XIANPENG LIU

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EDUCATION

North Carolina State University, Raleigh, NC *Aug. 2018 - Dec. 2023*
Ph.D. in Electrical Engineering *GPA: 3.96/4.00*
Research Focus: ***Computer Vision***; ***Deep Learning***; ***Machine Learning***; ***Data Science***

Harbin Institute of Technology, Harbin, China (C9 League in China) *Aug. 2012 - June 2018*
M.S. in Materials Processing Engineering
B.Eng. in Welding Science and Technology, Honors School (top 5%)

WORK EXPERIENCES

***Research Intern in Machine Learning*, OPPO Seattle Research Center (OSRC)** Bellevue, WA
Mentor: Dr. Guojun Qi (***IEEE Fellow***) Summer, Fall 2022
◦ ***Focus:*** **Deep Learning** projects for **3D Object Detection** and **Human Mesh Recovery**.

***Research Assistant*, Interpretable Visual Modeling, Computing and Learning (iVMCL) Lab** Raleigh, NC
Advisor: Prof. Tianfu Wu 2020 - Present
◦ ***Research Focus:*** **Computer vision** and **Deep learning**, especially on **2D/3D Object Recognition** (classification, detection, segmentation, etc.) and **3D Reconstruction** (**NeRF**).

***Research Assistant*, Multimedia and Forensic (MF) Lab** Raleigh, NC
Mentor: Prof. Chau-Wai Wong 2018 - 2020
◦ ***Research Focus:*** **Machine learning** on **Video Data Analysis/Forensics** and **Social Media Data analysis**.

PROJECT EXPERIENCES

3D Object Detection with a Novel Transformer-based Method iVMCL, OSRC
◦ Developed a novel **transformer-based** method for outdoor 3D object detection from single images (**Python, Pytorch, MMDetection3D**). Achieved a **new state-of-the-art** among monocular 3D detection methods.
◦ **First author paper** is accepted in **ICCV 2023**.

Human Mesh Recovery with a Lightweight Transformer Model OSRC
◦ Developed a novel **lightweight transformer** model for human mesh reconstruction from single images (**Python, Pytorch, MMClassification, timm**). Achieved a **new state-of-the-art** regarding accuracy, inference speed and computation cost.
◦ **Second author paper** is accepted in **CVPR 2023**.

3D Object Detection with a Novel Context Learning Formulation iVMCL lab
◦ Developed an efficient **Context Learning** formulation for outdoor 3D object detection from single images (**Python, Pytorch, MMDetection**). Achieved a **new state-of-the-art** among monocular 3D detection methods regarding accuracy, inference speed and computation cost.
◦ **First author paper** is accepted in **AAAI 2022**.

Video Analysis for Wetting Fabrics MF lab
◦ Developed a novel **machine learning** method for **video-based** wetting detection by performing pixel-wise likelihood ratio test (**Python, OpenCV, Numpy, Scipy, Seaborn**). The developed algorithm has been **deployed on wetting fabrics research projects**.
◦ **First author paper** is accepted in **ACSSC 2019**.

Social Media Data Crowdsourcing and Analysis MF lab
◦ Developed an **automatic big data collection and labelling system** for **social media analysis on tweets** (**SQL, PHP, Javascript and HTML/CSS**). The system has quality awareness and real-time monitoring design, which ensures the **high quality of collected data**.
◦ **Last author paper** is accepted in **ICME 2021**.

Robust Stereo-Matching with NeRF iVMCL lab

○ Developing a novel **NeRF**-based formulation for **Stereo Matching** in autonomouse driving applications. It achieves high quality disparity estimation and faithful novel view synthesis at the same time.
○ **Co-first author paper** is submitted and under-reviewed by top conferences.

Large Models Pretraining with Contrastive Learning iVMCL lab

○ Developing a patch-based context learning paradigm via **Contrastive Learning** for **Large Vision Model Pretraining**.

Human Face Detection with Aligned CAD Models iVMCL lab

○ Developing a **Deep Learning** based method for **human face detection** via detecting **human face landmarks** from **Aligned CAD Models**.

DeepFake Video Forensics with bio-signals MF lab

○ Developing a novel **machine learning** based method for detecting DeepFake videos with extracting and recognizing patterns of **bio-signals** on **human faces**.

SKILLS

Programming:	**Python**, **SQL**, C/C++, JavaScript, PHP, HTML/CSS
Libraries:	*Machine Learning & Data Science:* Numpy, Scipy, Pandas, Matplotlib, Seaborn
	Deep Learning: Pytorch, Tensorflow, Keras
	Computer Vision: OpenCV, MMDetection, MMDetection3D, Detectron2, Nerfstudio
Tools:	Matlab, Git, LaTeX, Vim

PUBLICATIONS

○ **X. Liu**, C. Zheng, K. Cheng, N. Xue, G. Qi and T. Wu. "Monocular 3D Object Detection with Bounding Box Denoising in 3D by Perceiver." in *Proceedings of the IEEE/CVF International Conference on Computer Vision (**ICCV**), 2023.*

○ C. Zheng, **X. Liu**, G. Qi and C. Chen. "POTTER: Pooling Attention Transformer for Efficient Human Mesh Recovery." in *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2023*. (Acceptance Rate 25.8%, 2360/9155.)

○ **X. Liu**, N. Xue and T. Wu. "Learning Auxiliary Monocular Contexts Helps Monocular 3D Object Detection." in *Proceedings of the AAAI Conference on Artificial Intelligence (**AAAI**), 2022*. (Acceptance Rate 14.6%, 1349/9020.)

○ K. Cheng*, **X. Liu***, N. Xue, T. Wu, Z. Zhang, H. Sun and C. Healey. "Stereo Matching via Learning a Density-based Volumetric Representation: From Supervised to Self-Supervised Learning." *: Equal contribution, (*Under Review)*

○ J. Wu, C. Wong, X. Zhao and **X. Liu**. "Toward Effective Automated Content Analysis via Crowdsourcing." in *IEEE International Conference on Multimedia and Expo (**ICME**)*, pp. 1-6, held virtually, July 2021.

○ **X. Liu** and C. Wong. "Video-based Wetting Detection for Blended Fabrics." in *IEEE Asilomar Conference on Signals, Systems, and Computers (**ACSSC**)*, pp. 89-93, Pacific Grove, USA, November 2019.

ACADEMIC SERVICES

Journal and Conference Reviewer:	**Journal:** Image and Vision Computing, Neurocomputing, Neural Networks, IEEE/CAA Journal of Automatica Sinica, Frontiers of Computer Science
	Conference: CVPR, ICCV, ECCV
Open Source Projects:	**ICCV'23 Paper:** https://xianpeng919.github.io/monoxiver
	AAAI'22 Paper: https://github.com/Xianpeng919/MonoCon