ZHUORAN ZHOU

School Address

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Education

University of Washington, *Seattle, WA*
Master of Science in Electrical and Computer Engineering Sep.21 - Mar.23
Advisor: Prof. Jenq-Neng Hwang

University of Washington, *Seattle, WA*
Bachelor of Science in Electrical and Computer Engineering Sep.17 - Jun.21
Senior Industry Capstone: Error detection of text queries transcribed from voice input with Telenav Inc.

Research Experience

Information Processing Lab, UW, *Seattle, WA*
Full-Time Research Assistant Nov.22 - Present

- Proposed and developed a human pose estimation optimization-based model that integrates a Score-matching diffusion model to iteratively adjust coarse ray-projected 3D poses in the 2D-3D lifting task. Achieved zero-shot SOTA performance even compared to learning-based models.
- Constructed a contrastive-learning, transformer-based multimodal model that learns feature alignments among 2D and 3D poses via an innovative contrastive loss. So far achieved performance comparable to SOTA.
- Transferred the idea of the optimization-based diffusion-refined pipeline to face alignment and face mesh reconstruction tasks by elevating 2D detections and iteratively adjusting scales and positions of representative 3D face landmarks for better de-occlusion and mesh reconstruction quality.
- Adopting CLIP's visual-text understanding to bridge three modalities: point cloud, image, and text through the integration of task-oriented prompt learning in the point cloud downstream tasks.

Microsoft Azure Vision Research Intern, *Seattle, WA*
Research Intern Jan.23 - Jun.23

- Established a classifier-guided DDPM Diffusion model trained by multiple symptom X-ray images to provide super-class pathological information to a multi-round medical-use question-answering image captioning model fine-tuned from GIT.
- Detected disease-afflicted regions via anomaly map difference between healthy and diseased images generated by the diffusion model. Appended anomaly map tokens to learned implicit latent prompts to facilitate medical report generation, resulting in SOTA performance.

Information Processing Lab, *Seattle, WA* Aug.20 - Jan.21
Undergrad Research Assistant

- Cooperated with NOAA in labeling fish mask data and fine-tuning a Mask-RCNN-based model, enhancing its ability of real-time fish species identification and instance segmentation within video footage.

Dr.Gire Lab, *Seattle, WA* Jun.19 - Aug.19
Undergrad Research Assistant

Undergrad Research Assistant

- Simulated locomotion patterns of rats subjected to varying voltage levels and predicted the positions when rats became occluded using a Kalman-Filter-based model.
- Applied the DeepLabCut model to keep track of multiple rats with bounding boxes in real-time.

Work Experience

Zongmu - Autonomous Driving Mobile Research Intern, *Shanghai* Jun.21 - Sep.21

- Tuned a Detectron2 ABCNet model, facilitating recognition of vehicle plates and parking lot numbers with an accuracy of over 85% under severe occlusion and various brightness conditions.
- Built an MQTT protocol-based network to transmit detection results to a cloud server which may reflect information on the mobile APP in less than 1.5 seconds. Additionally implemented an ONNX versioned model to support local execution on mobile devices.

Telenav - Software Engineer Capstone Intern, *Remote* Jan.21 - Jun.21

- Co-worked with Telenav Inc. in a group of three to develop a Java library to detect errors in the text queries transcribed from voice, and re-rank the queries by evaluating TF-IDF and n-gram correctness.
- Designed and developed an Android App to deploy the testing library so that the new voice recognition system could tolerate accents and noisy environments.

Publication(Under Review)

Jiang, Z.*, **Zhou, Z.***, Li, L., Chai, W., Yang, C. Y., & Hwang, J. N. (2023). Back to Optimization: Diffusion-based Zero-Shot 3D Human Pose Estimation. *arXiv preprint arXiv:2307.03833*. (*equal contribution)(Under Review WACV)

Jin, Y., **Zhou, Z.**, Yang, Z., Wang, J., & Hwang. J. N. (2023). Latent Prompting Network for Controllable Radiology Report Generation. (Under Review WACV)

Jiang, Z., Li, L., **Zhou, Z.**, & Hwang, J. N.(2023). CPAE: Contrastive 2D-3D Pose Feature Alignment and Estimation. (Under Review WACV)

Research Area

Diffusion Model, Generation Model, Multi-modality, Pose estimation, ViT, Prompt Tuning, Point Cloud, Computer Vision