



*Intelligence & Robotics*

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# ***Intelligence & Robotics***

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## Aims and Scope

The journal aims to publish high-quality original research on the theory, design, and applications of intelligence and robotics, with emphasis on interdisciplinary studies and real-world system development.

The scope of the Journal includes, but is not limited to:

- Biological, bio-inspired, and artificial intelligence;
- Embodied AI;
- Neural networks, fuzzy systems, and evolutionary algorithms;
- Sensing, multi-sensor fusion, localization, data analysis, modeling, planning, and control for various mobile, aerial, and underwater robotic systems;
- Robot cooperation, teleoperation and human-machine interactions;
- Computer vision for robotics and intelligence;
- Humanoid and intelligent robotic systems;
- Natural language processing for robotics and intelligence;
- Digital twins and virtual reality for robotics and intelligence;
- Embodied cognition, navigation and manipulation of robotic systems.



The journal publishes Research Articles, Review Articles, Technical Note, Editorial, Commentary, Perspective.

|                           |                     |
|---------------------------|---------------------|
| <b>Frequency</b>          | Quarterly published |
| <b>Publication model</b>  | Gold Open Access    |
| <b>APC</b>                | \$1800              |
| <b>Peer review model</b>  | Single-blind        |
| <b>Publication period</b> | 40 days             |
| <b>2025 accept rate</b>   | 40%                 |

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## Featured Articles

Digital twins to embodied artificial intelligence: review and perspective

Junfei Li, Simon X. Yang



Facial expression recognition using adapted residual based deep neural network

Ibrahima Bah, Yu Xue



Embracing the future: the rise of humanoid robots and embodied AI

Jiankun Wang, Chaoqun Wang, Weinan Chen, Qi Dou, Wenzheng Chi



Federated reinforcement learning: techniques, applications, and open challenges

Jiaju Qi, Qihao Zhou, Lei Lei, Kan Zheng



Intelligent robotics - misconceptions, current trends, and opportunities

Clarence W. de Silva



## Webinars

**Intelligence & Robotics**

**AI-Driven Multimodal Medical Imaging: Innovations for Early Diagnosis and Precision Care**

**Time**  
September 25, 2025  
8:00 AM, EDT (UTC -4), USA  
8:00 PM, CST (UTC +8), China

**Chair**  
**Yudong Zhang**  
School of Computing and Mathematical Sciences, University of Leicester, Leicester, UK.

**Speakers**  
**Lalithkumar Seenivasan**  
Advanced Robotics and Computationally Augmented Environments (ARCADE) Lab, Johns Hopkins University, Baltimore, Maryland, USA.  
**Liyue Shen**  
Electrical Engineering and Computer Science, College of Engineering, University of Michigan, Ann Arbor, MI, USA.

**Intelligence & Robotics**

**Bio-inspired Robotics: Nature Meets Technology**

**Time**  
June 5, 2025  
07:30 - 09:00 (USA, UTC-5)  
20:30 - 22:00 (China, UTC+8)  
13:30 - 15:00 (UK, UTC+1)

**Host**  
**Assoc. Prof. Chaomin Luo**  
Mississippi State University, Starkville, MS, USA.

**Speakers**  
**Asst. Prof. Rob Scharff**  
The Hong Kong University of Science and Technology, Hong Kong, China.  
**Asst. Prof. Tingjun Lei**  
University of North Dakota, Grand Forks, ND, USA.

**Intelligence & Robotics**

**Female Scholars' Contribution to Intelligence and Robotics**

**Time:** August 28, 2024 19: 00-21: 00 (Beijing, UTC+8)

**Host**  
**Prof. Hao Zhang**  
Tongji University, Shanghai, China.

**Speakers**  
**Assoc. Prof. Yang Liu**  
Beihang University, Beijing, China.  
**Assoc. Prof. Di Wang**  
Chongqing Jiaotong University, Chongqing, China.  
**Assoc. Prof. Chen Wang**  
Chinese Academy of Sciences, Beijing, China.

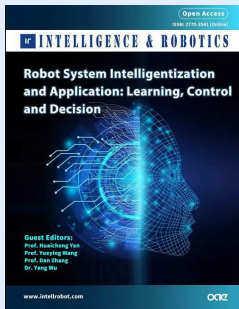
**Intelligence & Robotics**

**Unmanned Ships and Intelligent Shipping**

**Time**  
June 5, 2024 20: 00 (Beijing, UTC+8)

**Host**  
**Prof. Daqi Zhu**  
Institute of Underwater Vehicles and Intelligent Systems, University of Shanghai for Science and Technology, Shanghai, China.

**Speakers**  
**Prof. Yueying Wang**  
School of Mechatronic Engineering and Automation, Shanghai University, Shanghai, China.  
**Assoc. Prof. Xinqiang Chen**  
Institute of Logistics Science and Engineering, Shanghai Maritime University, Shanghai, China.



## ● Robot System Intelligentization and Application: Learning, Control and Decision

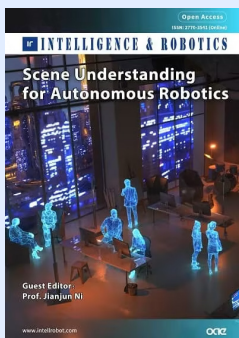
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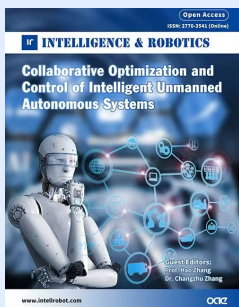
**Dr. Yang Wu**, School of Mechatronic Engineering and Automation, Shanghai University, Shanghai, China.



## ● Scene Understanding for Autonomous Robotics

### Guest Editor:

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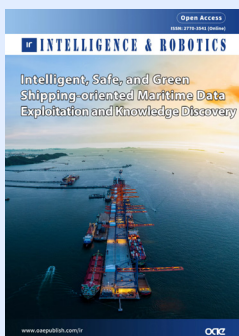


## ● Collaborative Optimization and Control of Intelligent Unmanned Autonomous Systems

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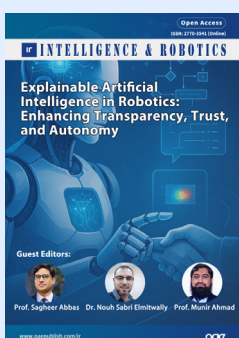


## ● Intelligent, Safe, and Green Shipping-oriented Maritime Data Exploitation and Knowledge Discovery

### Guest Editors:

**Assoc. Prof. Xinqiang Chen**, Institute of Logistics Science and Engineering, Shanghai Maritime University, Shanghai, China.

**Assoc. Prof. Yaqing Shu**, School of Navigation, Wuhan University of Technology, Wuhan, Hubei, China.



## ● Explainable Artificial Intelligence in Robotics: Enhancing Transparency, Trust, and Autonomy

### Guest Editors:

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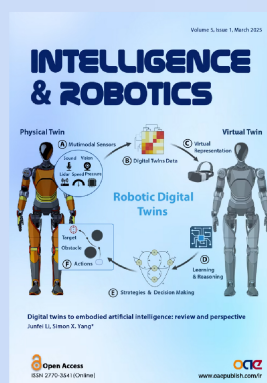
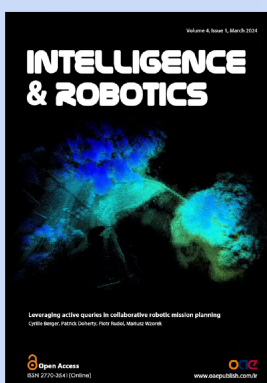
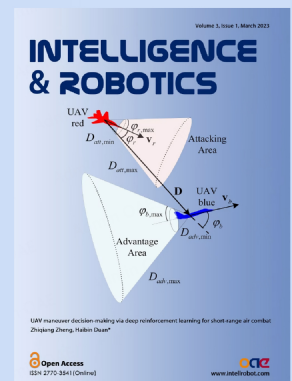
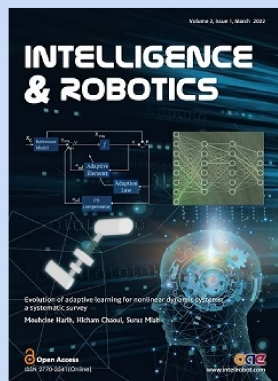
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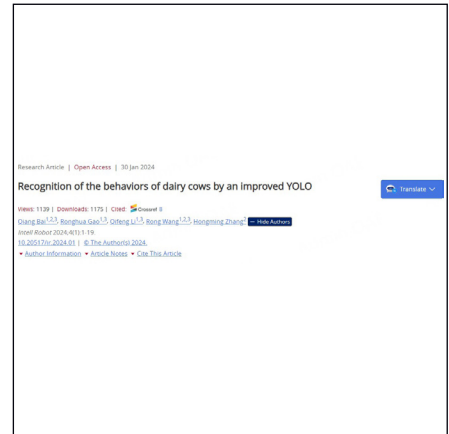
2024, 4(1), 1-19



Recognition of the behaviors of dairy cows by an improved YOLO

**Qiang Bai, Ronghua Gao, Qifeng Li, Rong Wang, Hongming Zhang**

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<http://dx.doi.org/10.20517/ir.2024.01>



### Open Access

#### Article

2024, 4(1), 20-38



Pig-ear detection from the thermal infrared image based on improved YOLOv8n

**Hui Han, Xianglong Xue, Qifeng Li, Hongfeng Gao, Rong Wang, Ruixiang Jiang, Zhiyu Ren, Rui Meng, Mingyu Li, Yuhang Guo, Yu Liu, Weihong Ma**

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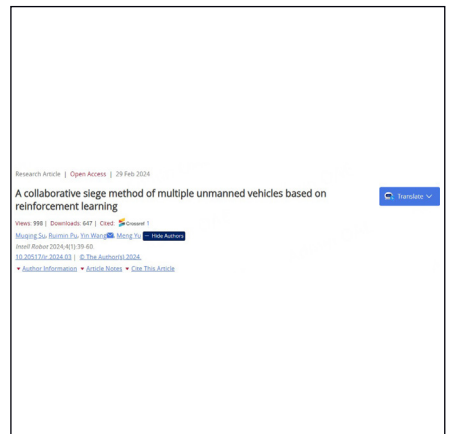
2024, 4(1), 39-60



A collaborative siege method of multiple unmanned vehicles based on reinforcement learning

**Muqing Su, Ruimin Pu, Yin Wang, Meng Yu**

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#### Article

2024, 4(1), 61-73

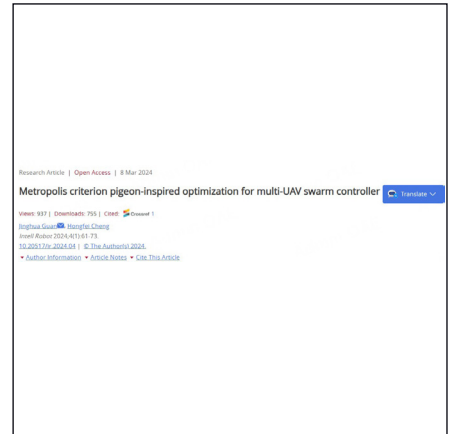


Metropolis criterion pigeon-inspired optimization for multi-UAV swarm controller

Jinghua Guan, Hongfei Cheng

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<http://dx.doi.org/10.20517/ir.2024.04>



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#### Article

2024, 4(1), 74-86



A small-sample time-series signal augmentation and analysis method for quantitative assessment of bradykinesia in Parkinson's disease

Zhilin Shu, Peipei Liu, Yuanyuan Cheng, Jinrui Liu, Yuxin Feng, Zhizhong Zhu, Yang Yu, Jianda Han, Jialing Wu, Ningbo Yu

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#### Article

2024, 4(1), 87-106



Leveraging active queries in collaborative robotic mission planning

Cyrille Berge, Patrick Doherty, Piotr Rudol, Mariusz Wzorek

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<http://dx.doi.org/10.20517/ir.2024.06>





## 2024 Publications

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#### Article

2024, 4(1), 107-24



Coordinated energy-efficient walking assistance for paraplegic patients by using the exoskeleton-walker system

**Chen Yang, Xinhao Zhang, Long Zhang, Chaobin Zou, Zhinan Peng, Rui Huang, Hong Cheng**

**Copy here to cite this article:** Yang, C.; Zhang, X.; Zhang, L.; Zou, C.; Peng, Z.; Huang, R.; Cheng, H. Coordinated energy-efficient walking assistance for paraplegic patients by using the exoskeleton-walker system. *Intell. Robot.* 2024, 4(1), 107-24. <http://dx.doi.org/10.20517/ir.2024.07>



### Open Access

#### Article

2024, 4(1), 125-45



A novel zero-force control framework for post-stroke rehabilitation training based on fuzzy-PID method

**Lina Tong, Decheng Cui, Chen Wang, Liang Peng**

**Copy here to cite this article:** Tong, L.; Cui, D.; Wang, C.; Peng, L. A novel zero-force control framework for post-stroke rehabilitation training based on fuzzy-PID method. *Intell. Robot.* 2024, 4(1), 125-45. <http://dx.doi.org/10.20517/ir.2024.08>



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#### Article

2024, 4(2), 146-63



Adaptive prescribed performance tracking control for underactuated unmanned surface ships with input quantization

**Jiaming Zhang, Xiang Liu, Xin Wang, Yang Wang, Yueying Wang**

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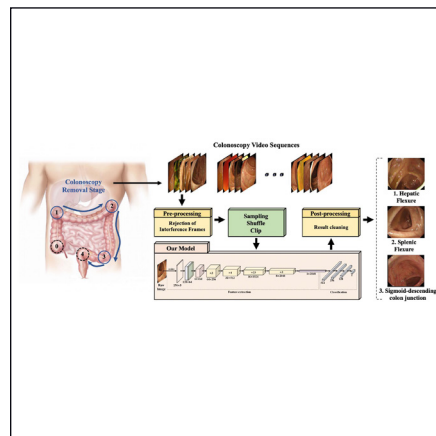
2024, 4(2), 164-78



A deep learning-based system for accurate detection of anatomical landmarks in colon environment

**Chengwei Ye, Kaiwei Che, Yibing Yao, Nachuan Ma, Ruo Zhang, Yangxin Xu, Jiankun Wang, Max Q. H. Meng**

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#### Article

2024, 4(2), 179-95



Towards environment perception for walking-aid robots: an improved staircase shape feature extraction method

**Xinxing Chen, Yuxuan Wang, Chuheng Chen, Yuquan Leng, Chenglong Fu**

**Copy here to cite this article:** Chen, X.; Wang, Y.; Chen, C.; Leng, Y.; Fu, C. Towards environment perception for walking-aid robots: an improved staircase shape feature extraction method. *Intell. Robot.* 2024, 4(2), 179-95. <http://dx.doi.org/10.20517/ir.2024.11>



### Open Access

#### Editorial

2024, 4(2), 196-9



Embracing the future: the rise of humanoid robots and embodied AI

**Jiankun Wang, Chaoqun Wang, Weinan Chen, Qi Dou, Wenzheng Chi**

**Copy here to cite this article:** Wang, J.; Wang, C.; Chen, W.; Dou, Q.; Chi, W. Embracing the future: the rise of humanoid robots and embodied AI. *Intell. Robot.* 2024, 4(2), 196-9. <http://dx.doi.org/10.20517/ir.2024.12>



## 2024 Publications

### Open Access

#### Article

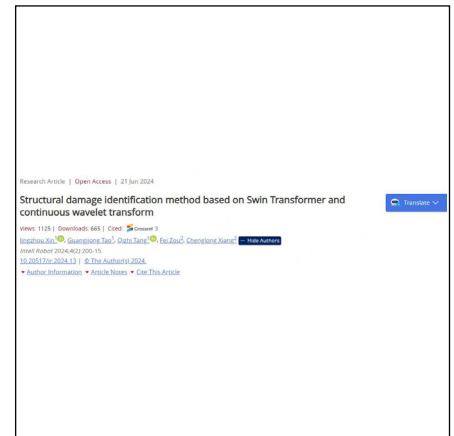
2024, 4(2), 200-15



Structural damage identification method based on Swin Transformer and continuous wavelet transform

**Jingzhou Xin, Guangjiong Tao, Qizhi Tang, Fei Zou, Chenglong Xiang**

**Copy here to cite this article:** Xin, J.; Tao, G.; Tang, Q.; Zou, F.; Xiang, C. Structural damage identification method based on Swin Transformer and continuous wavelet transform. *Intell. Robot.* 2024, 4(2), 200-15.  
<http://dx.doi.org/10.20517/ir.2024.13>



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#### Article

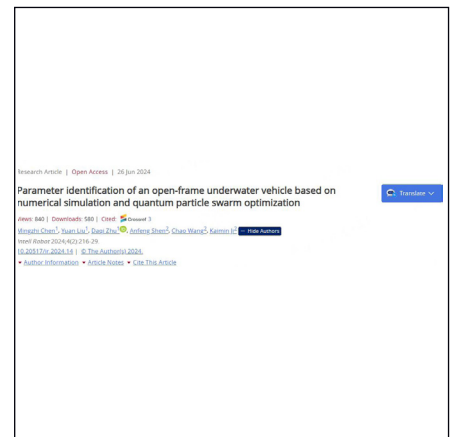
2024, 4, 216-29



Parameter identification of an open-frame underwater vehicle based on numerical simulation and quantum particle swarm optimization

**Mingzhi Chen, Yuan Liu, Daqi Zhu, Anfeng Shen, Chao Wang, Kaimin Ji**

**Copy here to cite this article:** Chen, M.; Liu, Y.; Zhu, D.; Shen, A.; Wang, C.; Ji, K. Parameter identification of an open-frame underwater vehicle based on numerical simulation and quantum particle swarm optimization. *Intell. Robot.* 2024, 4(2), 216-29.  
<http://dx.doi.org/10.20517/ir.2024.14>



### Open Access

#### Article

2024, 4(3), 230-43



A novel fatigue driving detection method based on whale optimization and Attention-enhanced GRU

**Zuojin Li, Minghong Li, Lanyang Shi, Dongyang Li**

**Copy here to cite this article:** Li, Z.; Li, M.; Shi, L.; Li, D. A novel fatigue driving detection method based on whale optimization and Attention-enhanced GRU. *Intell. Robot.* 2024, 4(3), 230-43.  
<http://dx.doi.org/10.20517/ir.2024.15>



## 2024 Publications

### Open Access

#### Article

2024, 4(3), 244-55



Importance-driven denial-of-service attack strategy design against remote state estimation in multi-agent intelligent power systems

**Xia Zhao, Guowei Liu, Lei Li**

**Copy here to cite this article:** Zhao, X.; Liu, G.; Li, L. Importance-driven denial-of-service attack strategy design against remote state estimation in multi-agent intelligent power systems. *Intell. Robot.* 2024, 4(3), 244-55.

<http://dx.doi.org/10.20517/ir.2024.16>



### Open Access

#### Article

2024, 4(3), 256-75

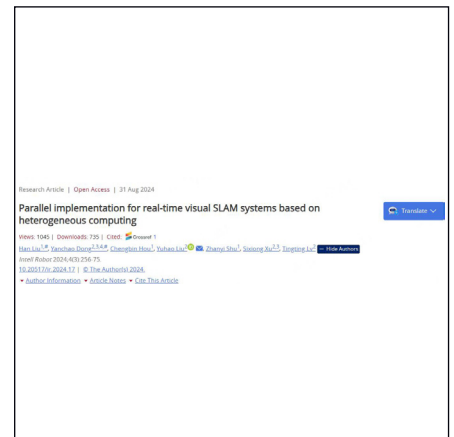


Parallel implementation for real-time visual SLAM systems based on heterogeneous computing

**Han Liu, Yanchao Dong, Chengbin Hou, Yuhao Liu, Zhanyi Shu, Sixiong Xu, Tingting Lv**

**Copy here to cite this article:** Liu, H.; Dong, Y.; Hou, C.; Liu, Y.; Shu, Z.; Xu, S.; Lv, T. Parallel implementation for real-time visual SLAM systems based on heterogeneous computing. *Intell. Robot.* 2024, 4(3), 256-75.

<http://dx.doi.org/10.20517/ir.2024.17>



### Open Access

#### Article

2024, 4(3), 276-92



An in-vehicle real-time infrared object detection system based on deep learning with resource-constrained hardware

**Tingting Zhuang, Xunru Liang, Bohuan Xue, Xiaoyu Tang**

**Copy here to cite this article:** Zhuang, T.; Liang X.; Xue B.; Tang X. An in-vehicle real-time infrared object detection system based on deep learning with resource-constrained hardware. *Intell. Robot.* 2024, 4(3), 276-92.

<http://dx.doi.org/10.20517/ir.2024.18>





## 2024 Publications

### Open Access

#### Review

2024, 4(3), 293-317

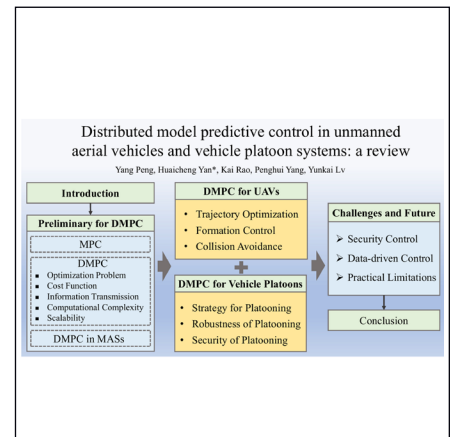


Distributed model predictive control for unmanned aerial vehicles and vehicle platoon systems: a review

**Yang Peng, Huaicheng Yan, Kai Rao, Penghui Yang, Yunkai Lv**

**Copy here to cite this article:** Peng, Y.; Yan H.; Rao K.; Yang P.; Lv Y. Distributed model predictive control for unmanned aerial vehicles and vehicle platoon systems: a review. *Intell. Robot.* 2024, 4(3), 293-317.

<http://dx.doi.org/10.20517/ir.2024.19>



### Open Access

#### Article

2024, 4(4), 318-38



Intelligent prediction of rail corrugation evolution trend based on self-attention bidirectional TCN and GRU

**Jian-Hua Liu, Wei-Hao Yang, Jing He, Zhong-Mei Wang, Lin Jia, Chang-Fan Zhang, Wei-Wei Yang**

**Copy here to cite this article:** Liu, J. H.; Yang W. H.; He J.; Wang Z. M.; Jia L.; Zhang C. F.; Yang W. W. Intelligent prediction of rail corrugation evolution trend based on self-attention bidirectional TCN and GRU. *Intell. Robot.* 2024, 4(4) 318-38.

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### Open Access

#### Article

2024, 4(4), 339-62

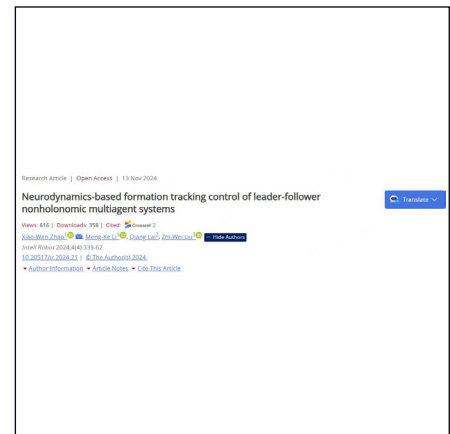


Neurodynamics-based formation tracking control of leader-follower nonholonomic multiagent systems

**Xiao-Wen Zhao, Meng-Ke Li, Qiang Lai, Zhi-Wei Liu**

**Copy here to cite this article:** Zhao, X. W.; Li, M. K.; Lai, Q.; Liu, Z. W. Neurodynamics-based formation tracking control of leader-follower nonholonomic multiagent systems. *Intell. Robot.* 2024, 4(4), 339-62.

<http://dx.doi.org/10.20517/ir.2024.21>



## 2024 Publications

### Open Access

#### Article

2024, 4(4), 363-84



Improved DDPG algorithm-based path planning for unmanned surface vehicles

**Menglong Hua, Weixiang Zhou, Hongying Cheng, Zihao Chen**

**Copy here to cite this article:** Hua, M.; Zhou, W.; Cheng, H.; Chen, Z. Improved DDPG algorithm-based path planning for unmanned surface vehicles. *Intell. Robot.* 2024, 4(4), 363-84. <http://dx.doi.org/10.20517/ir.2024.22>



### Open Access

#### Article

2024, 4(4), 385-405



Path planning method for USVs based on improved DWA and COLREGs

**Shiqi Liu, Xingmin Wang, Yang Wu, Qian Li, Jiuxiang Yan, Eugene Levin**

**Copy here to cite this article:** Liu, S.; Wang, X.; Wu, Y.; Li, Q.; Yan, J.; Levin, E. Path planning method for USVs based on improved DWA and COLREGs. *Intell. Robot.* 2024, 4(4), 385-405. <http://dx.doi.org/10.20517/ir.2024.23>



### Open Access

#### Article

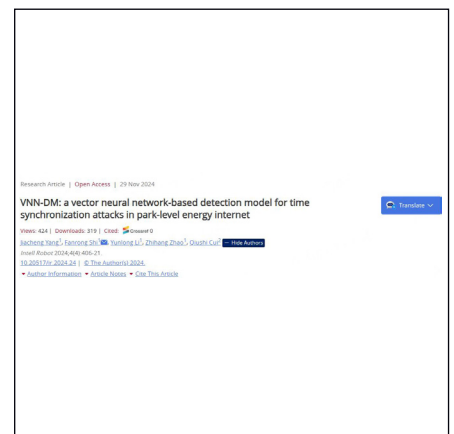
2024, 4, 406-21



VNN-DM: a vector neural network-based detection model for time synchronization attacks in park-level energy internet

**Jiacheng Yang, Fanrong Shi, Yunlong Li, Zhihang Zhao, Qiushi Cui**

**Copy here to cite this article:** Yang, J.; Shi, F.; Li, Y.; Zhao, Z.; Cui, Q. VNN-DM: a vector neural network-based detection model for time synchronization attacks in park-level energy internet. *Intell. Robot.* 2024, 4(4), 406-21. <http://dx.doi.org/10.20517/ir.2024.24>



## 2024 Publications

### Open Access

#### Article

2024, 4, 422-38

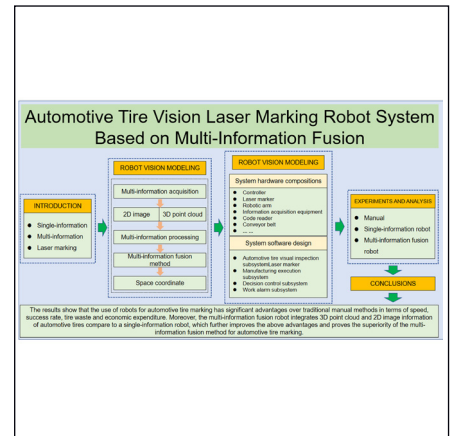


An automotive tire visual laser marking robot system based on multi-information fusion

**Chuanxiang Ren, Yunrui Xu, Xiang Liu, Haibo Liu**

**Copy here to cite this article:** Ren, C.; Xu, Y.; Liu, X.; Liu, H. An automotive tire visual laser marking robot system based on multi-information fusion. *Intell. Robot.* 2024, 4, 422-38.

<http://dx.doi.org/10.20517/ir.2024.25>



### Open Access

#### Article

2024, 4(4), 439-56



Dynamic event-triggered integral non-singular terminal sliding mode tracking of unmanned surface vehicle via an event-triggered extended state observer and adaptive neural network

**Xingmin Wang, Ruixue Liu, Aleksander Sladkowski, Qian Li, Ru Jiang**

**Copy here to cite this article:** Wang, X.; Liu, R.; Sladkowski, A.; Li, Q.; Jiang, R. Dynamic event-triggered integral non-singular terminal sliding mode tracking of unmanned surface vehicle via an event-triggered extended state observer and adaptive neural network. *Intell. Robot.* 2024, 4(4), 439-56.

<http://dx.doi.org/10.20517/ir.2024.26>



### Open Access

#### Review

2024, 4(4), 457-78



A survey of datasets in medicine for large language models

**Deshiwei Zhang, Xiaojuan Xue, Peng Gao, Zhijuan Jin, Menghan Hu, Yue Wu, Xiayang Ying**

**Copy here to cite this article:** Zhang, D.; Xue, X.; Gao, P.; Jin, Z.; Hu, M.; Wu, Y.; Ying, X. A survey of datasets in medicine for large language models. *Intell. Robot.* 2024, 4(4), 457-78.

<http://dx.doi.org/10.20517/ir.2024.27>



## 2024 Publications

### Open Access

#### Article

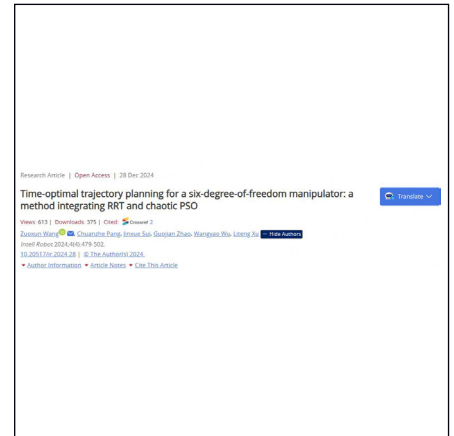
2024, 4(4), 479-502



Time-optimal trajectory planning for a six-degree-of-freedom manipulator: a method integrating RRT and chaotic PSO

**Zuoxun Wang, Chuanzhe Pang, Jinxue Sui, Guojian Zhao, Wangyao Wu, Liteng Xu**

**Copy here to cite this article:** Wang, Z.; Pang, C.; Sui, J.; Zhao, G.; Wu, W.; Xu, L. Time-optimal trajectory planning for a six-degree-of-freedom manipulator: a method integrating RRT and chaotic PSO. *Intell. Robot.* 2024, 4(4), 479-502. <http://dx.doi.org/10.20517/ir.2024.28>



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#### Article

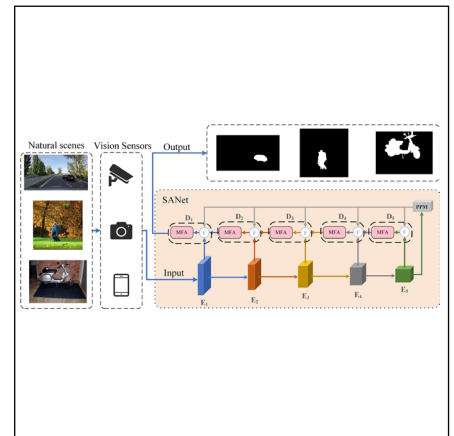
2024, 4(4), 503-23



SANet: scale-adaptive network for lightweight salient object detection

**Zhuang Liu, Weidong Zhao, Ning Jia, Xianhui Liu, Jiaxiong Yang**

**Copy here to cite this article:** Liu, Z.; Zhao, W.; Jia, N.; Liu, X.; Yang, J. SANet: scale-adaptive network for lightweight salient object detection. *Intell. Robot.* 2024, 4(4) 503-23. <http://dx.doi.org/10.20517/ir.2024.29>



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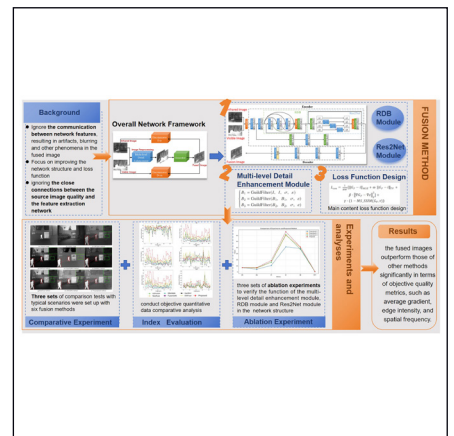
2024, 4(4), 524-43



Infrared and visible image fusion based on multi-level detail enhancement and generative adversarial network

**Xiangrui Tian, Xiaohan Xianyu, Zhimin Li, Tong Xu, Yinjun Jia**

**Copy here to cite this article:** Tian, X.; Xianyu, X.; Li, Z.; Xu, T.; Jia, Y. Infrared and visible image fusion based on multi-level detail enhancement and generative adversarial network. *Intell. Robot.* 2024, 4(4), 524-43. <http://dx.doi.org/10.20517/ir.2024.30>





## 2025 Publications

### Open Access

#### Article

2025, 5(1), 1-18

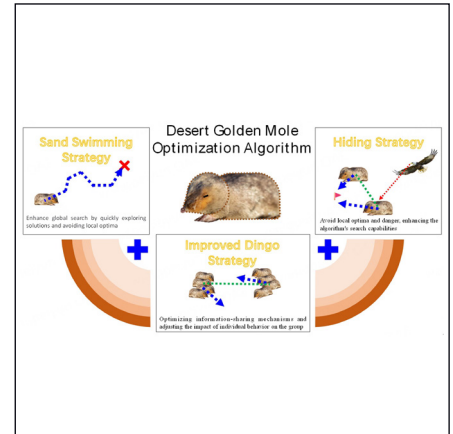


Optimization of wireless sensor network deployment based on desert golden mole optimization algorithm

**Zuoxun Wang, Changkun Guo, Jinxue Sui, Chuanyu Cui**

**Copy here to cite this article:** Wang, Z.; Guo, C.; Sui, J.; Cui, C. Optimization of wireless sensor network deployment based on desert golden mole optimization algorithm. *Intell. Robot.* 2025, 5(1), 1-18.

<http://dx.doi.org/10.20517/ir.2025.01>



### Open Access

#### Article

2025, 5(1), 19-33



An improved artificial potential field method for multi-AGV path planning in ports

**Xinqiang Chen, Chen Chen, Huafeng Wu, Octavian Postolache, Yuzheng Wu**

**Copy here to cite this article:** Chen, X.; Chen, C.; Wu, H.; Postolache, O.; Wu, Y. An improved artificial potential field method for multi-AGV path planning in ports. *Intell. Robot.* 2025, 5(1), 19-33.

<http://dx.doi.org/10.20517/ir.2025.02>



### Open Access

#### Article

2025, 5(1), 34-49

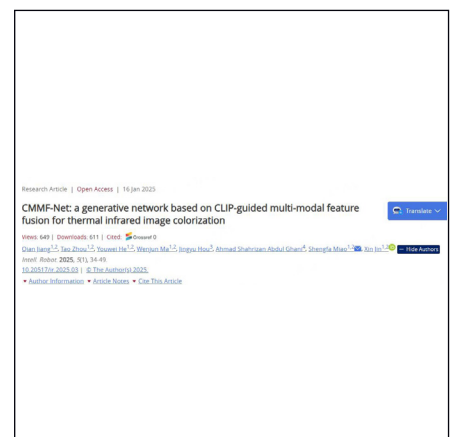


CMMF-Net: a generative network based on CLIP-guided multi-modal feature fusion for thermal infrared image colorization

**Qian Jiang, Tao Zhou, Youwei He, Wenjun Ma, Jingyu Hou, Ahmad Shahrizan Abdul Ghani, Shengfa Miao, Xin Jin**

**Copy here to cite this article:** Jiang, Q.; Zhou, T.; He, Y.; Ma, W.; Hou, J.; Abdul Ghani, A. S.; Miao, S.; Jin, X. CMMF-Net: a generative network based on CLIP-guided multi-modal feature fusion for thermal infrared image colorization. *Intell. Robot.* 2025, 5(1), 34-49.

<http://dx.doi.org/10.20517/ir.2025.03>



## 2025 Publications

### Open Access

**Article**  
2025, 5(1), 50-69



Adaptive variational empirical mode decomposition aware intelligent data-driven modeling for complex industrial processes

**Yujun Chen, Xiuli Zhu, Peng Wang, Kuangrong Hao, Kairui Sheng**

**Copy here to cite this article:** Chen, Y.; Zhu, X.; Wang, P.; Hao, K.; Sheng, K. Adaptive variational empirical mode decomposition aware intelligent data-driven modeling for complex industrial processes. *Intell. Robot.* 2025, 5(1), 50-69.  
<http://dx.doi.org/10.20517/ir.2025.04>



### Open Access

**Article**  
2025, 5(1), 70-87



A novel real-time intelligent detector for monitoring UAVs in live-line operation on 10 kV distribution networks

**Haibo Duan, Fanrong Shi, Bo Gao, Yingyue Zhou, Qiushi Cui**

**Copy here to cite this article:** Duan, H.; Shi, F.; Gao, B.; Zhou, Y.; Cui, Q. A novel real-time intelligent detector for monitoring UAVs in live-line operation on 10 kV distribution networks. *Intell. Robot.* 2025, 5(1), 70-87.  
<http://dx.doi.org/10.20517/ir.2025.05>



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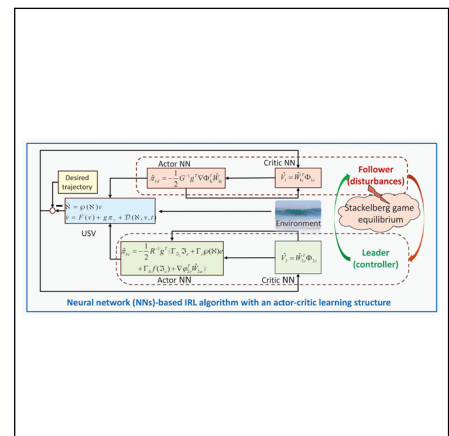
**Article**  
2025, 5(1), 88-104



Stackelberg game-based anti-disturbance control for unmanned surface vessels via integrative reinforcement learning

**Yizhen Meng, Chun Liu, Jing Zhao, Jing Huang, Guanbo Jing**

**Copy here to cite this article:** Meng, Y.; Liu, C.; Zhao, J.; Huang, J.; Jing, G. Stackelberg game-based anti-disturbance control for unmanned surface vessels via integrative reinforcement learning. *Intell. Robot.* 2025, 5(1), 88-104.  
<http://dx.doi.org/10.20517/ir.2025.06>



## 2025 Publications

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#### Article

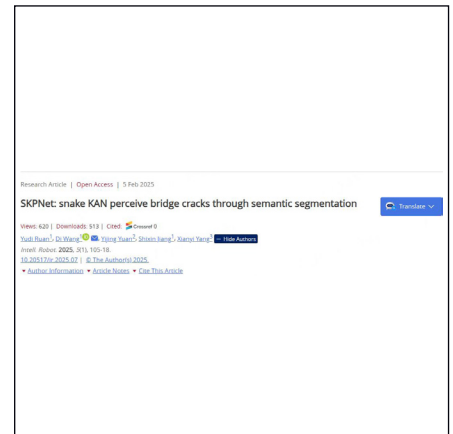
2025, 5(1), 105-18



**SKPNet: snake KAN perceive bridge cracks through semantic segmentation**

**Yudi Ruan, Di Wang, Yijing Yuan, Shixin Jiang, Xianyi Yang**

**Copy here to cite this article:** Ruan, Y.; Wang, D.; Yuan, Y.; Jiang, S.; Yang, X. SKPNet: snake KAN perceive bridge cracks through semantic segmentation. *Intell. Robot.* 2025, 5(1), 105-18. <http://dx.doi.org/10.20517/ir.2025.07>



### Open Access

#### Review

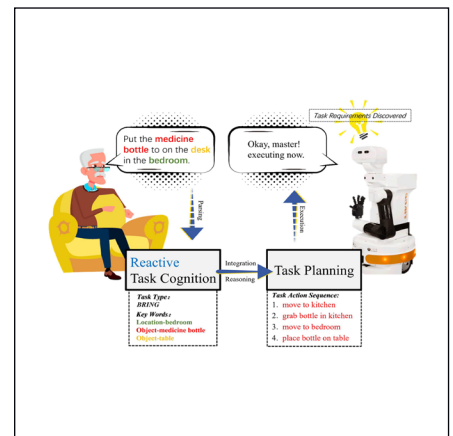
2025, 5(1), 119-42



**Task cognition and planning for service robots**

**Yongcheng Cui, Ying Zhang, Cui-Hua Zhang, Simon X. Yang**

**Copy here to cite this article:** Cui, Y.; Zhang, Y.; Zhang, C. H.; Yang, S. X. Task cognition and planning for service robots. *Intell. Robot.* 2025, 5(1), 119-42. <http://dx.doi.org/10.20517/ir.2025.08>



### Open Access

#### Review

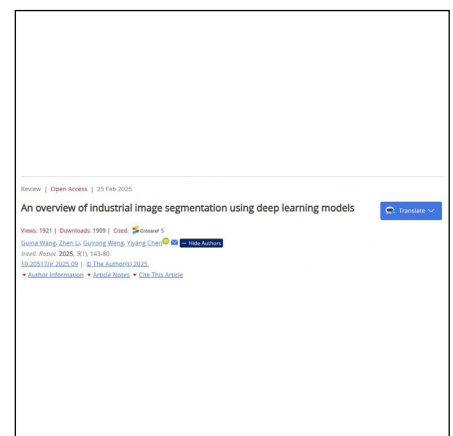
2025, 5(1), 143-80



**An overview of industrial image segmentation using deep learning models**

**Guina Wang, Zhen Li, Guirong Weng, Yiyang Chen**

**Copy here to cite this article:** Wang, G.; Li, Z.; Weng, G.; Chen, Y. An overview of industrial image segmentation using deep learning models. *Intell. Robot.* 2025, 5(1), 143-80. <http://dx.doi.org/10.20517/ir.2025.09>



## 2025 Publications

### Open Access

#### Article

2025, 5(1), 181-201

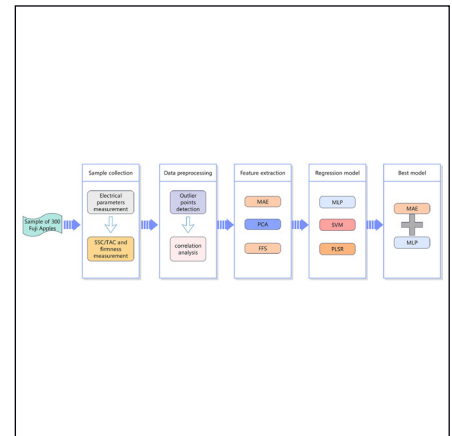


Non-destructive prediction of apple SSC/TAC and firmness based on multilayer autoencoder and multilayer perceptron

**Xu Tian, Lyuwen Huang, Mengqun Zhai, Mengyi Zhang, Pengju Hu, Mingjun Li, Liehong Ren**

**Copy here to cite this article:** Tian, X.; Huang, L.; Zhai, M.; Zhang, M.; Hu, P.; Li, M.; Ren, L. Non-destructive prediction of apple SSC/TAC and firmness based on multilayer autoencoder and multilayer perceptron. *Intell. Robot.* 2025, 5(1), 181-201.

<http://dx.doi.org/10.20517/ir.2025.10>



### Open Access

#### Review

2025, 5(1), 202-27

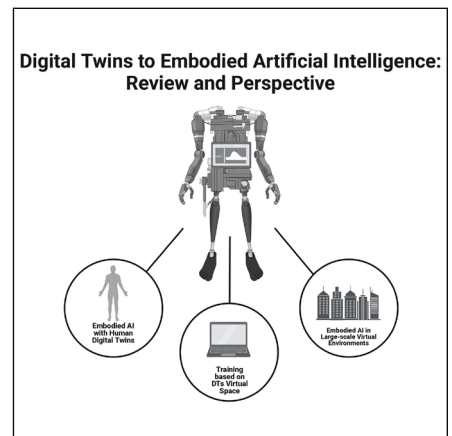


Digital twins to embodied artificial intelligence: review and perspective

**Junfei Li, Simon X. Yang**

**Copy here to cite this article:** Li, J.; Yang, S. X. Digital twins to embodied artificial intelligence: review and perspective. *Intell. Robot.* 2025, 5(1), 202-27.

<http://dx.doi.org/10.20517/ir.2025.11>



### Open Access

#### Article

2025, 5(1), 228-47

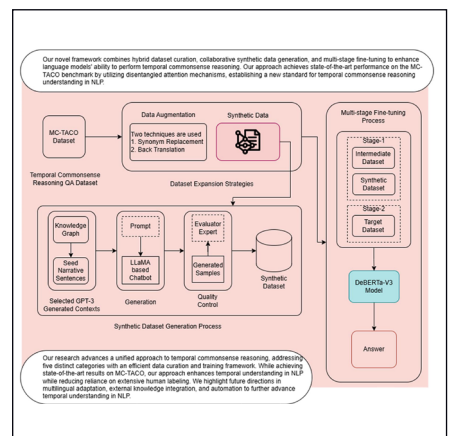


Enhancing temporal commonsense understanding using disentangled attention-based method with a hybrid data framework

**Wasif Feroze, Muhammad Shahid, Shaohuan Cheng, Elias Lemuye Jimale, Yi Yang, Hong Qu, Yulin Wang**

**Copy here to cite this article:** Feroze, W.; Shahid, M.; Cheng, S.; Jimale, E. L.; Yang, Y.; Qu, H.; Wang, Y. Enhancing temporal commonsense understanding using disentangled attention-based method with a hybrid data framework. *Intell. Robot.* 2025, 5(1), 228-47.

<http://dx.doi.org/10.20517/ir.2025.12>



## 2025 Publications

### Open Access

#### Article

2025, 5(2), 248-75

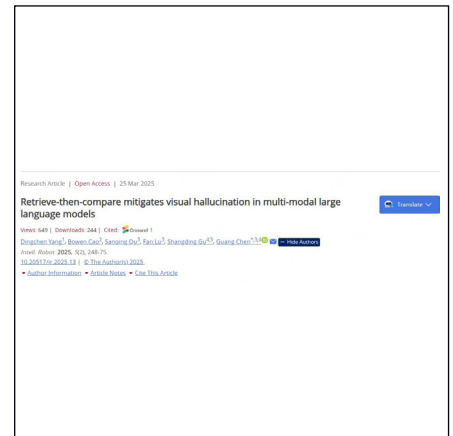


Retrieve-then-compare mitigates visual hallucination in multi-modal large language models

**Dingchen Yang, Bowen Cao, Sanqing Qu, Fan Lu, Shangding Gu, Guang Chen**

**Copy here to cite this article:** Yang, D.; Cao, B.; Qu, S.; Lu, F.; Gu, S.; Chen, G. Retrieve-then-compare mitigates visual hallucination in multi-modal large language models. *Intell. Robot.* 2025, 5(2), 248-75.

<http://dx.doi.org/10.20517/ir.2025.13>



### Open Access

#### Article

2025, 5(2), 276-91



An effective fault-tolerant control with slime mold algorithm for unmanned underwater vehicle

**Tianhong Zeng, Daqi Zhu, Chunhua Gu, Simon X. Yang**

**Copy here to cite this article:** Zeng, T.; Zhu, D.; Gu, C.; Yang, S. X. An effective fault-tolerant control with slime mold algorithm for unmanned underwater vehicle. *Intell. Robot.* 2025, 5(2), 276-91.

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### Open Access

#### Article

2025, 5(2), 292-312

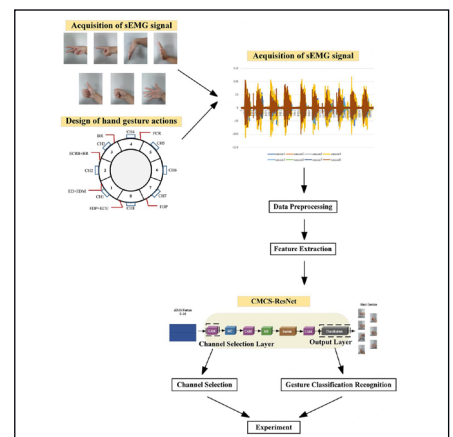


CAM-MR-MS based gesture recognition method using sEMG

**Lina Tong, Yunbo Li, Yixia Liang, Chen Wang**

**Copy here to cite this article:** Tong, L.; Li, Y.; Liang, Y.; Wang, C. CAM-MR-MS based gesture recognition method using sEMG. *Intell. Robot.* 2025, 5(2), 292-312.

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## 2025 Publications

### Open Access

#### Article

2025, 5(2), 313-32

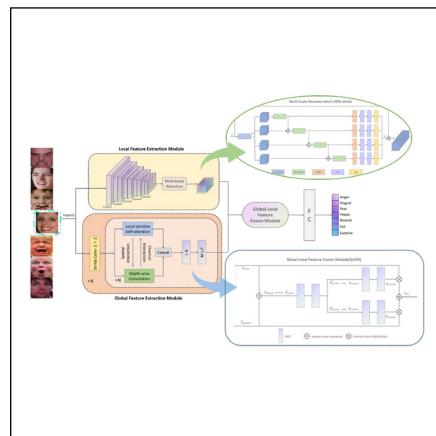


**MSAFNet: a novel approach to facial expression recognition in embodied AI systems**

**Huifang He, Runbin Liao, Yating Li**

**Copy here to cite this article:** He, H.; Liao, R.; Li, Y. MSAFNet: a novel approach to facial expression recognition in embodied AI systems. *Intell. Robot.* 2025, 5(2), 313-32.

<http://dx.doi.org/10.20517/ir.2025.16>



### Open Access

#### Article

2025, 5(2), 333-54

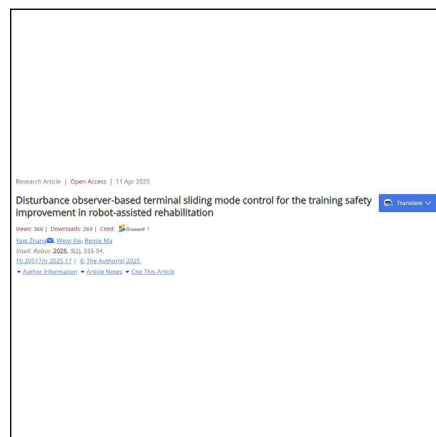


**Disturbance observer-based terminal sliding mode control for the training safety improvement in robot-assisted rehabilitation**

**Yaqi Zhang, Weiye Xie, Renjie Ma**

**Copy here to cite this article:** Zhang, Y.; Xie, W.; Ma, R. Disturbance observer-based terminal sliding mode control for the training safety improvement in robot-assisted rehabilitation. *Intell. Robot.* 2025, 5(2), 333-54.

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### Open Access

#### Article

2025, 5(2), 355-77

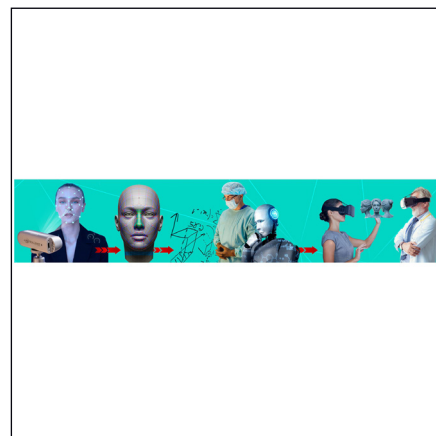


**Intelligent augmented reality application for personalised rhinoplasty using machine learning**

**Mohammad Saeid Heydari, Mahyar Kolivand, Montadar Al-Azzawi, Hoshang Kolivand**

**Copy here to cite this article:** Heydari, M. S.; Kolivand, M.; Al-Azzawi, M.; Kolivand, H. Intelligent augmented reality application for personalised rhinoplasty using machine learning. *Intell. Robot.* 2025, 5(2), 355-77.

<http://dx.doi.org/10.20517/ir.2025.18>





## 2025 Publications

### Open Access

#### Review

2025, 5(2), 433-49

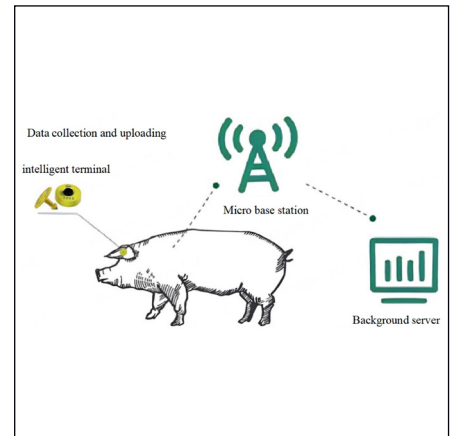


Research and application progress of electronic ear tags as infrastructure for precision livestock industry: a review

**Wei Peng, Zhengxu Liu, Jiazhu Cai, Yunxiang Zhao**

**Copy here to cite this article:** Peng, W.; Liu, Z.; Cai, J.; Zhao, Y. Research and application progress of electronic ear tags as infrastructure for precision livestock industry: a review. *Intell. Robot.* 2025, 5(2), 433-49.

<http://dx.doi.org/10.20517/ir.2025.22>



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2025, 5(2), 450-73

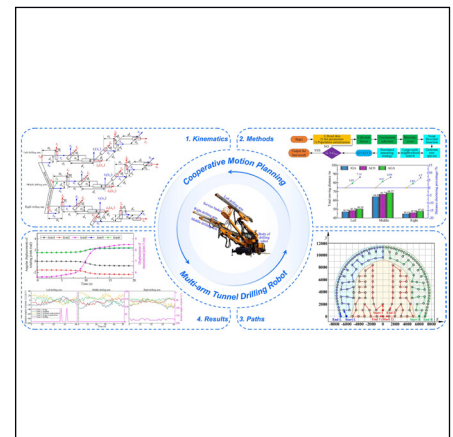


Smooth and efficient motion planning of large-scale and cooperative multi-arm tunnel drilling robot

**Yuming Cui, Jiajun Pu, Ningning Hu, Menghao Cui**

**Copy here to cite this article:** Cui, Y.; Pu, J.; Hu, N.; Cui, M. Smooth and efficient motion planning of large-scale and cooperative multi-arm tunnel drilling robot. *Intell. Robot.* 2025, 5(2), 450-73.

<http://dx.doi.org/10.20517/ir.2025.23>



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2025, 5(2), 474-87

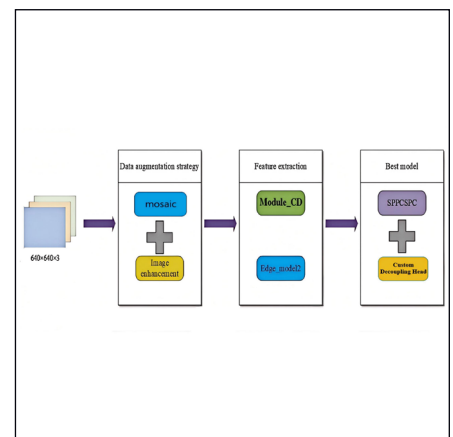


An intelligent fault detection algorithm for power transmission lines based on multi-scale fusion

**Tianyi Wu, Liming Wang, Xiangyi Xu, Lei Su, Wenjing He, Xinting Wang**

**Copy here to cite this article:** Wu, T.; Wang, L.; Xu, X.; Su, L.; He, W.; Wang, X. An intelligent fault detection algorithm for power transmission lines based on multi-scale fusion. *Intell. Robot.* 2025, 5(2), 474-87.

<http://dx.doi.org/10.20517/ir.2025.24>



## 2025 Publications

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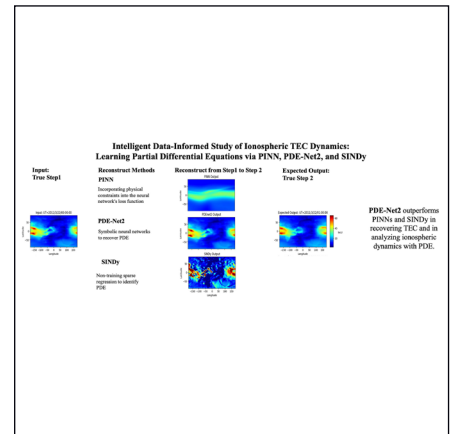
2025, 5(3), 488-504



Intelligent data-informed study of ionospheric TEC dynamics: learning partial differential equations via PINN, PDE-Net2, and SINDy

**Kening Zhang, Zhou Chen, Jingsong Wang, Chuansai Zhou**

**Copy here to cite this article:** Zhang, K.; Chen, Z.; Wang, J.; Zhou, C. Intelligent data-informed study of ionospheric TEC dynamics: learning partial differential equations via PINN, PDE-Net2, and SINDy. *Intell. Robot.* 2025, 5(3), 488-504. <http://dx.doi.org/10.20517/ir.2025.25>



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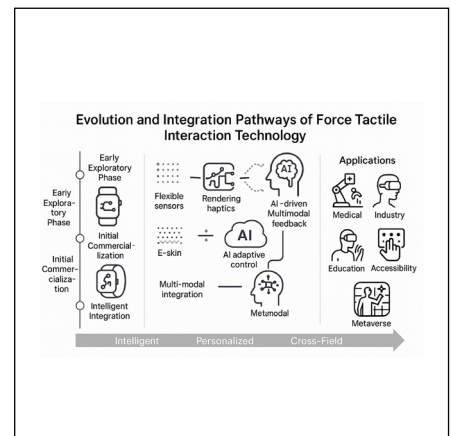
2025, 5(3), 505-19



Research on the development and application of force tactile interaction technology in China

**Xiaoqiang Hu, Zijia Zhen, Yunxiao Xu, Changsheng Zhu, Huimin Peng, Cheng Ma, Min Yang, Qi Zhu**

**Copy here to cite this article:** Hu, X.; Zhen, Z.; Xu, Y.; Zhu, C.; Peng, H.; Ma, C.; Yang, M.; Zhu, Q. Research on the development and application of force tactile interaction technology in China. *Intell. Robot.* 2025, 5(3), 505-19. <http://dx.doi.org/10.20517/ir.2025.26>



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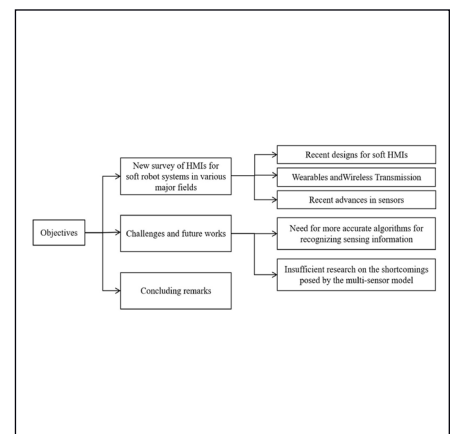
2025, 5(3), 520-40



Better interaction experience: human-machine interface for soft robotic systems

**Zeyu Gao, Zhiyuan Liao, Chunquan Li**

**Copy here to cite this article:** Gao, Z.; Liao, Z.; Li, C. Better interaction experience: human-machine interface for soft robotic systems. *Intell. Robot.* 2025, 5(3), 520-40. <http://dx.doi.org/10.20517/ir.2025.27>



## 2025 Publications

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2025, 5(3), 541-61

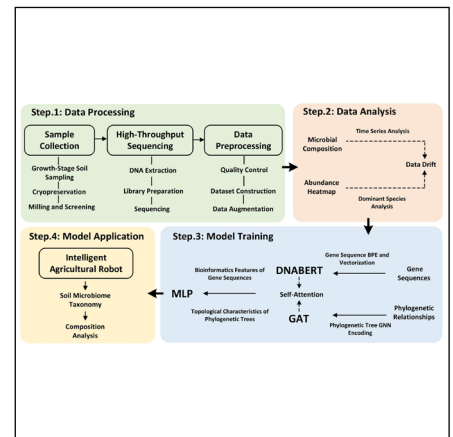


MicroGraphBERT: soil microbial gene sequence classification via fusing taxonomic hierarchies and DNABERTbased contextual embeddings

**Han Yang, Di Wang, Wenjie Pan, Chaoying Jiang, Weichang Gao, Xiaoji Luo, Zugui Tu**

**Copy here to cite this article:** Yang, H.; Wang, D.; Pan, W.; Jiang, C.; Gao, W.; Luo, X.; Tu, Z. MicroGraphBERT: soil microbial gene sequence classification via fusing taxonomic hierarchies and DNABERTbased contextual embeddings. *Intell. Robot.* 2025, 5(3), 541-61.

<http://dx.doi.org/10.20517/ir.2025.28>



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2025, 5(3), 562-78

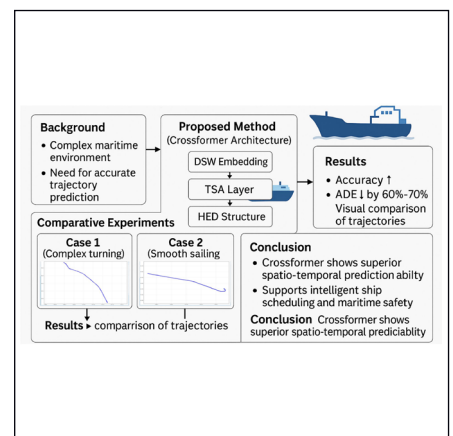


Ship trajectory prediction via a transformer-based model by considering spatial-temporal dependency

**Xinqiang Chen, Peiyang Wu, Yuzheng Wu, Loay Aboud, Octavian Postolache, Zichuang Wang**

**Copy here to cite this article:** Chen, X.; Wu, P.; Wu, Y.; Aboud, L.; Postolache, O.; Wang, Z. Ship trajectory prediction via a transformer-based model by considering spatial-temporal dependency. *Intell. Robot.* 2025, 5(3), 562-78.

<http://dx.doi.org/10.20517/ir.2025.29>



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2025, 5(3), 579-606

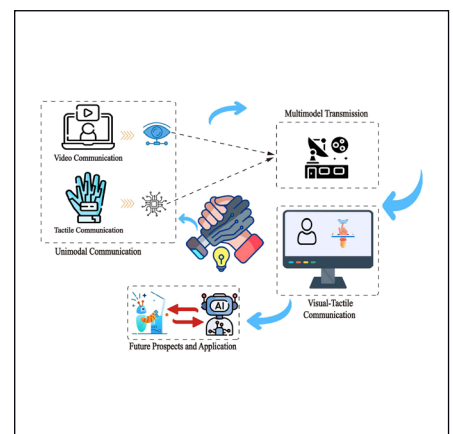


A review on multimodal communications for human-robot collaboration in 5G: from visual to tactile

**Zhuorui Wang, Mingkai Chen, Qian Liu**

**Copy here to cite this article:** Wang, Z.; Chen, M.; Liu, Q. A review on multimodal communications for human-robot collaboration in 5G: from visual to tactile. *Intell. Robot.* 2025, 5(3), 579-606.

<http://dx.doi.org/10.20517/ir.2025.30>





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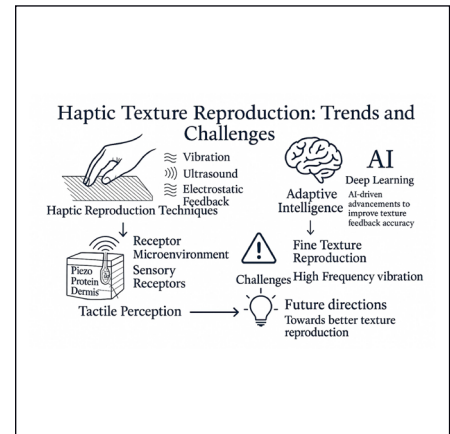
2025, 5(3), 607-30



A systematic review of haptic texture reproduction technology

**Si Chen, Tonghe Yuan, Lujin Xu, Weimin Ru, Dongqing Wang**

**Copy here to cite this article:** Chen, S.; Yuan, T.; Xu, L.; Ru, W.; Wang, D. A systematic review of haptic texture reproduction technology. *Intell. Robot.* 2025, 5(3), 607-30.  
<http://dx.doi.org/10.20517/ir.2025.31>



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#### Review

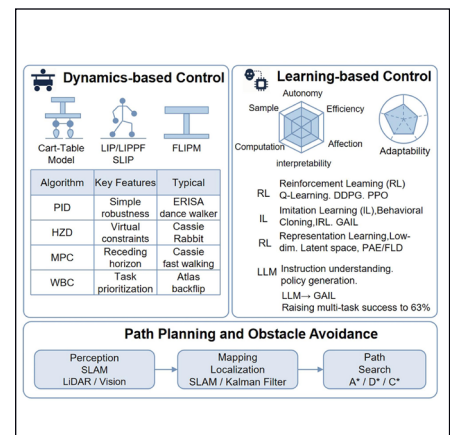
2025, 5(3), 631-60



Advancements in humanoid robot dynamics and learning-based locomotion control methods

**Shilong Sun, Haodong Huang, Chiyao Li**

**Copy here to cite this article:** Sun, S.; Huang, H.; Li, C. Advancements in humanoid robot dynamics and learning-based locomotion control methods. *Intell. Robot.* 2025, 5(3), 631-60.  
<http://dx.doi.org/10.20517/ir.2025.32>



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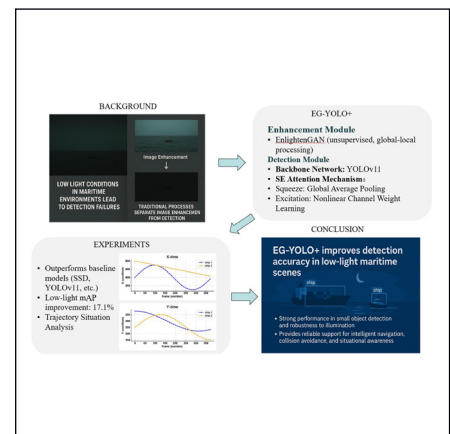
2025, 5(3), 662-78



Towards intelligent shipping: image-enhanced ship detection and situation analysis in low-light scenes

**Xinqiang Chen, Rui Yang, Yuzhen Wu, Han Zhang, Prakash Ranjitkar, Octavian Postolache, Yiwen Zheng, Zichuang Wang**

**Copy here to cite this article:** Chen, X.; Yang, R.; Wu, Y.; Zhang, H.; Ranjitkar, P.; Postolache, O.; Zheng, Y.; Wang, Z. Towards intelligent shipping: image-enhanced ship detection and situation analysis in low-light scenes. *Intell. Robot.* 2025, 5(3), 662-78.  
<http://dx.doi.org/10.20517/ir.2025.34>



## 2025 Publications

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2025, 5(3), 679-94



An improved U-Net model with multiscale fusion for retinal vessel segmentation

**Shilong Sun, Haodong Huang, Chiyao Li**

**Copy here to cite this article:** Ni, J.; Shi, J.; Zhan, Q.; Zhang, Z.; Gu, Y. An improved U-Net model with multiscale fusion for retinal vessel segmentation. *Intell. Robot.* 2025, 5(3), 679-94. <http://dx.doi.org/10.20517/ir.2025.35>



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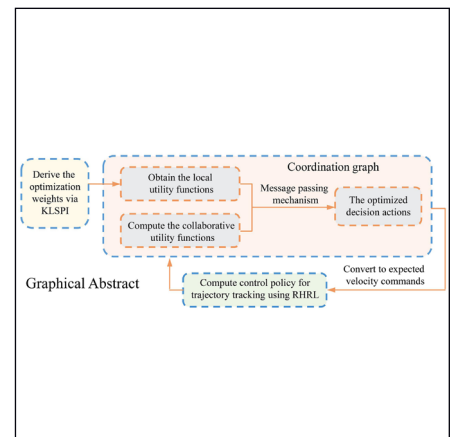
2025, 5(3), 695-716



Learning-based cooperative decision-making and control for multiple autonomous vehicles in unsignalized intersections

**Ronghua Zhang, Xincheng Xu, Yang Lu, Xin Xu, Xinglong Zhang, Qingwen Ma**

**Copy here to cite this article:** Zhang, R.; Xu, X.; Lu, Y.; Xu, X.; Zhang, X.; Ma, Q. Learning-based cooperative decision-making and control for multiple autonomous vehicles in unsignalized intersections. *Intell. Robot.* 2025, 5(3), 695-716. <https://dx.doi.org/10.20517/ir.2025.36>



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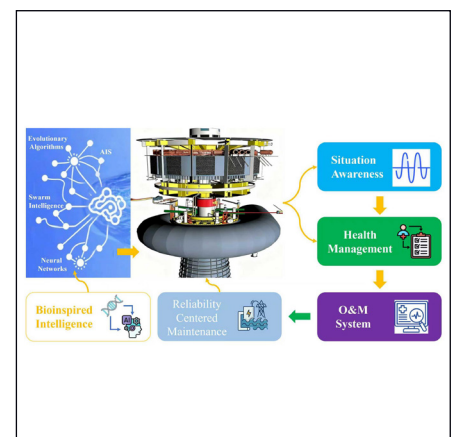
2025, 5(3), 717-44



Bioinspired intelligence for situation awareness and health management of hydroelectric units: perspective of reliability-centered maintenance

**Li Zhang, Shubo Qin, Junfei Li, Simon X. Yang, Xiaofei Li, Huqiang Sun, Jun Wang, Xiaobing Liu, Kun Yang**

**Copy here to cite this article:** Zhang, L.; Qin, S.; Li, J.; Yang SX.; Li, X.; Sun, H.; Wang, J.; Liu, X.; Yang, K. Bioinspired intelligence for situation awareness and health management of hydroelectric units: perspective of reliability-centered maintenance. *Intell. Robot.* 2025, 5(3), 717-44. <https://dx.doi.org/10.20517/ir.2025.37>



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**2025, 5(3), 745-63**

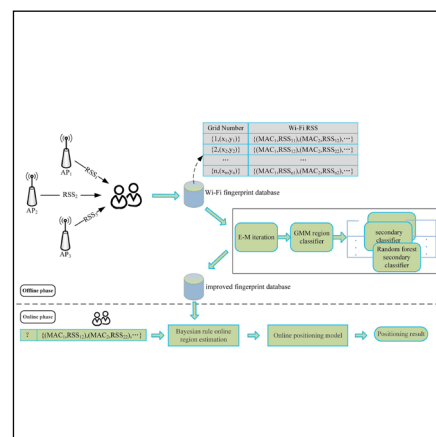


# A hierarchical positioning model for WiFi-based indoor localization in large-scale complex environments

**Zheng Yao, Puqing Chang, Qiwu Zhu, Wenjie Sun**

**Copy here to cite this article:** Yao, Z.; Chang, P.; Zhu, Q.; Sun, W. A hierarchical positioning model for WiFi-based indoor localization in large-scale complex environments. *Intell. Robot.* 2025, 5(3), 745–63.

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**2025, 5(3), 764-82**

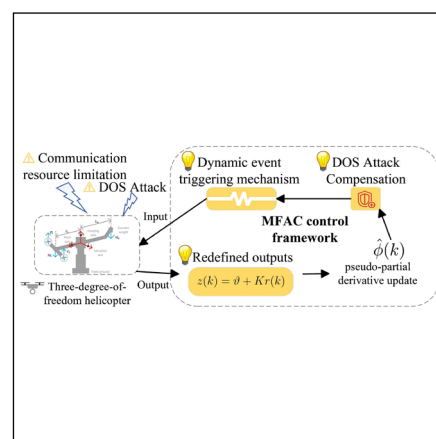


# Data-based dynamic event-triggered attitude control for helicopter with aperiodic denial-of-service attacks

**Ye Xu, Huarong Zhao, Yi Gao, Hongnian Yu, Li Peng**

**Copy here to cite this article:** Xu, Y.; Zhao, H.; Gao, Y.; Yu, H.; Peng, L. Data-based dynamic event-triggered attitude control for helicopter with aperiodic denial-of-service attacks. *Intell. Robot.* 2025, 5(3), 764-82.

<https://dx.doi.org/10.20517/ir.2025.39>



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**2025, 5(3), 783-804**



# Translation-based multimodal learning: a survey

**Zhengyi Lu, Yunhong Liao, Jia Li**

**Copy here to cite this article:** Lu, Z.; Liao, Y.; Li, J.  
Translation-based multimodal learning: a survey.  
*Intell. Robot.* 2025, 5(3), 783-804.

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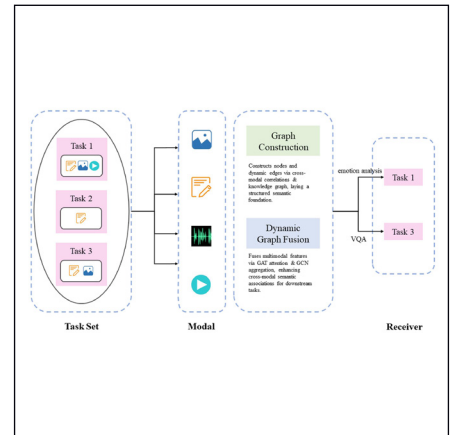
2025, 5(3), 805-26



Multimodal semantic communication system based on graph neural networks

**Xinran Ba, Xinguang Zhang, Shufeng Li, Jin Yuan, Jun Hu**

**Copy here to cite this article:** Ba, X.; Zhang, X.; Li, S.; Yuan, J.; Hu, J. Multimodal semantic communication system based on graph neural networks. *Intell. Robot.* 2025, 5(3), 805-26. <https://dx.doi.org/10.20517/ir.2025.41>



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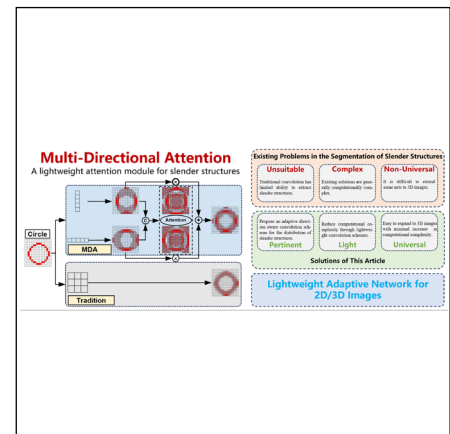
2025, 5(4), 827-43



Multi-directional attention: a lightweight attention module for slender structures

**Dong Liu, Yaoren Zhang, Yu Ren, Dehua Pan, Xiang He, Ming Cong, Guanghai Yu**

**Copy here to cite this article:** Liu, D.; Zhang, Y.; Ren, Y.; Pan, D.; He, X.; Cong, M.; Yu, G. Multi-directional attention: a lightweight attention module for slender structures. *Intell. Robot.* 2025, 5(4), 827-43. <https://dx.doi.org/10.20517/ir.2025.42>





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