**Project Ideas**

**Cryptography and Secure Communication:**

* First choice as links most with request
* Main aim is to implement and evaluate different cryptography algorithms for secure communication
* Examples include
* Scale can start small – focus on one specific algorithm/ technique at first and explore all potential vulnerabilities and improvements before moving on to others if I have time
* Information sources: Academic papers on cryptography, cryptography libraries, and open-source projects.

**Phishing Detection AI:**

* Develop a natural language based system that can identify phishing emails by analysing their content and language
* I.e. style of language, requests that are made, format/ layout, known sources
* Create a database as the system processes more text so that it ‘learns’ over time and can make better judgements
* No real way to scale – just add more features that the system can look for to see if an email is from a scammer
* Would make use of NLP libraries to analyse the language used

**Network intrusion detection with machine learning:**

* Develop a machine learning model that can analyse network traffic data and detect intrusions or suspicious activities
* Example attacks: Denial of service, man in the middle attack
* Start with one type of attack to evaluate the system’s performance
* Sources: Research papers on defence against cyber attacks, open source code that’s already in use for this type of situation

**Password Strength Analysis:**

* Asses the strength of a given password, offer recommendations to strengthen it if needed
* Will help users stay safe from several attacks like brute force or dictionary attacks – ie, will need to encourage the user to stay away from commonly used words that the attacker could guess
* Could make use of data on passwords and use experience to suggest better passwords

**Content Aggregator:**

* Search the web to get the most relevant webpages and information for a user
* Like google
* Maybe include the little summary of search that’s at the top – would need to read through webpages (maybe the top 5) and take main info to tell user the summary
* Makes use of web technologies
* Add AI by using the user’s recent searches and interactions to create a more custom and personalised experience – learn the user’s preferences without them saying them
* Content summary also uses AI
* Spam filtering?
* Trending topics?
* Quality assessment?
* Translation?
* Use Django and a feed parser library
* Backend developed in python and front end could be a webpage to best show results
* Ethical implications of using the user’s data to make all extras happen – simple as asking for permission before the user’s first use of the program – if no then continue without personalisation. Testing should be fine because can just use my own searches to gather data – later if I want someone else to test, make sure they agree to the use of their relevant info first.

**Expense Tracker:**

* Provide an interface that allows the user to track all of their expenses, keeping them organised and manageable
* AI element can be to analyse the data provided by the user to create a profile of their spending habits and offer advice on how to save and make the best use of their earnings.
* Ethically, may be tough to get lots of test data for the AI because people’s spending data is private
* Can use public data from the internet, most likely there’ll be enough data to train and test the system without having to get any data from elsewhere

**CYBOK**

Include in ethical section of project

* Collection of 21 chapters created by over 115 world experts to help the knowledge needs of the cyber security profession
* Open and freely accessible
* Funded by the National Cyber Security Programme and supported by the UK Cyber Security Council.
* Takes knowledge from a wide range pf sources and literature to create a comprehensive guide for any developer to follow and learn from.