Xu Mengdie

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EDUCATION

Southeast University, Nanjing, China ***Spt.2022 - Present***

- **Master** of Control Science and Engineering **Average Score**: 90.36/100
- **Supervisors**: Prof.Xianghui Cao (Website) and Assoc. Prof.Chaoqun Yang (Website)
- **Core Course**: Matrix Theory in Engineering (100), Digital Signal Processing (92), Intelligent Robot(88)

Shandong University, Ji'nan, China ***Spt. 2018 - Jun. 2022***

- **Bachelor** of Control Science and Engineering **GPA**: 3.95/5
- **Dissertation**: The Detection and Recognition of Road Obstacles Based on Deep Learning
- **Core Course**: Principles of Automatic Control II (97), Probability and Statistics (95), Functions of Complex Variable and Laplace Transform (99)

PUBLICATIONS & PATENTS

Publications (* corresponding author)

1. **Mengdie Xu**, Chaoqun Yang*, Xiaomeng Cao, Shishan Yang, Xianghui Cao, "Irregular extended target tracking with unknown measurement noise covariance ", **Signal Processing**, 2024. **(Available online)**. **(SCI, JCR Q2)**
2. **Mengdie Xu**, Xiaofeng Wang, Chenxi Yao, Chaoqun Yang*, "Real-world experiments on acoustic detection of small UAVs", in Proc. ICAUS, Nanjing, China, 2023. **(EI)**

Patents

1. Chaoqun Yang, **Mengdie Xu**, Xianghui Cao," Road-map aided method based on Gaussian mixture labeled multi-Bernoulli filter", Chinese Patent, CN116734869A, unauthorized.

RESEARCH EXPERIENCE

Research on Irregular Extended Target Tracking with Non-Uniformly Distributed Measurements
Mar. 2024 - Present

- Considering that scatter centers are densely distributed on several discrete parts rather than uniformly distributed on the entire target, I am researching a tracking algorithm for irregular extended targets with non-uniformly distributed measurements.
- Each region with a high density of measurements, referred to as a sub-target, is represented by a Gaussian process model. Association variables are defined for each measurement and its corresponding sub-target. The posterior distributions of all variables are derived using the variational Bayesian method.

Irregular Extended Target Tracking with Unknown Measurement Noise Covariance
May 2023 - Jan. 2024

- A novel tracking algorithm, named VB-GP-SCKF, was proposed to address the challenge of tracking irregular extended target while adapting to unknown measurement noise.
- The VB-GP-SCKF algorithm utilized the Gaussian process (GP) model to represent the shape of the target. To derive the posterior distribution of the unknown measurement noise and the target's shape state, the variational Bayesian method was employed in the algorithm. The square-root cubature Kalman filter was then used to handle the nonlinearity in extended target tracking.
- Extensive experiments with simulated and real-time lidar data showed that the VB-GP-SCKF algorithm outperformed existing methods in both accuracy and robustness.

Fund Project of National Defense Key Laboratory of Science and Technology

Apr. 2023 - Jun. 2023

- Proposed a high-precision direction finding and localization algorithm based on coprime arrays. Tackled the data association problem in tracking multiple radiation sources by introducing the labeled random finite sets.
- Developed a software platform to achieve an integrated process for direction finding, localization, and tracking from multiple radiation sources.

HONORS & AWARDS

- Second Class Academic Scholarship of Southeast University. 2023
- Third Class Academic Scholarship of Southeast University. 2022
- First Class Academic Scholarship of Shandong University. 2021
- Second Class New Scenery Academic Scholarship of Shandong University. 2021
- The Provincial Second Prize of the National College Student Intelligent Car Competition. 2020

EXTRACURRICULAR ACTIVITY

Assistant for The Undergraduate Course in Power Electronic Technology, Spring 2024

REFEREES

Prof.Xianghui Cao Email: xhcao@seu.edu.cn

- Vice President of National College of Excellence Engineers, Southeast University
- IEEE/CAA Journal of Automatica Sinica, Editorial Board Member
- IEEE Transactions on Industrial Informatics, Editorial Board Member

Assoc. Prof.Chaoqun Yang Email: ycq@seu.edu.cn

- Used to be the chief engineer of a radar softwar, and participated in the research and development of algorithms and software for many airborne radars. Some of his research results have been used in many active aircraft.