

Final Year Project

- Cyber Security Job Analytics

Task 1: Research

What is Cyber Security Job Analytics and why?

Cyber Security Job Analytics is where I do a deep analysis of the jobs within Cyber Security. For example I would be talking about what jobs there are, what kind of certification would be needed and what wouldn't be needed. I'll analyse the growth rates and hiring trends within the jobs, etc.

I am doing this because I myself get confused with all the information that is provided on the internet as it can get very confusing. So from this I can present it in a simpler and more readable way for all kinds of people such as students, teachers, educational institutions, employers etc. This would be targeted for people in the UK only.

What I'll be doing to help, is create many infographics that will be easy to understand and eye appealing for the users so it wouldn't have to make users research a lot of websites..

Websites that help:

Cyber Security Job Frameworks:

https://www.ukcybersecuritycouncil.org.uk/careers-and-learning/cyber-career-framework/?gad_source=1&gclid=Cj0KCQiA6Ou5BhCrARIsAPoTxB1h1mkmERdJWvLjGtsCEO6pEX__1lrNFdzt7XqMr07eAKYQ-BCM28aAvOYEALw_wcB

<https://www.cyberseek.org/pathway.html>

More cyber security jobs:

<https://uk.indeed.com/career-advice/finding-a-job/careers-in-cyber-security>

Infographics:

Cyber Security Jobs:

Types of Routes into cyber security:

1. Digital Forensics
 - a. Digital Forensic Investigator
 - b. Forensic Examiner
 - c. Digital Forensic Incident Response Specialist
 - d. Digital Forensic and data management analyst
 - e. Junior Digital Device Data Recovery Practitioner
 - f. Digital Forensic Technician
 - g. Computer Forensic Consultant
2. Cyber Threat Intelligence
3. Cyber Security Management
4. Incident Response
5. Network Monitoring and Intrusion Detection
6. Vulnerability Management
7. Security Testing
8. Cryptography and Communication Security
9. Secure Operations
10. Identity and Access Management
11. Secure System and Architecture Design
12. Cyber Security Audit and Assurance
13. Data Protection and Privacy
14. Secure System Development
15. Cyber Security Governance and Risk management

Supervisor Discussion:

METHODOLOGY

API and download data
use recruiting website

Download data every Friday or smth for s couple weeks

1000 data

did it decrease over Christmas or increase etc

kaggle.com ? Data science job

asm

csv

<https://www.kaggle.com>

<https://www.kaggle.com/code/abdullamidlajkm/cyber-security-jobs-eda>

2nd Meeting;

Start Scraping using python

Tools for python scraping libraries

<https://scrapfly.io/blog/how-to-scrape-indeedcom/#:~:text=Is%20it%20legal%20to%20scrape,it's%20perfectly%20legal%20to%20scrape.>

<https://www.scrapingdog.com/blog/scrape-indeed-using-python/>

Add Scraping Artefact

Mid Review Project

[**BSc Project Report Template_v06 \(1\).docx**](#)

Project Management: GitHub

Monthly Schedule in a table and what ive done so far

1. prepare python programme for scraping
2. Use Report Template
3. Set up Github as Project management Tool and create a monthly, work schedule for the project.

3rd Meeting;

Top 10 job websites for cybersecurity

Download data on some websites

Write everything down as some information cant be scrapped on

Task 2: Defining the scope

Project Objective:

I'll be analysing cyber security jobs and providing insights for students and aspiring professionals who have an interest within the cyber security field. My aim of the final year project is to identify trends, requirements, and patterns in cybersecurity roles using real world data. Our aim is to make it easy, accurate and relevant for students who are seeking cyber security related jobs.

Platforms to use:

- LinkedIn
- Glassdoor
- Indeed
- Any Other Job Websites that will be API or Scrapping Friendly

Data that will be gained:

- Job Title
- Location
- Salary Range
- Required Skills
- Certifications
- Experience Level
- Posting Date
- Company Name

I'll be trying to collect data once per week and my targeted data to collect would be 1000 job posts.

Aim of Analysis:

- Trends: See if job postings increase or decrease over time
- Certifications that are really required and the top certifications
- Technical and professional skills
- Salary
- Categorise similar job roles

Deliverables:

- Graphs and Charts showing trends
- Infographics and Posters
- CSV files of cleaned and structured data that has been collected
- A Report explaining the methodology, findings and recommendations

Tools and Technologies:

- Python to extract data, analyse and visualise
- Key Libraries such as pandas, BeautifulSoup
- Data Sources for APIs, web scraping, or existing datasets

Research data sources

What is an API?

API stands for application programming interfaces. It is like a bridge that allows two software to communicate to each other. An example of it would be thinking of it as a restaurant where myself (the developer) requests data (job listing), and the API role would be the waiter who fetches and delivers the data from the server, like a waiter bringing your order from the kitchen. Many websites that I'll be needing for my final year project such as indeed, linkedin have API's.

<https://www.youtube.com/watch?v=ByGJQzIzxQg>

What is Pre-existing dataset?

A pre-existing dataset is, as can be seen in the name, data that had been gathered, cleaned and shared by someone else. This would mean that it would just download the existing data however the problem with this is that it could be out of date and you can only get limited information, so you will only get what you can see there. However this would be saving a lot of time. The dataset can be found on many platforms such as Kaggle.

What is Scrapping?

Web scraping is a technique used to extract data directly from websites. It is basically copying information from a webpage into a structured format like a table or CSV file (Comma Separated Value, a plain text file used to store data of texts and numbers in a structured format) . For example if I wanted to see a list of job postings from websites like Indeed, then I can scrap the information instead of manually copying it.

APIs for Cybersecurity Job Data

1. **LinkedIn Jobs API** - Provides job postings, including cybersecurity roles (requires developer access).
<https://docs.microsoft.com/en-us/linkedin/>
 2. **Adzuna API** - UK-focused job listings, including cybersecurity categories.
<https://developer.adzuna.com/>
 3. **Reed Jobs API** - UK-based job portal with detailed job postings.
<https://www.reed.co.uk/developers>
 4. **Glassdoor API** - Global job data, including cybersecurity. Some UK-specific data may require filtering.
<https://www.glassdoor.com/developer/index.htm>
 5. **Indeed API** - Job listings, including cybersecurity roles (check for UK-based job filtering).
<https://developer.indeed.com/>
 6. **CyberSeek API (if available)** - Focuses on cybersecurity career pathways and job trends in the UK.
<https://www.cyberseek.org/>
 7. **Workable API** - Recruitment tool that lists cybersecurity job openings.
<https://developer.workable.com/>
 8. **UK Government API** - Public sector job listings, including cybersecurity roles.
<https://data.gov.uk/>
 9. **Jobfeed API** - Provides job listings and labour market trends in the UK.
<https://www.jobfeed.com/>
 10. **Talent.com API** - UK-focused job listings, including cybersecurity opportunities.
<https://talent.com/>
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Websites for Web Scraping Cybersecurity Job Data

1. **Indeed UK** - Cybersecurity jobs tailored for the UK market.
<https://uk.indeed.com/>
2. **LinkedIn UK** - Regular job postings for cybersecurity professionals.
<https://www.linkedin.com/jobs/>
3. **Reed.co.uk** - Dedicated UK job portal with cybersecurity opportunities.
<https://www.reed.co.uk/jobs/>
4. **Glassdoor UK** - Reviews, salaries, and job listings in cybersecurity.
<https://www.glassdoor.co.uk/>
5. **CWJobs.co.uk** - Specialized in IT and cybersecurity roles in the UK.
<https://www.cwjobs.co.uk/>
6. **Monster UK** - A variety of UK job postings, including cybersecurity.
<https://www.monster.co.uk/>
7. **TotalJobs UK** - Another UK-specific platform for cybersecurity jobs.
<https://www.totaljobs.com/>
8. **JobServe UK** - IT and cybersecurity-focused job postings.
<https://www.jobserve.com/>

9. **Technojobs UK** - Technology-specific jobs, including cybersecurity roles.
<https://www.technojobs.co.uk/>
 10. **UKCyberJobs** - Dedicated to cybersecurity positions in the UK.
<https://www.ukcyberjobs.co.uk/>
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Pre-Existing Datasets

1. **Kaggle** - Search for "UK cybersecurity jobs" or related datasets.
<https://www.kaggle.com/>
2. **UCI Machine Learning Repository** - Look for datasets on employment trends or cybersecurity skills.
<https://archive.ics.uci.edu/ml/index.php>
3. **Data.gov.uk** - Government datasets on job markets and cybersecurity.
<https://data.gov.uk/>
4. **UK Office for National Statistics (ONS)** - Labour market datasets, including IT roles.
<https://www.ons.gov.uk/>
5. **CyberSeek UK (if available)** - Detailed cybersecurity job pathways and data.
<https://www.cyberseek.org/>
6. **GitHub (search for open datasets)** - Community-contributed cybersecurity job datasets.
<https://github.com/>
7. **World Bank Data** - General employment data with filters for IT jobs.
<https://data.worldbank.org/>
8. **EU Open Data Portal** - Labour market trends in cybersecurity (focus on UK filters).
<https://data.europa.eu/euodp/en/home>
9. **Stack Overflow Survey Data** - Includes insights on developer and IT roles.
<https://insights.stackoverflow.com/survey>
10. **Adzuna Dataset** - UK-specific job trends, potentially including cybersecurity.
<https://www.adzuna.co.uk/>

Start using API and learning

I'll be starting off with the LinkedIn API. 1st I had to create an account for LinkedIn. After that I was taken to the create an app page where I'll have to fill in the details. I don't have a LinkedIn Page so I had to create a new one in order to get the API.

<https://www.youtube.com/watch?v=Q0GpVxZoi28>
<https://www.youtube.com/watch?v=8dOT4YRYTOs>

Start using Scrapping and learning

<https://www.youtube.com/watch?v=Ct8Gxo8StBU>

<https://realpython.com/beautiful-soup-web-scraper-python/#scrape-the-fake-python-job-site>

Now I'll be trying to scrap some data on VS Code and experiment with it. So 1st I open up VSCode and open up a terminal and install some important libraries which are requests - which fetches web pages, beautifulsoup4 - Parses HTML data, pandas - structures data in table and lxml - improves HTML parsing speed and also installed selenium for javascript heavy websites such as linkedin etc.

Scrapping

So far I've started scraping 3 websites indeed, Cyber council and Reed! However they haven't been giving me the certificates and Reed isn't scrapping properly yet. I have been using ChatGPT to help me but also i've done some extra research and found out some certificates that would be needed or are useful. For example you would need GSES GIAC Security essentials certificate for nearly everything.

Meeting:

Scrape Technical Skills and Non Technical Skills

Monthly Update:

- December: Started Doing Research
- February: Started Using API
- March: Moved Into using Scraping Method
- April: Tried Scraping Websites like Indeed, Reed and cybersecurity but failed
- May: Used CWJobs and Scaped some jobs and Finalised Final Year Project