

Jiangxin Sun

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Education

University of Trento

Nov. 2024 - Present

PHD IN COMPUTER SCIENCE AND TECHNOLOGY

- Supervisors: Prof. **Nicu Sebe** & Prof. **Daniel Cremers**

Sun Yat-sen University

Sep. 2020 - Jun. 2023

M.E. IN COMPUTER SCIENCE AND TECHNOLOGY

- Supervisors: Prof. **Wei-Shi Zheng** & Prof. **Jian-Fang Hu**

Sun Yat-sen University

Aug. 2016 - Jun. 2020

B.E. IN COMPUTER SCIENCE AND TECHNOLOGY

- GPA: 3.9/4.0

Research Interests

- My research interests lie in Computer Vision and Machine Learning. My goal is to develop perceptual systems to achieve human-level recognition capabilities and further build intelligent decision-making systems to interact with complex environments.
- Currently, my focus is on interpretable autonomous driving systems, segmentation prediction and human motion prediction.

Publications

JOURNAL ARTICLES

APANet: Auto-Path Aggregation for Future Instance Segmentation Prediction [\[LINK\]](#)

Jian-Fang Hu*, **Jiangxin Sun***, Zihang Lin, Jian-Huang Lai, Wenjun Zeng, Wei-Shi Zheng (* equal contribution)
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2021

CONFERENCE PROCEEDINGS

Temporal Continual Learning with Prior Compensation for Human Motion Prediction [\[LINK\]](#)

Jianwei Tang, **Jiangxin Sun**, Xiaotong Lin, Lifang Zhang, Wei-Shi Zheng, Jian-Fang Hu
Advances in Neural Information Processing Systems (NeurIPS), 2023

You Never Stop Dancing: Non-freezing Dance Generation via Bank-constrained Manifold Projection [\[LINK\]](#)

Jiangxin Sun, Chunyu Wang, Huang Hu, Hanjiang Lai, Zhi Jin, Jian-Fang Hu
Advances in Neural Information Processing Systems (NeurIPS) Spotlight, 2022

Action-guided 3D Human Motion Prediction [\[LINK\]](#)

Jiangxin Sun, Zihang Lin, Xintong Han, Jian-Fang Hu, Jia Xu, Wei-Shi Zheng
Advances in Neural Information Processing Systems (NeurIPS), 2021

Predictive Feature Learning for Future Segmentation Prediction [\[LINK\]](#)

Zihang Lin*, **Jiangxin Sun***, Jian-Fang Hu, Qizhi Yu, Jiang-Huang Lai, Wei-Shi Zheng (* equal contribution)
Proceedings of the IEEE International Conference on Computer Vision (ICCV), 2021

Predicting future instance segmentation with contextual pyramid convlstm [\[LINK\]](#)

Jiangxin Sun, Jiafeng Xie, Jian-Fang Hu, Zihang Lin, Jian-Huang Lai, Wenjun Zeng, Wei-Shi Zheng
Proceedings of the ACM International Conference on Multimedia (ACM MM), 2019

Research Experience

University of Trento

Aug. 2024 - Present

GRADUATE RESEARCHER IN MHUG

- Advisor: Prof. **Nicu Sebe**
- Topic: World Model Predictive Control for Interpretable Autonomous Driving**
 - Explicitly evaluate the consequences of candidate actions, understand upcoming traffic scenes, and choose the most suitable action by leveraging the predictive capability of the world model, enhancing interpretability during both training and inference.
 - Enable WMPC to support predictive control and flexible training strategies including offline learning, online learning, and their combination. Offline learning allows WMPC to benefit from existing experts through imitation learning for a strong initialization. Meanwhile, online learning enables both learning from scratch and fine-tuning through interactive exploration, which reduces the heavy reliance on expert data and facilitates potential domain adaptation.

ETH Zurich

Aug. 2023 - Jul. 2024

RESEARCH ASSISTANT IN COMPUTER VISION LAB

- Advisor: Prof. **Fisher Yu**
- **Topic: Semantic Predictive Control for Interpretable Autonomous Driving**
 - Proposed a novel multimodal transformer-based predictive model to anticipate future scene information.
 - Explicitly evaluated the consequences of actions and select the most appropriate action.

Sun Yat-sen University

Aug. 2018 - Jun. 2023

UNDERGRADUATE & GRADUATE RESEARCHER

- Supervisors: Prof. **Wei-Shi Zheng** & Prof. **Jian-Fang Hu**
- **Topic 1: Adaptive Context Aggregation for Segmentation Prediction**
 - Collaborator: Prof. **Wenjun Zeng**
 - Aims to predict future unobserved instance segmentation according to observed past RGB frames. The mainstream is to insert a prediction block into an instance segmentation model (e.g., Mask R-CNN) and predict future pyramid features.
 - Developed a flexible network for collaboratively predicting multi-level pyramid features.
 - Proposed an adaptive aggregation approach to exploit the underlying structural relationship among pyramid features.
 - Designed auto-path to selectively and adaptively aggregate contextual information among different pyramid levels.
 - Accepted by **ACM MM** 2019 [LINK] & Revised approach accepted by **TPAMI** in 2021 [LINK].
- **Topic 2: Predictive Feature Learning for Segmentation Prediction**
 - Collaborator: Prof. **Jianguo Zhang**
 - Pointed out the contradiction between learning discriminative segmentation features and learning reliable future prediction.
 - Designed an autoencoder-based framework to learn a predictive representation of segmentation features.
 - Proposed an uncertainty-aware prediction module to learn both feature prediction and uncertainty estimation.
 - Preliminary work accepted by **ICCV** 2021 [LINK] & Revised approach submitted to **TPAMI**.
- **Topic 3: Temporal Continual Learning for Human Motion Prediction**
 - Identified two main limitations in existing models: the learning of short-term predictions is hindered by the focus on long-term predictions, and the incorporation of prior information from past predictions into subsequent predictions is limited.
 - Proposed a novel multi-stage training framework and introduced a prior compensation factor to tackle the forgetting problem of prior knowledge.
 - Accepted by **NeurIPS** 2023 [LINK].

Microsoft Research Asia

Aug. 2021 - Jan. 2022

RESEARCH INTERN IN INTELLIGENT MULTIMEDIA GROUP

- Advisor: Dr. **Chunyu Wang**
- **Topic: Non-freezing Dance Generation**
 - Aims to predict future dance choreography conditioned on past motion and music pieces. The mainstream is to learn single-modal feature extractors and a cross-modal predictor.
 - Achieved non-freezing large-magnitude dance generation.
 - Presented bank-constrained manifold projection to suppress the noises in the predicted motions and leveraged the coherence in <past, future> motion dynamics to reduce the uncertainty and ambiguity in motion prediction.
 - Accepted by **NeurIPS** 2022 (**Spotlight**). [LINK]

Huya Incorporated

Jul. 2020 - Jul. 2021

RESEARCH INTERN IN COMPUTER VISION GROUP

- Advisor: Dr. **Xintong Han**
- **Topic: Action-guided Motion Prediction**
 - Aims to predict future unobserved 3D human motion according to observed past RGB frames. The mainstream is to insert a prediction block into a motion capture model and predict future latent features.
 - Introduced action information into human motion prediction.
 - Constructed an action-specific memory bank to exploit representative sub-actions and retrieved possible motion dynamics to guide future motion prediction.
 - Accepted by **NeurIPS** 2021. [LINK]