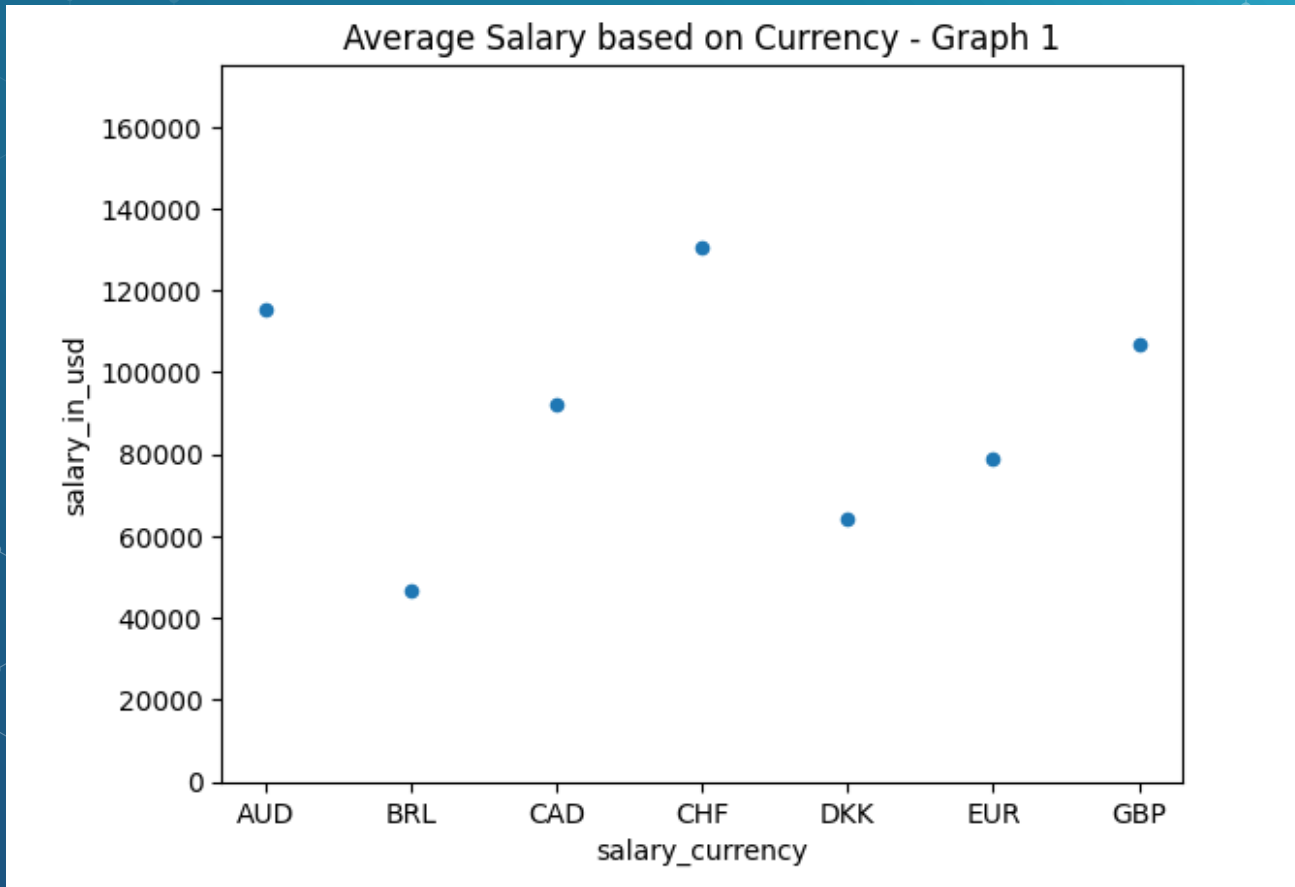
This graph shows the first 7 currencies. Please see appendices for other two graphs.

Currency

- **The 5 countries found with a USD salary above $100K were USA, Israel, Switzerland, Australia & the UK.**

- **Indicates a strong cybersecurity field in countries with stronger currencies especially the five mentioned**

- **Currencies performing at bar with the USD are also indicators of good economic conditions within the countries**

- **Important for cybersecurity professionals if they would like to expand their scope of work**
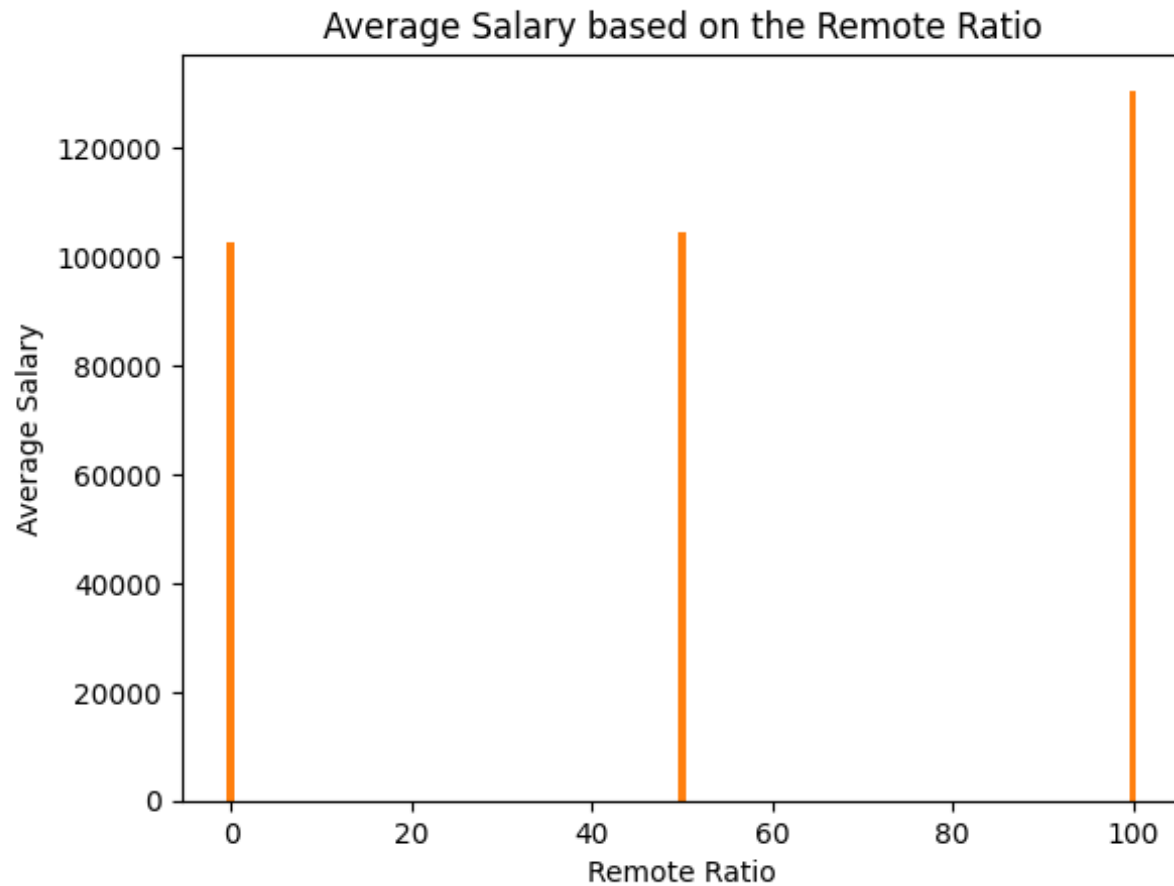
Remote Ratio

remote_ratio	Mean Salary	Median Salary	St Dev. Salary	Variance Salary
0	102674.051502	100000.0	50848.863998	2.585607e+09
50	104666.081633	90000.0	68104.428896	4.638213e+09
100	130586.079324	120000.0	74048.828134	5.483229e+09

The highest average salaries are earned by by the remote ratios of 100, 50, and 0 respectively.

Remote Ratio

Average Salary based on the Remote Ratio

Remote Ratio

The reasoning for the results is as follows:

- Professionals who are 100% remote tend to make the highest average salary mostly due to the fact that they have time flexibility to do projects whenever needed
- Professionals with 0% remote are required to come into an office and therefore work a set number of hours
- This is also upkeeping with the trend of increasingly remote jobs

It is clear that that fully remote professionals make the highest average salaries followed by hybrid professionals and fully in-person.

Work Year Comparison
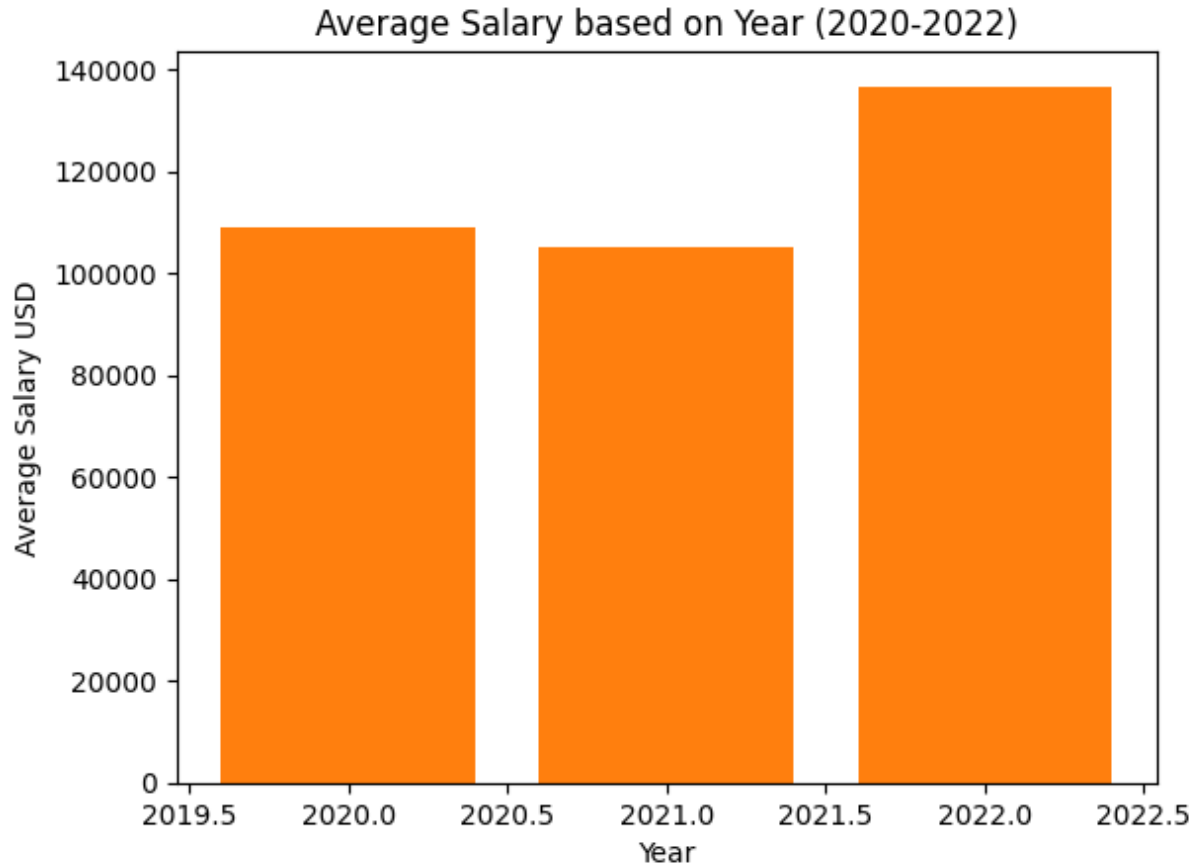
Work Year Comparison

Similar to remote ratio:

- **Work year salaries in 2020 and 2021 were relatively lower**

- **Most likely due to effects of COVID-19 and scramble in workplaces to adjust to online environments quicker (would've impacted 0% remote far more)**

- **Salaries rose in 2022 indicating that professionals/companies have either learned to manage hybrid environments or switched to 100% remote**

Summary of Results as per research questions

- The effect of employment type and experience level is clear and generally tend to have a positive relationship

- Similarity of job title names is not reflective of salary

- Middle sized companies tend to have the highest average salary as compared to large sized companies

- Looking at the currency can give us an indication of well-performing currencies as well as general economic conditions

- Remote ratio has an effect on salary - as the ratio increases, salary increases

- Salaries increased in 2022 after the last 2 years of 2020 and 2021

References

Dataset:

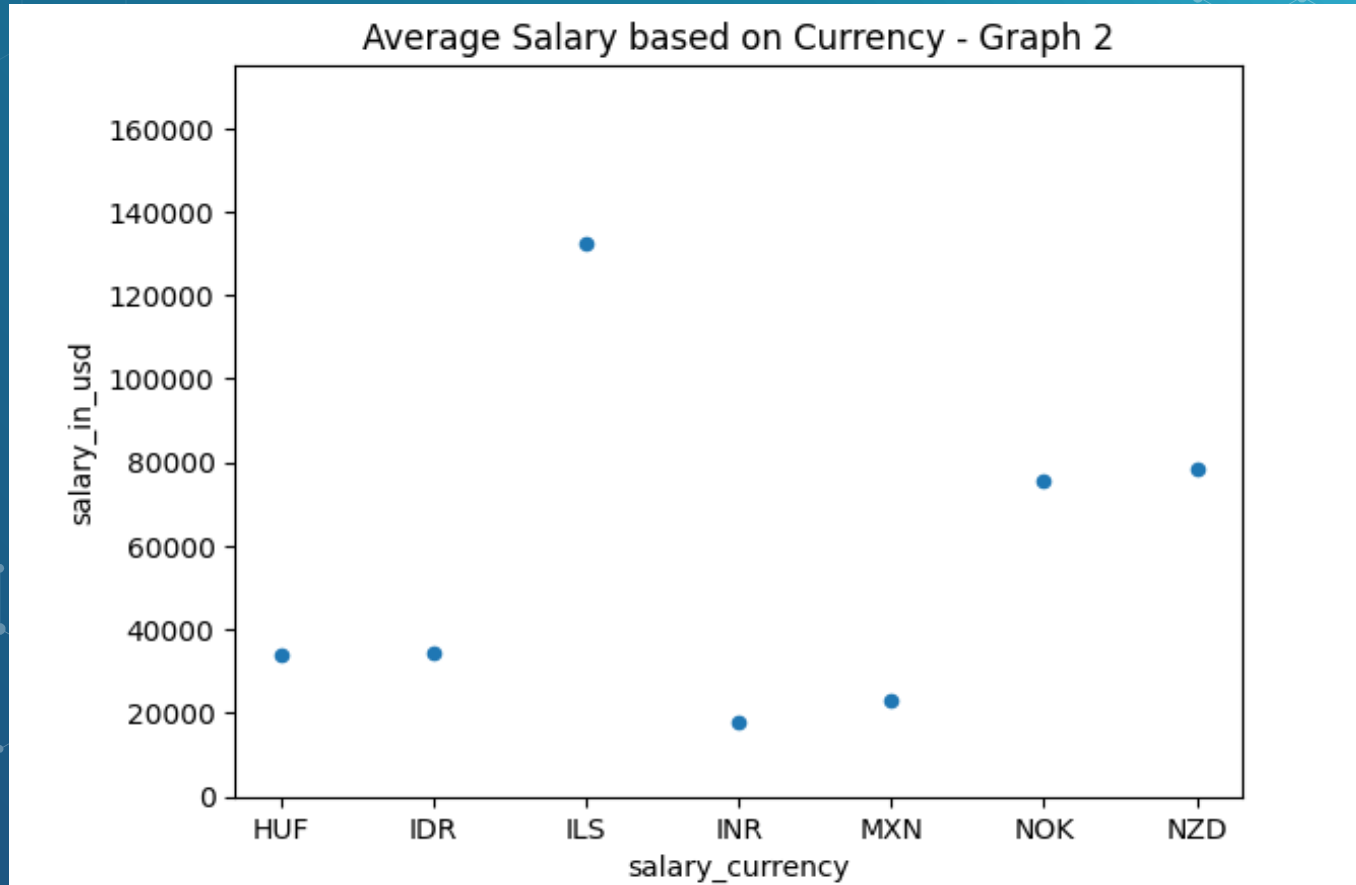https://www.kaggle.com/datasets/deepcontractor/cyber-security-salaries

Other Sources:

https://www.forbes.com/sites/chuckbrooks/2023/03/05/cybersecurity-trends--statistics-for-2023-more-treachery-and-risk-ahead-as-attack-surface-and-hacker-capabilities-grow/

https://kingslanduniversity.com/cybersecurity-contracting-full-time#what_is_contract_employment

Appendix A: Currency Graph 2

Average Salary based on Currency - Graph 2

Appendix B: Currency Graph 3

Average Salary based on Currency - Graph 3