

Xiaoxuan(Sherley) Qin

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SUMMARY

I am a passionate graduate student with a research interest in Network/Information Security and Privacy. My research has included enhancing a network neighbor discovery protocol using deep learning techniques and establishing post-quantum keys in the quantum world. I have hands-on experience in network protocol analysis, penetration testing, wireless access exploitation and have participated in cybersecurity competitions such as NCL and CTF. And I am positively confronting emerging challenges, striving to contribute to the academia and the society.

NOTABLE SKILLS

Programming Language: Python, JAVA, R, C, HTML/CSS, JavaScript, LaTeX

Research Techniques: Network: NS-3, Wireshark, Nmap, Nessus, Metasploit, Aircrack-ng; Data Management: Hadoop, MySQL, Hive

English Proficiency: TOEFL: 112 (R: 28, L: 30, S: 24, W: 30)

EDUCATION

Carnegie Mellon University

Visiting Student

Research Area: Cybersecurity

Core Courses: Introduction to Cryptography

Pittsburgh, PA

09/2023 – till present

University of Pittsburgh

Master of Information Science(ongoing)

Tentative GPA: 3.81/4

Research area: Network Security and Information Security

Core Courses: Information Security and Privacy: A, Network Security: A, Application of Network: A-, Algorithm Design: A, Machine Learning: A

Pittsburgh, PA

09/2022 – till present

Hubei University of Economics

Bachelor of Management in Information Management and Information system

Overall GPA: 3.7/4.0

Core Courses: Linear Algebra 88, Business Statistics I/II (Probability): 95/93, Data Structure: 91, Java I: 85, Java II: A+, Database System: A+, Data Communication: A+, Web Application Development: A+, Mobile Application Development A

Wuhan, Hubei

09/2017 – 06/2021

RESEARCH EXPERIENCE

Enhancing Neighbor Discovery in Wireless Sensor Networks Using Deep Learning Techniques

03/2023 - present

Research Scope:

The primary objective of this research is to explore the potential of employing deep learning techniques, specifically **Multi-Layer Perceptrons (MLP)** and **Graph Convolutional Networks (GCN)**, in enhancing the **Searchlight Protocol**, aiming to reduce the latency of neighbor discovery and improve energy efficiency within a **Wireless**

Sensor Network (WSN).

Achievements:

- Conducted a detailed comparative analysis of various protocols, successfully pinpointing Searchlight as a potential candidate for enhancement in neighbor discovery by deep learning techniques.
- Undertook an extensive comparison of two deep learning models, considering the trade-off between prediction accuracy and computational resources in neighbor discovery.
- By integrating the chosen deep learning model into the Searchlight protocol in the WSN with edge computing, the performance of neighbor discovery was effectively enhanced, ensuring more accurate and efficient neighbor discovery.

On Post-Quantum Key Establishment

04/2023 - 08/2023

Supervisor: Prof. Krishnamurthy, Prashant Venkata (University of Pittsburgh)

Research Scope:

The research focuses on how to enhance the secure data transmission in a post-quantum world of mixed post-quantum and pre-quantum secure flows through the **key pre-distribution** method.

Achievements:

- Proposed a key pre-distribution scheme to enhance the security of communications in a post-quantum world.
- Formulated a probability model to evaluate the probabilities of successful key matches between non-post-quantum and post-quantum nodes under varying key pre-distribution.
- Devised a simulation-driven key pre-distribution mechanism, culminating in an empirical model to guarantee finding a shared key between two heterogeneous nodes (a non-post-quantum node and a post-quantum node).
- Introduced two strategies to help quickly build a successful connection between a non-post-quantum node and a post-quantum network.

An Empirical Study on the Impact of E-commerce Application User Interface Design 02/2021 - 06/2021

Supervisor: Prof. Zhu, Xiaobo (Hubei University of Economics)

Research Scope:

This study aimed to delve into the determinants of **user experience** within E-commerce platforms by examining **interface and interaction design**, integrating **emotion** as an intermediary variable. The research specifically targeted a broad age demographic from 16 to 65 and utilized UI Design Elements and Emotional Factors with Taobao's User Experience as the primary evaluation benchmark to build a research model.

Achievement:

- Developed a research model that identifies Interface Design and Interaction Design as primary variables, and Emotional Factors as intermediary variables, using Taobao's User Experience as the evaluation object.
- Quantified the influence of UI design on user satisfaction and recommended specific enhancements to mobile UI design to improve the user experience measurably.
- Awarded "**Outstanding Undergraduate Thesis**"

ACADEMIC EXPERIENCE

PPG Project based on Machine Learning

03/2023 – 04/2023

Advisor: Dr. Yurko, Joseph (University of Pittsburgh)

Description:

- Developed machine learning models to predict the important property and classify the popularity of paint colors based on inputs from two color models: RGB and HSL.

Responsibilities:

- Performed regression analysis and classification using both **non-Bayesian and Bayesian linear models** to decipher the influence of color model inputs on a concealed paint property and to discern the popularity of paint colors based on color model inputs.
- Trained and tuned models with more complex methods such as **Generalized Linear Model, Elastic Net, Neural Network, Random Forest, SVM, and Gradient-Boosted Tree**.
- Tested model performance using **RMSE, Accuracy (for classification), and ROC (for classification)** to ascertain the most effective predictive model.
- Leveraged the selection of the best models to successfully identify key variables that had a strong impact on the important paint property and the popularity of paint colors.

Database System for E-Commerce

10/2022 – 12/2022

Description:

- A database system designed as an online perfume and body-care shopping system, which displays six categories of products with eight types of scents - aiming at providing customers with a good online perfume and body-care shopping experience.

Responsibilities:

- Database Design (**MySQL**): Designed and implemented a comprehensive e-commerce database comprised of 10 entities and 10 relationships between them.
- Customer Interface Development (**Flask**): Developed a comprehensive customer interface, that allow customers to register, log in, modify personal information, browse and search items by category or scent, add products to their shopping cart, and complete checkout process securely.
- Manager Interface Development (**Flask**): Designed a comprehensive management portal for site administrators, enabling them to view product details, update product information, manage product availability, and monitor sales data.

(Project available at: https://github.com/Qin99113/22fall_infsci2710_project)

Enhancement of Canvas Search Engine

09/2022 – 12/2022

Advisor: Prof. He, daqing (University of Pittsburgh)

Description:

- As an Everyday Study Management Platform used by college students, Canvas provides search functions in different modules, like "Assignment", "Discussion", etc, separately for a particular course. However, it has no global search function across different modules, also students are not able to search in detail for specific content. This project is attempting to design a **global search engine** that can target all the details in all the modules on canvas, including words in PPT or WORD the instructor or the TA issued.

Responsibilities:

- Contributed to addressing the challenge of insufficient global search capabilities, i.e., through enhancing the ability of the search engine to access and retrieve data from the entire platform of a specific course.
- Perfected the Search Algorithm of Canvas to increase its breadth and precision, implementing both exact search algorithm and **fuzzy search algorithm (BM25)** and evaluated by **MAP**, which recorded [relatively] a high score of **0.837**
- Refined search results display mechanism to provide users with more relevant, accurate, and intuitive results: this helped to enhance user experience and boost **user satisfaction** nearly by **50%**.

(Project available at: <https://youtu.be/FShazMnyVy8>)

Big Data Analysis of Taobao's Singles Day Sales

01/2019 – 02/2019

Advisor: Wenli Zhang (Chinese Academy of Sciences)

Description:

- The project is aimed at harnessing the vast amount of consumer data from Taobao's Singles Day sales to extract strategic intelligence, with the goal of enabling the creation of highly targeted marketing campaigns and enhancing customer experience.

Responsibilities:

- Constructed a Hadoop cluster on a Linux system, built a Hive data warehouse to store 7027945 pieces of data, and then built MySQL relational database to run real-time query and information visualization, and integrated them using Sqoop for efficient data transmission.
- Quantified and subsequently visualize consumer behaviors, preferences, and expenditure levels segmented by age, gender, and region during Taobao's Singles Day, providing a robust data-backed foundation for crafting personalized marketing strategies.

TEACHING ASSISTANT

Programming Essentials for Business Analytics(Fall 2023)

- *Instructor: Dr. Ahmad, Altaf (University of Pittsburgh)*
- *Credit 3; 491 undergraduate students*
- *Course website: https://catalog.uppitt.edu/preview_course.php?catoid=213&coid=1175721*

PRACTICAL EXPERIENCE

Hangzhou Xiaomawang Education Technology Co. Ltd.

05/2021- 02/2022

Lecturer of Python Programming

- Instructed students in Python programming, starting with fundamental concepts, followed by data structures, then progressing through algorithm development, modular programming, front-end design, and data scraping and culminating in AI programming.
- Guided nearly 90% of students to achieve the Level 3 Python Certificate endorsed by the China Institute of Electronics and received almost 100% positive feedback from students.

SAP China

08/2020 - 09/2020

PTA of Intelligent Manufacture Project Group

- Developed in-depth analysis of Dissona's Value Stream Mapping, which encompassed customer and market demand, production management, and supply chain system management, and identified critical process bottlenecks.
- Designed and implemented robust information systems (CRM, ERP, SCM, MES) tailored to optimize process and resource management, thereby effectively resolving bottlenecks identified through Dissona's Value Stream Mapping, culminating in a 100% successful transformation towards an intelligent workshop.
- Attended AI+CRM products seminar, discussing how to integrate AI with CRM to realize personality service to increase efficiency and manage risks.

AWARDS & HONOURS

Canglong Student Scholarship (Twice) (Top 10%); Specialized Scholarship (Top 5%)

REFERENCES

Prof. Krishnamurthy, Prashant Venkata

School of Computing and Information

University of Pittsburgh

Email: prashk at pitt.edu

Webpage: <https://sites.pitt.edu/~prashk/>

Dr. Jain, Aayush

School of Computer Science

Carnegie Mellon University

Email: aayushja at andrew.cmu.edu

Webpage: <https://sites.google.com/view/aayushjain/home>