Chien Erh (Cynthia) Lin

Robotics Institute E-mail: chienerh@umich.edu

Education

University of Michigan	Robotics	M.S.	4.00/4.00	2018-Present
National Taiwan University	Mechanical Engineering	B.S.	3.85/4.30	2013-2017

Research Experience

- **BioElectronic Vision Lab**, *Prof. James Weiland* May 2019 – Present
  Developing a computer vision-based system that can navigate someone visually impaired to the targeted door with object detection, object tracking, and visual SLAM.
- **Deep Robot Optical Perception Laboratory**, *Prof. Matthew Johnson-Roberson* Nov. 2018 – May 2019
  Reconstructed an underwater scene in 3D, despite the low texture and low contrast of underwater images. Projected structured light patterns onto a submerged object and implemented image processing techniques to decode the captured sequences to recover the structure of the scene.
- **Biophotonics and Bioimaging Laboratory**, *Prof. Ta-Te Lin* July 2017 – June 2018
  Constructed an IoT-based wireless imaging and sensor node system for remote greenhouse pest monitoring. Achieved 90% accuracy of pest classification using a deep neural network, enabling farmers to easily track the amount of pests in real-time.
- **Advanced Medical Device Laboratory** *Prof. Hao-Ming Hsiao* Aug 2014 – July 2017
  Innovated a novel spherical stent for treatments of cerebral aneurysms and liver cancer. Designed, simulated, and manufactured intravascular stents.

Publications

Journal Papers

- Hao-Ming Hsiao, Tzu-Yuan Lin, **Chien-Erh Lin**, Han-Yu Lee, and Yi-Ping Wang. "Innovation of New Occlusion Devices for Cancers." *Applied Sciences* 7, no. 5 (2017): 530.
- Hao-Ming Hsiao, Yi-Ping Wang, Yu-Han Cheng, Tzu-Yuan Lin, and **Chien-Erh Lin**. "A Novel Spherical Stent Concept for Intracranial Aneurysm." *Sensors and Materials* 28, no. 9 (2016): 947-955.

Conference Papers

- Dan Jeric Arcega Rustia, **Chien Erh Lin**, and Jui-yung Chung. "IE2-8: A Real-time Multi-class Insect Pest Identification Method using Cascaded Convolutional Neural Networks." In *9th International Symposium on Machinery and Mechatronics for Agriculture and Biosystems Engineering (ISMAB)* 23, no. 1 (2018): 67-67.
- Hao-Ming Hsiao, Wen-Hsin Yang, Tzu-Yuan Lin, **Chien-Erh Lin**, and Jiong-Hong Chen. "A Novel Spherical Stent for Occlusion of Cancer and Aneurysm." In *the Biomedical Engineering Society (BMES) Annual Meeting*, Phoenix, USA, October 11-14, 2017.
- Han-Yu Lee, **Chien-Erh Lin**, Tzu-Yuan Lin, Shu-Wei Hsu, Chih-Han Yang, and Hao-Ming Hsiao. "Innovation of New Occlusion Devices for Cancers." In *International Conference on Inventions 2016 (ICI)*, Kenting, Taiwan, September 30 - October 3, 2016.
- Yen-Ting Wang, Yi-Ping Wang, Tzu-Yuan Lin, **Chien-Erh Lin**, and Hao-Ming Hsiao. "Drug-eluting stent with rhombic-shape reservoirs for drug delivery." In *Applied System Innovation (ICASI), 2016 International Conference*, pp. 1-4. IEEE, Okinawa, Japan, May 28 - June 1, 2016.

Patents

- Dan Jeric Arcega Rustia, **Chien Erh Lin**, and Ta-Te Lin. "Pest surveillance system." U.S. Patent Application 15/990,791, filed July 25, 2019.

Work Experience

University of Michigan, Ann Arbor, Michigan USA
Grader, EECS 565: Linear Feedback Control Systems Jan. 2019 – Apr. 2019

National Taiwan University, Taipei, Taiwan
Research Assistant, Bio-Industrial Mechatronics Engineering Department July 2017 – June 2018

Industrial Technology Research Institute, Hsinchu, Taiwan
Intern July 2016 – Aug. 2016

Abbott Vascular, Taipei, Taiwan
Software Engineer Intern July 2015 – Oct. 2015

Projects

- **Image Caption Generator with Simple Semantic Segmentation** Winter 2019
  Utilized a pre-trained ImageNet as the encoder, and a Long-Short Term Memory (LSTM) net with attention module as the decoder in PyTorch that can automatically generate properly formed English sentences of the inputted images and achieved BLEU-4 score 0.2320 (out of 1) with beam search size 5 in evaluation. Implemented a simple semantic segmentation algorithm using the sentence generated along with it's attention layer.
- **Evaluation of LeGO-LOAM** Winter 2019
  Evaluated LeGO-LOAM (Lightweight andGround-Optimized Lidar Odometry and Mapping) which reduced computational expense while keeping similar accuracy compared to LOAM method using KITTI Odometry Benchmark Dataset, UTBM Dataset and KAIST Urban Dataset. Compared the mapping and odometry results of these data, and analysis the relative motion and mapping error in this report.
- **Vehicle Classification and Localization** Fall 2018
  Utilizing OpenCV for image preprocessing and TensorFlow for DenseNet deep learning to classify 22 different types of vehicle and localize them by point cloud data.
- **Mobile Robot with Particle Filter and Path Planning** Fall 2018
  Implementing a waypoint navigation system, a simultaneous localization and mapping (SLAM) system using 2D LiDAR, an A* path planning algorithm, and a visualization of the environment for a mobile robot.
- **Self-Balancing Robot with Path Planning** Fall 2018
  Integrated Mobile Robotics Cape with the Beaglebone, implemented a gyrodometric-based dead-reckoning navigation system, PID controlled the robot using IMU sensor feedback and used feedback from the Optitrack motion capture system to navigate a set of waypoints using A* planning algorithm.
- **6-DOF Robot Arm with an RGB-D camera** Fall 2019
  Combined forward kinematics, inverse kinematics, object detection, and color segmentation to let a 6-DOF robot arm do specified tasks automatically including grasping blocks to align in color order.

Awards

- Presidential Award, National Taiwan University 2015-2017
- International Design Awards (IDA), USA, Gold Winner June 2016
- STAM Student Thesis Competition, Taiwan, Second Prize Nov. 2016
- Bachelor Degree Thesis Award, National Taiwan University, Third Prize June 2017
- SPINTECH Technology Thesis Awards, Taiwan, Honorable Mention Sep. 2016
- Material Innovation Award, Taiwan, Honorable Mention Oct. 2016

Professional Service

- **UM Robotics Mentorship Program – Mentor** May 2019 – Present
  Mentoring a first year graduate student in the Robotics Institute at University of Michigan.
- **UM Discover Engineering – Workshop Organizer and Volunteer** July 2019 – Aug. 2019
  Helped design and organize a robotics coding activity for a two day camp for local high school students. Guided students in the workshop through the robotics line following and grasping task. The camp focused on increasing their interest in STEM, as well as over-viewing its academic and career paths.
- **Ann Arbor Summer Festival – KidZone Volunteer** July 2019
  Explained the theory and the usage of Lidar to local families.
- **ASME NTU Student Section, Taiwan – Secretary** Aug. 2016 – June 2017
  Held a series of lectures, co-organized Taiwan Student Professional Development Conference.
- **NTUME Student Association – Member** July 2015 – June 2016
  Held academic activities including a three-day corporate visit, and an honored alumnus speech.
- **NTU ME Summer Camp – Leader of Course Division** Feb. 2015 – July 2015
  Organized 3 speeches, 4 institution visits, and DIY activity for 100 participants.
- **NTU International Affairs – Student Volunteer** Sep. 2014 – June 2016
  Liaison for visiting students from France and Germany. Guided them through a campus and city tour, as well as introduced them to Taiwanese culture.
- **Taipei Astronomical Museum – Volunteer Docent** June 2013 – Aug 2014
  Guided visitors of all ages and many countries through the museum, advancing their understanding of astronomy.