Haoyang Hu

Tel: 86-18906709345 **Email:** hhyoffer@163.com

EDUCATION BACKGROUND:

Nanjing University of Science and Technology (NJUST) **School of Cyber Science and Engineering**
B. Eng. in Cyber Science and Engineering **GPA: 85.25/100 (Top 12%)** *2021.09-2025.06*

PUBLICATION:

Co-First Author, Network Intrusion Detection Algorithm Based on LightGBM Model and Improved Particle Swarm Optimization, IEEE International Conference on CyberSciTech 2024, September 2024 (Accepted)

PATENT:

A Guide Cane and its Control Method (Granted, First Author, Invention Patent, CN111110531A, June 2024)

A News Recommendation System Based on Federated Learning and SM Algorithm (Under Review, Second Student Author, Invention Patent, CN118094008A, January 2024)

A Guide Cane (Granted, First Author, Utility Model Patent, CN212235240U, January 2020)

RESEARCH EXPERIENCE:

AISDR: A Study on AI-Based Technologies for Drug Registration Assistance *Leader, 2024.06-Present*

- Collaborated with the China Pharmaceutical University team to design an algorithm to predict whether a new drug would successfully pass priority review and provide improvement suggestions in case of prediction failure.
- Conducted extensive research on pharmaceutical regulations and gathered comprehensive drug approval data from major databases, covering drug attributes, clinical trial results, approval timelines, and more. Utilized Python scripts to summarize, organize, and preprocess the data, creating a robust and structured dataset.
- Studied and analyzed legal regulations to develop the first drug registration process framework in the field, incorporating AI at critical stages for enhanced analysis and prediction.
- Optimized the Llama2-7B model and implemented methods such as LoRA and in-context learning (ICL) to increase efficiency and reduce costs. Ranked and selected relevant features from complex datasets to refine the input data.
- Accurately modeled the drug registration process and conducted phased predictions using a random forest algorithm. Applied an LSTM algorithm enhanced with a multi-head self-attention mechanism to handle time-series data and predict whether drugs could pass priority review. Ensured model stability and accuracy through multi-parameter tuning and cross-validation.
- Designed intelligent suggestion triggers that provide clients with concrete, feature-based improvement recommendations in case of prediction failure, aiming to enhance the success rate of resubmissions for priority review.
- Currently writing research papers, filing patents, registering a companie and starting businesses.

Research and Development of an IoT Network Intrusion Detection System *Core Member, 2023.05-2024.05*

- Designed and implemented an enhanced heuristic optimization feature selection algorithm, proposed the OptiCrow algorithm to improve the efficiency of feature selection in the system, used the Crow Search Algorithm (CSA) combined with the Levy flight strategy, Cauchy mutation strategy, and differential mutation strategy, significantly enhanced the global search capability and convergence speed of the algorithm.
- Improved the convergence speed and computational efficiency of the model by introducing binary conversion to discretize the continuous results of EHO algorithm, enhanced the global search capability of the traditional Crow Search Algorithm.
- Extracted data using Python from the KDD open-source dataset, performed standardization and normalization, and created a lightweight classification model using LightGBM, optimized the model hyperparameters with GA (Genetic Algorithm) and PSO (Particle Swarm Optimization) algorithms, improved accuracy by 2.66%.
- Conducted multidimensional experimental evaluations, demonstrated significant performance advantages of the proposed algorithm compared to other Intrusion Detection Systems (IDS).
- Our paper was accepted by CyberSciTech 2024 conference, where I shared our work as delegate.
- Currently writing another one for higher-quality submission.

Efficient-FedRec-SM: A News Recommendation System Based on Federated Learning and SM Algorithm
Core Member, 2023.09-2024.01

- Developed a news recommendation system based on federated learning and SM algorithm to protect user privacy, provide efficient personalized recommendation services, and ensure data security and compliance.
- Applied SM2 and SM9 algorithms from the SM algorithm suite to encrypt and digitally sign gradient data, and ensured security and integrity during transmission.
- Implemented digital signature for gradient data on the client-side via Python by writing SM9 algorithm functions, and employed the SM2 algorithm for data encryption to ensure the privacy and security of user data.
- Decrypted the received information on the server-side to ensure the integrity and accuracy of uploaded gradients.
- Proposed an efficient privacy-preserving news recommendation federated learning framework—Efficient-FedRec-SM with good recommendation performance and defense against poisoning attacks, and ensured user privacy and personalized recommendations.
- Received the third prize in the National Cryptographic Technology Competition.
- Obtained an invention patent under review.

China International College Students' "Internet+" Innovation and Entrepreneurship Competition: ***SafeGuide - Intelligent Guide Wand Based on CV*** *Leader, 2018.09-2023.12*

- Programmed using Python and Arduino, applied algorithms like time difference, pulse echo, differential measurement, FFT transform, etc., to achieve over ten functions including intelligent recognition, obstacle avoidance, tracking, and alerting for pedestrians, vehicles, and other obstacles.
- Leveraged the YOLO algorithm and miniature probes to implement the visual functionality of the smart guide cane, capable of accurately reflecting the surroundings.
- Implemented control using the Arduino system and microcontroller board programming based on sensor data collection requirements.
- Utilized CAD modeling simulation and 3D printing technology to complete the design and manufacturing of the smart guide cane, ensuring the product' appearance and functionality were comprehensive.
- Composed a complete business plan and design report.

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- Won the grand prize at the Hongchuang College Joint Cup, the Most Potential Award at the RoboCom City Hero Challenge, the silver medal in the RoboCom Scientific Literacy Assessment National Finals.
- Has been granted a invention patent *A Guide Cane and its Control Method.*
- Has been granted a utility model patent *A Guide Cane.*

INTERN EXPERIENCE:

ECO-LAB, Tencent *Digital Rights Protection Intern, 2024.09-Present*

Exploring the fields of AI governance, cybersecurity and privacy protection:

- **Industry insights and research:** Conducted in-depth research on key areas such as cybersecurity and AI governance, analyzing industry trends and peer strategies of relevant companies.
- **Data analysis and reporting:** Contributed to the collection, analysis, and visualization of ESG data, assisted in drafting high-quality analytical reports, and supported data-driven decision-making.

Taking responsibility for developing AI-driven efficiency tools:

- **News Reporting System Development:** Developed a workflow to automatically collect, summarize, and deliver daily news reports on relevant topics to colleagues' mailboxes, which has been actively used in our team.
- **LLM Training:** Built a proprietary knowledge base for training, fine-tuned the model, designed specialized prompts, and developed a large language model specifically tailored for ESG report writing, which is set to be deployed in our team.
- **CV Model Development:** Deployed an image recognition model for the *'Emin Environmental Protection Action Group'* mini program using CNN and OCR. The mini program is successfully launched and actively used by over 3,000 employees.

Cloud Network Maintenance Center, China Telecom Corporation Limited

Equipment Maintenance Support Intern, 2024.01-2024.02

- Assisted the team in inspecting, maintaining, and servicing equipment to ensure the normal operation of network devices.
- Engaged in data center inspections, familiarized with the characteristics and working principles of various network devices under team guidance, and identified potential device issues for resolution.
- Participated in monitoring phishing emails and conducting penetration testing on the internal network, identified potential phishing emails through analysis of email sources, headers, and content, and took appropriate preventative measures to address cybersecurity issues.
- Engaged in internal network penetration testing, simulated hacker attack methods to discover and eliminate potential cybersecurity risks, and ensured the stability and security of the internal network.

Judicial Appraisal Institute, CINGHOO Technology Co., Ltd. *Data Forensic Analysis Intern, 2023.07-2023.08*

- Participated in electronic data forensics analysis for the public security department, aiding in case filings.
- Utilized tools such as FTK and RStudio in the PE system for data recovery and imaging of hard drives, and employed Mobile Master and OTG backup tools to extract data from mobile phones and computers.
- Wrote Python scripts and utilized tools like Excel to meet client needs, analyzed WeChat group red packet transfer records to reconstruct gambling game rules, automatically identified and added headers to headerless files, and batch-searched domains to scrape emails, registrant, and DNS server information.
- Contributed to writing judicial appraisal reports, conducting electronic data forensics, and data analysis on dozens of mobile phones and computers.
- Co-authored 13 judicial appraisal reports and received a recommendation letter from my leader.

Xuanjia Laboratory, Hangzhou MoreSec Technology Co., Ltd. *Security Service Intern, 2022.07-2022.08*

- Participated in cybersecurity service projects, mainly assisting the department's lab in conducting network security risk assessments to enhance customer protection levels.
- Engaged in the analysis of system and network logs, detecting abnormal activities, and helping customers identify and address security issues promptly.
- Involved in web security research projects, using tools like NMAP for regular scans of websites, identifying, and submitting vulnerabilities to maintain web security.
- Participated in the 2022 National Cybersecurity Operation organized by the Ministry of Public Security, responsible for network scanning, data analysis, and assisting in phishing campaigns to induce target users to click.

AWARDS:

First Prize of Outstanding Student Scholarship, NJUST	*2024.09 & 2024.03*
Success Scholarship, NJUST	*2024.09*
Outstanding Class Cadre, NJUST	*2024.09 & 2024.04*
Beyond Scholarship, NJUST	*2024.03*
Advanced Certified Data Analyst, China Financial Analysis Institute	*2024.02*
First Prize of National College Student Data Analysis Competition	*2023.12*
Third Prize of National Cryptography Technology Competition	*2023.11*
Merit Student, NJUST	*2023.11*
Third Prize of Outstanding Student Scholarship, NJUST	*2023.09, 2023.03 & 2022.09*
National Third Prize and Provincial Second Prize, 11th “TIPDM CUP” Data Mining Challenge	*2023.10*
Third prize, 2023 “Science Park Cup” Mathematical Modeling Competition	*2023.07*
Junior (level 1) Industrial Internet -- Industrial Internet platform, MIIT	*2023.06*
Honorary Certificate of 2021 China Association of Automation	*2021.10*

ENGLISH & COMPUTER SKILLS:

English: IELTS: 6.5

Computer: Proficient in R, C++, Python; Windows, Linux; LaTeX; MS Excel, MS Office, and Tableau.