Website:zhangshaohu.github.io
Git: github.com/zhangshaohu

SHAOHU ZHANG

(605) 592-0499
szhang42@ncsu.edu

EDUCATION

North Carolina State University   **Raleigh, NC**   **8/2017–12/2022**
Ph.D. candidate in **Computer Science** |Adviser: Prof. Anupam Das

South Dakota State University   **Brookings, SD**   **8/2013–5/2017**
Graduate student in Computer Science (transferring to NCSU) |Adviser: Prof. Myounggyu Won
M.S. Civil Engineering (Transportation Engineering) |Adviser: Prof. Jonathan Wood

Zhejiang Ocean University   **Zhoushan, China**   **9/2006–6/2010**
B.A. Marine Fishery Science and Technology

SKILLS AND INTERESTS

- Experience in ArcGIS, Mobile App Development, Microcontroller programming, Machine Learning, and Deep Learning.
- Proficient in C++ and Python, familiar with Java, SAS, Matlab and R.
- ML frameworks: Scikit-learn, Pytorch, Tensorflow/Keras.
- ML experience: Data analytic and Visualization, Supervised/unsupervised modeling.
- Interests: machine learning, sensor sensing, IoT, privacy and security.

EMPLOYMENT

- **Research Assistant, Wolfpack Security and Privacy Research (WSPR) Lab, NCSU**   **12/2019–present**
- **Research Assistant, Wolfpack Interactive, Sensing and Networking Lab (WiSN) Lab, NCSU**   **8/2017–12/2019**
- **Research Assistant, Wireless Embedded and Networked Systems (WENS) Lab, SDSU**   **8/2015–12/2016**
- **Research Assistant, Civil Lab for Operations and Safety Engineering in Transportation, SDSU**   **5/2014–5/2015**

SELECTED PROJECTS

- **HeadTalk:** Inspired by interpersonal communication clues, I proposed and developed a device-free and non-obtrusive acoustic sensing system, HeadTalk, to thwart both the misactivation of voice assistants and replay attacks. The proposed acoustic sensing technique can accurately infer the direction of the voice and thereby associate addressability with voice commands, allowing VAs to record and transmit audio data only when they detect a human speaker facing them from a distance **(Linux, Python, Matlab, and SVM)**.
- **HandLock:** Proposed and developed the concept of using a gesture-based authentication system for smart home voice assistants called *HandLock*, which uses built-in microphones and speakers to generate and sense inaudible acoustic signals to detect the presence of a known hand gesture. *HandLock* can act as a second-factor authentication for performing sensitive activities such as making online purchases through voice assistants. Through extensive experiments involving 45 participants, we show that *HandLock* can achieve on average 96.51% true-positive-rate at the expense of 0.82% false-acceptance-rate **(Linux, Python, Matlab, and RF)**.
- **Naturalistic Driving Data project:** main investigator to evaluate relationships between perception-reaction times, emergency deceleration rates, and crash outcomes by mining the Naturalistic Driving Data **(Logistic regression, Causal inference)**.

SELECTED AWARDS

- **COE Enhancement Fee Travel Award:** North Carolina State University, 2020.
- **NSF Student Travel Grant:** SenSys'16 and MobiCom'17.
- **Sigma Xi Graduate Research Award:** South Dakota State University, 2016.
- **Outstanding Undergraduate Thesis Award:** Zhejiang Ocean University, China, 2010.

PROFESSIONAL SERVICE

- **Conference Review:** IEEE SP'21; USENIX Security Symposium'21; NDSS'21; AsianCCS'20 & 21.
- **Journal Review:** ACM IMWUT'19; IEEE IoT Journal'21; ACM Trans. IIS'21.

SELECTED PUBLICATIONS

- **Shaohu Zhang**, Anupam Das, Speaker Orientation-Aware Security and Privacy Control for Voice Assistants, **NDSS'22** (Under Review).
- **Shaohu Zhang**, Anupam Das, Enabling 2-FA for Smart Home Voice Assistants using Inaudible Acoustic Signal, **RAID'21**.
- **Shaohu Zhang**, Raghav Venkatnarayan, Muhammad Shahzad, *A WiFi-based Home Security System*, **IEEE MASS**'20
- Jonathan Wood, **Shaohu Zhang**, *Evaluating Relationships Between Perception-Reaction Times, Emergency Deceleration Rates, and Crash Outcomes using Naturalistic Driving Data*, **Transportation Research Record**, 2020.
- Muhammad Shahzad, **Shaohu Zhang**, *Augmenting User Identification with WiFi Based Gesture Recognition*, **Ubicomp**'18