

# Haowen Liu

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## RESEARCH INTERESTS

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**Computer Security, Computer Architecture, Artificial Intelligence Security, Network Security**

## EDUCATION

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**Shanghai Jiao Tong University**

Shanghai, China

*Bachelor of Engineering in Information Security, Minor in Japanese*

*Sep. 2017 – June 2021*

## RESEARCH PROJECTS

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**Attack Graph Generation Technique for V2X Vehicle Internet** | *IoV Security* Jan. 2021 – June 2021

- **Project:** Graduation Thesis
- **Supervisor:** Jin Ma (Associate Professor)
- **Research Content:** Implement a prototype of IoV attack graph generation system based on causality to find the security problems caused by the combination of vulnerabilities in the system.
- **Project Output:** 1 Graduation Thesis, a prototype system (in progress)

**Vulnerability Analysis Based on Attack Graph in Vehicle Internet** | *IoV Security* May 2020 – Sep. 2020

- **Project:** Undergraduate Summer Internship Program
- **Supervisor:** Xiuzhen Chen (Associate Professor)
- **Research Content:** Analyze the vulnerabilities inside IoV based on attack graph technology using MulVAL. Find the attack dependency in IoV based on *ATT&CK* matrices.

**Adversarial Example Defense Based on Feedback Network** | *Deep Learning* Oct. 2019 – March 2021

- **Project:** HUAWEI-SJTU Innovation Joint Laboratory of Cyber Security, YBN2019105168-SOW06
- **Supervisor:** Ping Yi (Associate Professor)
- **Research Content:** Propose a new adversarial example defense method based on feedback network, which uses feedback network to eliminate or detect adversarial disturbance in input. Implement a prototype system.
- **Project Output:** 1 top conference paper (submitted), 1 patent (filed), a prototype system

**A Semi Passive Security Analysis Tool for ICS** | *Network Security, Attack Graph* Oct. 2019 – Sep. 2020

- **Project:** 13th National College Student Information Security Contest
- **Supervisor:** Gongshen Liu (Professor)
- **Research Content:** Propose a semi passive method to help network managers for security analysis of Industrial Control System based on Bayesian Attack Graph by improving MulVAL. Implement a prototype system.
- **Project Output:** First Prize, 1 patent (filed), a prototype system

**Retinal Scanning Display for Mixed Reality** | *AR, Optics, Waveguide, Laser* April 2018 – Sep. 2019

- **Project:** 34th PRP project, T030PRP34068
- **Supervisor:** CHAO PING CHEN (Associate Professor)
- **Research Content:** Present a design of a contact lens display, which features an array of collimated light-emitting diodes and a contact lens, for the augmented reality. The resolution of light-emitting diodes is foveated to match with the density of cones on the retina.
- **Project Output:** 1 journal paper (published), 1 conference paper (published), 1 patent (authorized)

## PUBLICATIONS

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### Conferences

- [1]. Jie Chen, Lantian Mi, Chao Ping Chen, **Haowen Liu**, Jinghui Jiang, Wenbo Zhang, and Yuan Liu “A foveated contact lens display for augmented reality”, *Proc. SPIE, Optical Architectures for Displays and Sensing in Augmented, Virtual, and Mixed Reality (AR, VR, MR) (SPIE AR VR MR)*, in San Francisco, California, United States, 2020. (Oral)

### Journals

- [1]. Jie Chen, Lantian Mi, Chao Ping Chen, **Haowen Liu**, Jinghui Jiang, and Wenbo Zhang, "Design of foveated contact lens display for augmented reality", *Optics Express (OE)*, Vol.27, No.26, pp. 38204-38219, 2019.

## Patents

- [1]. Ping Yi, **Haowen Liu**, Hsiao-Ying Lin, "System and Method of Adversarial Example Detection Based on Feedback Reconstruction", 2020.11, Application Number: PCT/CN2020/129298.
- [2]. Jianming Guo, Gongshen Liu, Ziang Chen, **Haowen Liu**, Zihan Liu, "A Semi Passive Security Analysis Tool for Industrial Control Network using Bayesian Attack Graph Technique", 2020.12, Application Number: CN202011519498.4.
- [3]. Jie Chen, Chao Ping Chen, **Haowen Liu**, Jinghui Jiang, Lantian Mi, "Intraocular display device based on retinal scanning", 2019.12, Authorization Number: CN110955063B.

## TECHNICAL SKILLS

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**Languages:** Python, C/C++, SQL, Verilog, HTML, x86 Assembly

**Frameworks:** Django, Nginx, PyTorch

**Developer Tools:** Git, VS Code, PyCharm, Xilinx, Terminal, Xcode, Spyder, Sublime, SolidWorks, AutoCAD

**Disciplines:** Cyber Science, Computer Security, Cryptography, Computer Architecture, Deep Learning, Electrics

## HONORS

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- 2020, Third Prize for the 6th Qian Xuesen Cup Contest
- 2020, First Prize for the 13th National College Student Information Security Contest
- 2020, Honorable Mention for Interdisciplinary Contest In Modeling
- 2019, AY 2018-2019 Academic Progress Scholarship
- 2019, AY 2018-2019 Class C Scholarship
- 2019, Honorable Mention for Mathematical Contest In Modeling
- 2019, Outstanding Project in 34th PRP
- 2018, Third Prize for the 35th National College Student Physics Contest
- 2017, Zhiyuan Honors Program of Engineering Scholarship