Zhicong Sun

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EDUCATION

Southern University of Science and Technology (SUSTech) Sept 2020 - Jun 2023(Expected)
M.E. in Electronic science and technology at the Department of Computer Science and Engineering
Supervisors: Prof. Shuang-Hua Yang, Prof. Yulong Ding
GPA: 3.2/4. Core Courses: Intelligent data analysis, Advanced Artificial Intelligence, Advanced Algorithms, Evolutionary Computation, Research Skills.

Harbin Institute of Technology (HIT) Sept 2016 - Jun 2020
B.Eng. in Communication Engineering at the School of Information Science and Engineering
Supervisor: Prof. Changjun Yu
Top 10 Most Influential Graduates

PUBLICATIONS

1. Zhicong Sun, Yulong Ding, Shuang-Hua Yang. Contradictions Identification of Safety and Security Requirements for Industrial Cyber-Physical Systems. *IEEE Internet of Things Journal, Under Review.*

2. Zhicong Sun, Yulong Ding, Shuang-Hua Yang. Joint Safety and Security Risk Analysis in Industrial Cyber-Physical Systems: A Survey. *IEEE Internet of Things Journal, Under Review.*

RESEARCH EXPERIENCE

1. Identification and Resolution of Contradictions between Safety and Security (S&S) in Intelligent Connected Vehicle (ICV)
Main Researcher | SUSTech Sept 2022 - Present
Advisor: Prof. Shuang-Hua Yang

- Supported by Huawei Trustworthy Intelligent Systems Laboratory.
- Goal: to identify and reduce the contradiction in S&S requirements for ICV, satisfying high accuracy and efficiency in the coordination of safety and security in ICV.
- Current achievements: investigated the literature and formulated a detailed research proposal. This work focuses on five parts: the system model of ICV, the unified elicitation of S&S requirements, the semi-formal representation of S&S requirements, the methodology for identifying contradictions in S&S requirements, and the solution of S&S contradictions.

2. Dealing with Security and Safety (S&S) Contradictions for Industrial Cyber-Physical Systems
Main Researcher | SUSTech Sept 2021 - Present
Advisor: Prof. Shuang-Hua Yang

- Supported by the National Natural Science Foundation of China, Grant Number: 61873119 and Shenzhen Key Laboratory of Safety and Security for Next Generation of Industrial Internet.
- Goal: to propose a systematic methodology for identifying the contradictions in S&S requirements and provide strategies to reduce such contradictions.
- Current achievements: completed two articles as the first author and submitted them to the IEEE Internet of things Journal (both are under review), including one review article (24 pages, submitted on 05-May-2022) and one regular article about contradictions detection (21 pages, submitted on

26-Jul-2022).

3. Direction Estimation of Ionospheric Echo based on High-Frequency Ground Wave Radar
Main Researcher | HIT Jan 2020 - May 2020
Advisor: Prof. Changjun Yu

- Supported by the National Natural Science Foundation of China, Grant Number: 61971159 and Institute of Electronic Engineering Technology, HIT.
- Goal: High-frequency ground wave radar can detect and track targets beyond the line of sight. However, the ionospheric echo has a negative impact on the detection of the target since its large intensity and wide coverage area. This work aims to estimate the azimuth and elevation of ionospheric echo, so as to provide a basis for the suppression of ionospheric clutter in future work.
- Actions: analyzed the signal and modeled the array flow pattern of the two-dimensional receiving antenna; compare the effects of different array parameters and criteria on digital beamforming; compared the convergence performance of different adaptive weight vector adjustment algorithms; compared two kinds of DOA estimation algorithms, including beam-scanning-based methods and super-resolution estimation methods.
- Achievements: reduced the time complexity of the algorithm for beam-scanning-based angle measurement from $O(n^2)$ to $O(n)$; got 95 points in the graduation project review, ranking second in my major; appraised as an excellent graduation design of the HIT.

4. Part of Other Research Experiences

- Using visualisation/human-computer interaction/data analysis to overcome limitations of safety and security risk analysis (to be started soon, co-research with Zezheng Feng).
- Simple Covariance Matrix Self-Adaptation Evolution Strategy with Repelling Subpopulations
- Optimization of the initialization of item grouping under the BIGO model
- Optimization of the convergence speed and the local search ability of the IFEP algorithm
- Electronic Control of Robots in Robomaster (China University Robot Competition)

TEACHING EXPERIENCE

CS324 Internet of Things. 2022 Spring
Teaching Assistant | Prof. Shuang-Hua Yang

- Objectives: to introduce the commonly used protocols and standards in the Internet of Things (IoT) and explore general wireless networking technologies (e.g., general wireless networks, LoRa, NB-IoT, wireless mobile ad hoc networks (MANET), wireless sensor networks, and IoT) and IoT-associated technologies (e.g., Big Data).
- Guided the experimental courses, answered questions about the content in theoretical courses, and corrected homework and assisted the professor in class.

WORK EXPERIENCE

- **Standard Robots, Shenzhen, Co., Ltd** Jul 2020 - Aug 2020
  Intern | Electronic Control Group
- **ZTE Corporation** Jan 2020 - Feb 2020
  Intern | Wireless Communication Group, Asia Pacific Training Base, Yantai

LEADERSHIP

- **HIT Robot Contest Team (HRCT)**

Head of the Electronic Control Group | HIT Aug 2017 - May 2018
Vice Captain & Head of the Electronic Control Group | HIT Jun 2018 - Aug 2019

- **Maker Space**
  Head of the lab | HIT Sept 2017 - Feb 2018

AWARDS

- Second Prize in Preliminary Contest of Business Plan of the 15th China Graduate Electronic Design Contest, 2020 (Leader).
- Second Prize in the South China Division of the 15th China Graduate Electronic Design Contest, 2020 (Deputy leader).
- **Second Prize in the Final Tournament of the 18th RoboMaster University Championship**, China University Robot Competition, 2019 (Leader).
- Grand Prize in the North China Division of the 18th Robomaster University Technical Challenge, 2019 (Leader).
- First Prize in the Northern Division of the 18th RoboMaster University Championship, China University Robot Competition, 2019 (Leader).
- Participation Award in ICRA RoboMaster AI Challenge, 2019 (Member).
- **Grand Prize in the 7th China Marine Vehicle Design and Construction Contest**, 2018 (Leader).
- Third Prize in the University Student Science and Technology Innovation Competition, Shandong, 2018 (Deputy leader)..
- Third Prize in the Northern Division of the 17th RoboMaster University Championship, China University Robot Competition, 2018 (Leader).
- First Prize in the HITwh Internal Contest of the Shandong Science and Technology Innovation Competition, 2018 (Deputy leader).
- Second Prize in the 1st HITwh Headmaster Cup Science and Technology Contest, 2018 (Leader).
- First Prize of the HITwh Artificial Intelligence and Intelligent Hardware Contest, 2018 (Leader).

HONORS

- **Top 10 Most Influential Graduates**, 2020.
- Outstanding Scientific and Technological Innovation Individual of the School of Information Science and Engineering, 2019.
- Science and Technology Innovation Scholarship, 2019, 2018, 2017.
- Outstanding Communist Party Member of the School of Information Science and Engineering, 2018.
- Excellent Volunteer, 2018.
- Social Work Scholarship, 2017.
- Sports Excellence Scholarship, 2017.

LANGUAGES & SKILLS

- Languages: Chinese (Native), English (passed CET 6; the IELTS exam I signed up for was cancelled because of the epidemic prevention and control Arrangement, and I am preparing for the next one).
- Computer: level 3 of the National Computer Rank Examination.
- Table tennis: won sixth place in men's singles of Fujian Province and third place in men's singles of the city of Quanzhou.
- Singing: won the second place in the city of Nan'an.

REPORTS & INTERVIEWS ON ME

- Return visits of Top 10 Most Influential Graduate [link 1] [link 2] [link 3]
- Interview about my experience in science and innovation in HIT. [link]