: zhangshaohu.github.io
: github.com/zhangshaohu

SHAOHU ZHANG

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EDUCATION

Ph.D. candidate in **Computer Science** |Adviser: Prof. Anupam Das — North Carolina State University — 8/2017–12/2022
Research area: applied machine learning, sensor sensing, IoT, privacy and security.

MS. Computer Science & Civil Engineering — South Dakota State University — 5/2017
Research area: ITS, sensor sensing, and transportation data analysis.

B.A. Marine Fishery — Zhejiang Ocean University, China — 6/2010

SKILLS AND INTERESTS

- Experience in ArcGIS, Mobile App Development, Microcontroller programming, Machine Learning, and Deep Learning.
- Proficient in MatLab and Python, familiar with C++, Java, SAS, 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 AND SELECTED PROJECT

- **Research Assistant, Wolfpack Security and Privacy Research (WSPR) Lab, NCSU** 12/2019–present
  HeadTalk (**Finalist of Facebook proposal** the 2021 Towards Trustworthy Products in AR, VR, and Smart Devices, PI: Anupam Das): proposed and developed a device-free and non-obtrusive acoustic sensing system 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 (RAID'21): 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. **(Linux, Python, Matlab, and RF)**.
- **Research Assistant, Wolfpack Interactive, Sensing and Networking Lab (WiSN) Lab, NCSU** 8/2017–12/2019
  Speech Reconstruction: reconstructed the speech by training and learning high-resolution speech and the vibration response from the VR accelerometer and achieved 20% speech recognition accuracy through Google Speech-to-Text API. **(C++, Python, Matlab, TensorFlow, Keras, and DNN)**.
  WiFi Home Sensing (MASS'20): a home security system detects the door/window/human movement (over 90% accuracy) utilizing WiFi signals **(Linux, Matlab, SVM, DTW, and Networking)**.
- **Research Assistant, Civil Lab for Operations and Safety Engineering in Transportation, SDSU** 1/2017–7/2017
  Naturalistic Driving Data project (TRR'20): main investigator to evaluate causal relationships between perception-reaction times, emergency deceleration rates, and crash outcomes by mining the Naturalistic Driving Data **(Java, Logistic regression, and Causal inference)**.
- **Research Assistant, Wireless Embedded and Networked Systems (WENS) Lab, SDSU** 8/2015–12/2016
  A WiFi-based traffic monitoring system (ICCCN'17): designed and implemented a WiFi-based traffic monitoring system to classify vehicles, measure vehicle speed, and perform vehicle lane detection using WiFi signals **(Linux, Matlab, SVM, and Networking)**.

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.

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; IEEE Trans. Mobile Computing'21.