Jingwen Shi

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EDUCATION

Research Area: Mobile Systems and Network, Security, Cloud Computing

- **Michigan State University** — Michigan, USA
  Ph.D. Candidate, Computer Science, — *Aug. 2019 - 2025 Spring*
  Thesis: Security of Multimedia Communication Services in 5G/4G Network
- **University of Chinese Academy of Sciences** — Beijing, China
  M.S., Applied Computer Technology — *Sept. 2016 - May 2019*
  Thesis: Traffic Prediction and Uncertainty Interval Estimation for E-commerce Clusters
- **Hunan University** — Hunan, China
  B.S., Information Security — *Sept. 2012 - May 2016*
  Thesis: Visual Search Engine with Crawler System for Information Security Laws

SKILLS

Python, C/C++, Java, Matlab, Android, Tensorflow, Keras, scikit-learn, Linux, 3GPP Standards, srsRAN, USRP, QXDM, Wireshark, Julia, Hadoop, MongoDB, HBase, PostgreSQL, OpenSSL, D3.js, Django, Scrapy, MySQL

RESEARCH INTERNSHIP

AT&T Lab — *June 2024 - Aug. 2024, USA*

- **Intelligent Traffic Monitoring in 5G/4G IoT and IoV Network:** Developed an AI-based framework for traffic analysis and anomaly detection in 5G/4G network, evolving ML, statistics and signal processing. Submitted **one patent**. Assisted with productization.

Los Alamos National Lab — *June 2021 - Aug. 2021, USA*

- **Privacy of Cyber-Physical System (CPS):** Built a CPS simulation testbed. Developed an automated framework with SVM/SVD/FSM to re-construct the CPS from observation. Achieved an accuracy of **97%**.

Alibaba — *Jan. 2019 - June 2019, China*

- **Cloud Traffic Prediction:** [*JST'19*] Designed Bayesian Neural Networks for Query per second prediction for Taobao, the largest C2C platform in China. Achieved **99.8%** test accuracy. Contributed to **one patent**.
- **Virtual Machines Anomaly Detection:** Invented a framework based on isolation forest, 3-sigma, and KDE for clusters over 1000 virtual machines. Reduced **95%** of false alarms. Contributed to **one patent**.

SELECTED PROJECTS

Wireless Network and Mobile System

1. **Mobile System Security:** [*ACM Mobicom'24*] Discovered vulnerabilities in mobile systems and 5G/4G standards. Devised three attacks: DoS on cellular connection, SMS spoofing, and video call service abuse. Proposed defenses for each. Invited as Co-PI for a Google ASPIRE proposal.
2. **Radio Access Network Security:** [*IEEE CNS'23*] Discovered vulnerabilities in 5G/4G radio protocols, and designed overshadowing and privacy inference attacks. Implemented radio sniffer and overshadow tools over wireless communications. Integrated Mask R-CNN, DSFD, and ResNet50 for privacy inference.
3. **Mobile Payment Security:** [Mobicom'24, Under Review] Inferred user payment and bank information during customer service calls from the wireless channel by Deep Siamese Neural Network and LSTM.
4. **Cellular Network Infrastructure Security:** [*ACM Mobicom'22* (*Best Community Paper, AT&T Security Award*), *ACM GetMobile'23*, *IEEE TON'24*] Constructed an entire cellular network simulation testbed including device, radio access network, 5G/4G core network, and IP Multimedia Subsystem. Successfully defended DoS and free-data attacks against 911 services.
5. **User Authentication in Cellular Network:** [*IEEE TMC'22*] Participated in designing a new user authentication mechanism on the top of cellular infrastructures.
6. **IMS Signaling Auto-Checking:** [USENIX NSDI'25, Under Review] Responsible for implementing the IMS signaling testing tool in C++ for 5G/4G phones.

Cloud Computing

1. **Distributed Spatial Index:** [*IEEE IPCCC'18*] Created a spatial index reducing I/O traffic by up to **70%**. Evaluated on Hbase and MongoDB.
2. **Distributed Storage:** Created a data pipeline connecting HDFS to PostgreSQL for satellite images.