NING-HSU WANG

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RESEARCH INTERESTS

360° images, DoF images, 3D geometry, Robotics Perception, Computer Vision, Deep Learning

SUMMARY OF QUALIFICATIONS

- Research abilities developed by designing novel DNN and submitting/presenting in top conferences.
- Robotics skills enhanced by designing mechanism and control system in multiple undergraduate projects.
- Project lead of a 14-month 360° Stereo Depth Estimation project.
- Demonstrated teamwork skills as a collaborator of multiple projects (360° Stereo, Planar Reconstruction, 3D Horror Scene, etc.) and nationwide startup competition.
- Self-motivated fast learner who explores various fields of expertise from Computer Vision to Business.

EDUCATION

National Tsing Hua University *January 2018 - July 2020*
- Master in Electrical Engineering
- Advised by Prof. Min Sun.
- **GPA: 4.3/4.3**

National Chiao Tung University *September 2013 - June 2017*
- Bachelor in Mechanical Engineering
- **GPA: 3.41/4.0, Last 60: 3.67/4.0, Ranking: 13/49, 25/99**

PUBLICATIONS

360SD-Net: 360° Stereo Depth Estimation with Learnable Cost Volume
- ***Ning-Hsu Wang****, Bolivar Solarte, Yi-Hsuan Tsai, Wei-Chen Chiu, Min Sun*
- *International Conference on Robotics and Automation 2020 (**ICRA 2020**),* ***Accepted***
- *Short Version in ICCV 2019 360PI Workshop,* ***Spotlight***

Indoor Panorama Planar 3D Reconstruction via Divide and Conquer (In submission)

AWARDS AND HONOR SOCIETY

The Phi Tau Phi Scholastic Honor Society of the Republic of China. *2020*
- *Honorary Member of the Society*

Appier Conference Scholarship for Top Researches on Artificial Intelligence. *2020*

EXPERIENCE

Mediatek *February 2020 - Present*
- *Computer Vision Research Intern*

Research oriented internship with topics related to Stereo Matching, Disparity Estimation, Light-Field Camera, DoF (Depth of Field) Images and Blur/Bokeh Effects.

Vision Science Lab, National Tsing Hua University *January 2018 - July 2020*
- *Research Student, advised by Prof. Min Sun.*

Project lead of 360° Stereo Depth Estimation, co-advised by Prof. Wei-Chen Chiu and Dr. Yi-Hsuan Tsai. We proposed the Learnable Cost Volume to improve stereo matching on 360° images, and was accepted in **ICRA 2020** (short version accepted as **Spotlight Paper in ICCV-W 2019**). **Planar Reconstruction**, co-advised by Prof. Hwann-Tzong Chen, is currently in submission.

Young Entrepreneurs of the Future, Epoch Foundation *January 2018 - July 2018*

- *Contestant, Team Technical Lead*

A nationwide startup competition including the following progress: Garage Party, Elevator Pitch, Workshop, with a **Second Place Award** in Garage Party.

Atos *August 2017*

- *On-site Engineer*
- *29th Summer Universiade internet system maintenance.*

Tokyo Electron Limited Robot Combat *2017*

- *Contestant*

PROJECT HIGHLIGHTS

360° Stereo Depth Estimation and 3D Reconstruction

- Presented the first 360° stereo dataset with disparity/depth ground truth.
- Implementation of DNN baselines as well as conventional methods.
- Presented a DNN with several novel modules for 360° stereo depth estimation.
- Generalization to real-world scenes with model trained on synthetic data.

Planar Reconstruction

- Proposed a novel DNN to reconstruct promising 3D indoor scenes from 360° images.
- Presented a new 360° planar dataset as well as a new benchmark with two baseline models.
- Implementation of DNN baselines with adaption to 360° images.
- Presented a new planar representation to solve the 360° ground truth surface inconsistency.

3D Horror Scene: Horror Style Transfer Using 360° Views and 3D Reconstruction

- Collection of horror scene data.
- Implementation of **CycleGAN** for style transfer.
- Implementation of **LayoutNet** for 360° layout reconstruction.

Design and implementation of Logistic UAV (Unmanned Aerial Vehicle)

- Design and implementation of UAV mechanism.
- Design and implementation of unloading mechanism and motor control system.
- Design of UAV surveillance system.
- Demostration of UAV control for unseen location object unloading.

Object Searching Robot Design

- Design and implementation of KNR mechanism and ultrasonic avoidance system.
- LabVIEW programming of motor control, sensor feedback and image processing.

Validation of *The Lambda Method for Integer Ambiguity Estimation*

- Implementation of *The Lambda Method for Integer Ambiguity Estimation* with Matlab simulation.

ABILITIES AND CERTIFICATIONS

Programming	**Python, C/C++, HTML, CSS**
DL Framework	**Pytorch, TensorFlow**
Software & Tools	**LabVIEW**: Industrial Control & Simulation
	Matlab: Mathematics Simulation
	LTSpice: Electrical Circuit Simulation
	ANSYS-Fluent: Computational Fluid Dynamics Simulation
	AutoCAD, Solidworks: Computer-aided Design Drafting Software
Hardware	**Arduino, 8051**
Misc.	**OpenCV, Github, Vim, Linux, LaTeX**
Language	**Fluent in Mandarin (Native)**
	Proficient in English, TOEIC Golden Certification (Score: 900)
	Elementary Proficiency in Japanese (4 semesters)