

Jiangxin Sun

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Education

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, semantic/instance 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), 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

ETH Zurich

Aug. 2023 - Present

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 and relevant measurements conditioned on candidate actions, leading to an action-conditioned world model.
 - Explicitly evaluated the consequences of actions and select the most appropriate action with maximal driving distance to the destination and minimal violations.
 - Can be learned through both online learning and offline learning. Online learning can significantly improve driving performance based on offline pre-trained models.
 - Still in progress.

- 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 via explicitly modeling prediction uncertainty and introducing uncertainty decay.
 - Proposed an uncertainty-aware prediction module to learn both feature prediction and uncertainty estimation.
 - Preliminary work accepted by **ICCV** 2021 [LINK] & Revised approach scheduled to be 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.
 - Obtained an easily optimized and more reasonable objective function through theoretical derivation.
 - Accepted by **NeurIPS** 2023 [LINK].

Microsoft Research Asia

Aug. 2021 - Jan. 2022

- 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. [LINK]

Huya Incorporated

Jul. 2020 - Jul. 2021

- 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]

Awards

Outstanding Graduate, Sun Yat-sen University

2023

China National Scholarship, Sun Yat-sen University

2022