Ning-Hsu (Albert) Wang

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Research Interest

Computer Vision, Machine Learning, 3D Geometry & Reconstruction, VR/AR, 360° Vision, Computational Photography, Robotic Perception, Generative AI

EDUCATION BACKGROUND

National Tsing Hua University — **Hsinchu, Taiwan**
Master of Science in Electrical Engineering, advised by Prof. Min Sun — *Feb. 2018 – Aug. 2020*
GPA: 4.3/4.3

National Chiao Tung University — **Hsinchu, Taiwan**
Bachelor of Science in Mechanical Engineering — *Sep. 2013 – Jun. 2017*
Last 60 credits GPA: 3.74/4.3

PUBLICATIONS

Ning-Hsu Wang, Ren Wang, Yu-Lun Liu, Yu-Hao Huang, Yu-Lin Chang, Chia-Ping Chen, Kevin Jou, "Bridging Unsupervised and Supervised Depth from Focus via All-in-Focus Supervision", ICCV 2021. [link]

Cheng Sun, Chi-Wei Hsiao, **Ning-Hsu Wang**, Min Sun, Hwann-Tzong Chen, "Indoor Panorama Planar 3D Reconstruction via Divide and Conquer", CVPR 2021 Oral. [link]

Ning-Hsu Wang, Bolivar Solarte, Yi-Hsuan Tsai, Wei-Chen Chiu, Min Sun, "360SD-Net: 360° Stereo Depth Estimation with Learnable Cost Volume", ICCV-W 2019 Spotlight, ICRA 2020. [link]

PATENT

Methods and Apparatuses of Depth Estimation from Focus Information — **MediaTek**
Ren Wang, Yu-Lun Liu, Yu-Hao Huang, ***Ning-Hsu Wang*** — *Feb. 2022*
U.S. Patent Appl. 17/677,365, filed Feb. 2022, published Sep. 2022, no. US20220309696A1. [link]

EXPERIENCE

Taiwan AILabs, Metaverse Team — **Taipei, Taiwan**
Machine Learning Research Engineer — *Aug. 2021-Present*

- **Metaverse Project**
  - Led the optimization of the **Omnidirectional Video Face Detection and De-identification** functionality for virtual scene generation, resulting in a notable **400% improvement in inference speed** (**5 times faster**).
  - **Integrated EquiConv with optical flow method** (**RAFT**) to enhance stability and user experience in **virtual scene walk-through**, while also contributing to the development of 4 additional features.
  - Introduced a novel **light-source representation** and spearheaded the development of a NN model and dataset for **character and object insertion, lighting, and accurate shadow casting in virtual environments**. (Successfully delivered the feature from inception to completion **within a six-month timeframe**)
  - Formulated an inclusive strategy for advancing a **multi-task Generative AI** (**stable-diffusion**) algorithm, emphasizing style generation and super resolution, with additional support for panorama image generation.
  - Developed a 360 projection converter to effectively address distortion challenges when utilizing neural network models on 360-degree images.
- **Video Enhancement Project**
  - Engineered a high-performance video enhancement pipeline leveraging cutting-edge **video decompression and super-resolution** techniques. Demonstrated exceptional results, achieving comparable performance to the primary competitor on documentary videos within a month.

- **Avatar and Virtual Studio**
  - Orchestrated the design of the algorithmic development pipeline and development for avatar movement and **human motion generation**, while also actively participating in algorithm development.
  - Engineered the implementation of the **text-to-image** feature in a virtual studio, leveraging state-of-the-art **Generative AI** models.
  - Assisted in improving video matting techniques for enhanced background removal.

MediaTek, MM, MTD, IVP **Hsinchu, Taiwan**
Contract Researcher in Computer Vision *Aug. 2020-Feb. 2021*
Research intern in Computer Vision *Feb. 2020-Aug. 2020*

- Published an **IEEE conference paper** in Computer Vision (**ICCV 2021**) and obtained a **US Patent** in the field of depth estimation for images with bokeh effects (shallow depth of field).
- Introduced a novel dataset for depth estimation on blurred images and developed an innovative unsupervised training technique.
- Demonstrated exceptional performance by surpassing SOTA methods with significant margins on multiple datasets: DDFF-12-Scenes (5.5%), HCI-4D-Light-Field (20%), and Defocus-Net (27%).

VSLab, National Tsing Hua University **Hsinchu, Taiwan**
Graduate Research Assistant *Feb. 2018-Aug. 2020*

- Published **two IEEE conference papers** in the fields of Computer Vision and Robotics (**ICRA 2020, CVPR 2021 Oral**).
- Led the 360° Stereo Project, under the guidance of Prof. Min Sun, Prof. Wei-Chen Chiu, and Dr. Yi-Hsuan Tsai; focused on planar reconstruction, co-advised by Prof. Hwann-Tzong Chen.
- Presented two 360° stereo datasets and developed a novel deep neural network for depth estimation on 360° stereo images (ICRA 2020).
- Introduced a new benchmark and method utilizing indoor human structures and 360° images for indoor panorama planar reconstruction (CVPR 2021 Oral).

Young Entrepreneurs of the Future, Epoch Foundation **Taipei, Taiwan**
Technical Lead *Jan. 2018-July. 2018*

- Led a technical team in a nationwide startup competition and achieved Second Place in the first stage of the two stages.
- Developed an electronic mask-like device incorporating active noise canceling technology, suitable for both meeting and gaming purposes.

PROFESSIONAL ACTIVITY

Served as a reviewer for:
- Journals: RA-L, TPAMI, IJCV
- Conferences: AAAI 2023, CVPR 2023, ECCV 2024

SKILLS

Programming: Python, C/C++, HTML/CSS
Tools: PyTorch, TensorFlow, OpenCV, Scikit-Learn, Vim, Linux, Git, LaTeX
Software/Hardware: LabVIEW, Matlab, LTSpice, ANSYS-Fluent, AutoCAD, Solidworks, Arduino, 8051
Language: Mandarin (native), English (fluent, TOEIC: 900)

HONORS & AWARDS

Honorary Member of The Phi Tau Phi Scholastic Honor Society of the Republic of China 2020
Appier Conference Scholarship for Top Researches on Artificial Intelligence 2020
Arctic Code Vault Contributor (GitHub) 2020