Mingdong Li

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About Me

I possess an interdisciplinary background in Mechanical Engineering and Computational Neuroscience. My research interests lie in **Brain-machine Interface, Computational Neuroscience, and Robotics**. My doctoral research focuses on analyzing neural population coding and brain-machine interface systems using point process filtering. My current work mainly involves building data pipelines for data collection factories, developing multi-modal manipulation algorithms, and pre-training foundation models.

🎓 Education

2021.09 – 2025.10 **Hong Kong University of Science and Technology**, PhD in Robotics and Autonomous Systems
Thesis: Modeling Functional Neural Connectivity in Point Process Filtering for Brain-machine Interface
Supervisors: Yiwen Wang, Qifeng Chen (Co-supervisor)

2018.09 – 2021.04 **Zhejiang University**, Master of Science (Mechanical Design and Theory)
Supervisor: Yixiong Feng (Changjiang Scholar, Academician Jianrong Tan's Team)

2013.09 – 2018.07 **Tongji University**, Bachelor of Engineering (Mechanical Design, Manufacturing and Automation, 5-Year Experimental Class)

💼 Work Experience

1. **Anker Innovations Co., Ltd.** (Humanoid Lab, Dexterous Manipulation Algorithm Engineer) 2025.04 – Present
   - Lead the UMI multimodal and foundation model pre-training team. Focus on integrating language and tactile modalities based on preliminary VA model exploration; explore visual, language, and tactile fusion schemes based on DiT; lead the implementation of multi-task manipulation models and pre-training architecture design for foundation manipulation models; explore pre-training architectures for multi-source UMI data and WAM applications.
   - Lead the design and implementation of the self-developed UMI data collection system, including data collection factory infrastructure, data format definition, and cross-team collaboration for worker training and data quality inspection. Scaled parallel data collection to 30 operators within the first month, producing 100+ hours of effective data daily. Currently amassed 3000+ hours of single-arm manipulation data for foundation model training, successfully covering industry-standard demos.
   - Lead data storage, augmentation, and annotation operations. Built a PB-scale local distributed storage system and cross-platform cloud collaboration (Alibaba Cloud, Volcengine), established training management workflows across object storage (OSS, TOS) and file storage (CPFS, vePFS), and fully integrated the data pipeline from storage and cloud migration to preprocessing.
   - Lead technical research, evaluation, and supply chain integration of tactile sensors for dexterous hands. Evaluated mainstream tactile sensors (e.g., Pacini, Tashan, Moxian, Huawei Tech, visual-tactile sensors); organized supplier technical exchanges and factory evaluations to drive hardware selection. Successfully integrated a two-finger gripper tactile data collection system with a real-robot inference pipeline based on Diffusion Policy, enabling tactile-integrated real-world manipulation.
2. **Schindler (China) Elevator Co., Ltd.** (Marketing Dept., Product Management Intern) 2017.11 – 2018.03
   - Participated in showroom planning, sales strategy formulation, and market data analysis for tier-1 regional agents.

🏆 Honors & Awards

1. HKUST ECE Future Leader *2025*
2. German Academic Exchange Service (DAAD) AInet fellowship (AI4Science) *2024*
3. NextGen Scholar Award (IEEE Annual International Conference of EMBS) *2024*
4. Zhejiang University Outstanding Graduate Scholarship (Top 1% of graduating class) *2021*
5. Zhejiang Lab Global AI Competition (Pedestrian Multi-Object Tracking Algorithm, Excellence Award 10/233) *2019*
6. 7th National Undergraduate Mechanical Product Innovation Design Competition, 1st Prize *2016*
7. Tongji University Academic Scholarship, 2nd and 3rd Prizes *2013-2018*

⚙️ Skills

- **Coding & AI**: Python / Matlab / Claude/ Opencode
- **Product Design**: AutoCAD / Inventor / Solidworks / Ansys
- **Languages**: Chinese (Native), English (Fluent), German (Basic)

📃 Publications

[Working Papers]:

1. **Mingdong Li**, Zhiwei Song, Shuhang Chen, Xiang Zhang, Yiwen Wang*. Dynamic Functional Neural Connectivity Inference for Multi-Task Neuroprosthetic Control in a Point Process Filter, ***IEEE Transactions on Biomedical Engineering*** *(TBME). (under revision)*
2. **Mingdong Li**, Jieyuan Tan, Shenghui Wu, Zhiwei Song, Mingyi Wang, Shicheng Qiu, Zixu Wang, and Yiwen Wang*. Adaptive Superposition Point Processes for Modeling Neural Population Representations Underlying Behaviors in Brain-machine Interface, ***Cyborg and Bionic Systems***. *(to be submitted)*

[Journals]:

1. Shenghui Wu, Zhiwei Song, Xiang Zhang, Yifan Huang, Shuhang Chen, Xiang Shen, Jieyuan Tan, **Mingdong Li**, Ziyi Wang, Yujun Chen, Kai Liu, Dario Farina, Jose Principe, Yiwen Wang*. A generative spike prediction model using behavioral reinforcement for re-establishing neural functional connectivity, ***Nature Computational Science****, 2026*.
2. Zhiwei Song, Xiang Zhang, **Mingdong Li**, Jieyuan Tan, Yiwen Wang*. An Online Knowledge Transfer Framework for Task Learning in Brain-Machine Interfaces, ***IEEE Transactions on Neural Systems and Rehabilitation Engineering*** *(TNSRE), 2025*.
3. **Mingdong Li**, Shuhang Chen†, Xiang Zhang, Yiwen Wang*. Neural Correlation Integrated Adaptive Point Process Filtering on Population Spike Trains, ***IEEE Transactions on Neural Systems and Rehabilitation Engineering*** *(TNSRE)*, 2025. *(†: co-first author)*
4. **Mingdong Li**, Shanhe Lou*, Hao Zheng, Yixiong Feng, Yicong Gao, Siyuan Zeng, Jianrong Tan. A Cognitive Analysis-based Key Concepts Derivation Approach for Product Design, ***Expert Systems With Applications*** *(ESWA)*, 2024.
5. **Mingdong Li**, Shanhe Lou*, Yicong Gao, Hao Zheng, Bingtao Hu, Jianrong Tan. A Cerebellar Operant Conditioning-inspired Constraint Satisfaction Approach for Product Design Concept Generation, ***International Journal of Production Research*** *(IJPR)*, 2023.
6. Xuanyu Wu, Zhaoxi Hong*, Yixiong Feng, **Mingdong Li**, Shanhe Lou, Jianrong Tan. A Semantic Analysis-driven Customer Requirements Mining Method for Product Conceptual Design, ***Scientific Reports*** *(Sci. Rep.)*, 2022.
7. Yixiong Feng, **Mingdong Li**, Shanhe Lou*, Yicong Gao, Jianrong Tan. A Digital Twin-Driven Method for Product Performance Evaluation Based on Intelligent Psycho-Physiological Analysis, ***ASME Journal of Computing and Information Science in Engineering*** *(JCISE)*, 2021.

[Conferences & Patents]:

1. **Mingdong Li**, et al. Estimating Neural Representations Underlying Behaviors via Point Process Filtering in Brain-machine Interface Task Learning, ***IEEE EMBS 12th Annual International Conference on Neural Engineering (NER)*** *(Spotlight, top 5%)*

2. **Mingdong Li**, et al. An Adaptive Superposition Point Process Model with Neuronal Encoding Engagement Identification, ***2024 46th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC).*** *(Oral)*
3. **Mingdong Li**, et al. Tracking the Dynamic Functional Neural Connectivity via Conjugate Gradient Optimization, ***2023 45th EMBC.*** *(Oral)*
4. **Mingdong Li**, et al. Modeling Neural Connectivity in a Point-Process Analogue of Kalman Filter, ***2022 44th EMBC.***
5. Y. Feng, **Mingdong Li**, Y. Gao. CN110090818B, Authorized Invention Patent, 2020
6. M. Li, Y. Zhang, N. Xu, **Mingdong Li**, S. Liu. CN106127958B, Authorized Invention Patent, 2018

📈 Project Experience

1. Point Process Filtering and Neural Population Coding for Invasive Brain-Machine Interfaces (Doctoral Project) *2021-2025*
2. Intelligent Design of Product Schemes (Master's Project: Design document analysis, machine learning solution derivation, and EEG analysis) *2018-2021*
3. Smartphone IMU + Matlab Mobile for Step Counting and Trajectory Reconstruction *2019*
4. Shanghai College Students' Innovation and Entrepreneurship Training Program (Candy packaging machine product design, prototype construction, and patent drafting) *2015-2016*

📎 Service

- Reviewer:
  - Journal of Neural Engineering (JNE), IEEE Transaction on Intelligent Vehicles (TIV), npj Artificial Intelligence
  - Conferences: EMBC, ISBI, NER
- Teaching Assistant:
  - EMIA4110 Practical Machine Learning *2024 Spring*
  - ELEC4130 Machine Learning on Images *2023 Spring*
- Conference / Forum Organizing Committee:
  - 3rd and 4th International Workshop on Neural Engineering & Rehabilitation