

楊耀奮 YAO-YU, YANG

Ph.D. Candidate

Computer-Aided Engineering Group
Department of Civil Engineering
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SUMMARY

Highly interested in theory and practice in control engineering, especially in robotics. 4 years' experience in developing user interfaces for data visualization; tools include AWS, Node.js, d3.js, C/C++, C#. Familiar with device development using Arduino, RaspberryPi, Python, C/C++, ROS, and UART. Continuously acquiring knowledge about digital signal processing and machine learning control.

EDUCATION

Ph.D. in Civil Engineering, Specialization in Computer Aided Engineering, *Feb.2016 – Feb.2023¹*
National Taiwan University, Taipei, Taiwan.

- Thesis: Automatic Connection System for Civil Structures Using Novel Structural Connector Design and Rotary Crane Control Method, Supervised by Dr. Chia-Ming Chang and Dr. Shih-Chung Kang
- Course: Automation and Robotics in Construction(4.0/4.0), Data Visualization(4.0/4.0), Optimal Control(3.7/4.0)

Graduate Exchange Student, Department of Civil Engineering, Structural Engineering Division, *Aug. 2014 – Jul. 2015*
Bauhaus University Weimar, Weimar, Germany.

- Project: Portable Device and User Interface Prototyping for Structure Health Data Remote Monitoring, Supervised by Dr. Guido Morgenthal

M.S. in Civil Engineering, Specialization in Computer Aided Engineering, *Sep. 2012 – Jan. 2016*
National Taiwan University, Taipei, Taiwan. **(Skipped this degree to pursue Ph.D)**

- Thesis: Crowd-Based Velocity Measuring Method for Surface Flows, Supervised by Dr. Shih-Chung Kang

B.S. in Civil Engineering, National Taiwan University, Taipei, Taiwan. *Sep. 2008 – Jun. 2012*

- Interdisciplinary Team Project: BotBeep – An affordable warning device for wheelchair rearward safety, Supervised by Dr. Shih-Chung Kang and Dr. Pei-Chun Lin
- Course: Automatic Control Systems(3.7/4.0), Engineering Graphics(3.7/4.0)

HONORS

- **Best Paper Award.** "Structural Connector Design for Automated Modular Construction", Symposium on Construction Engineering and Management, Taiwan, 2020.
- **Doctoral Scholarship Award.** SINOTECH Foundation, Taiwan, 2018.
- **Travel Award for Conference.** Ministry of Science and Technology, Taiwan, 2017 & 2018.
- **Best Student Presentation Award.** "Crane-Based Autonomous Erection and Assembly System", International Conference on Civil and Building Engineering Informatics, Taiwan, 2017.
- **2nd Prize.** "Development of a Mobile Surface Flow Measuring Device Using Image Analysis", Master thesis Competition in Hydraulic Engineering Conference, Taiwan, 2013.
- **Innovation and Technology Group Scholarship Award.** "BotBeep – An affordable warning device for wheelchair rearward safety", CTCI Foundation, Taiwan, 2012.

PATENTS GRANTED

- **Yao-Yu Yang**, Chia-Ming Chang, Fang-Yao Yeh, Shih-Chung Kang, "Joint Structure and Method for Assembling a Joint Structure", Taiwan Patent Number I739649, Sep. 11, 2021.
- Shih-Chung Kang, Chia-Ming Chang, **Yao-Yu Yang**, Peng-Yuan Chen, "A Crane Bang-Bang Control Guiding Method for Sway Reduction", Taiwan Patent Number I671256, Sep. 11, 2019.
- Shih-Chung Kang, Pei-Chun Lin, Yung-Shun Su, Ci-Jyun Liang, Pei-Yi Lee, **Yao-Yu Yang**, Kevin Lin, Chuan-En Lee, "Early Warning Method and Device to Prevent Wheelchair from Tipping Over", US Patent Number 9549861, Jan. 24, 2017. Taiwan Patent Number I514335, Dec. 21, 2015.
- Tai-Shan Liao, Ko-Fei Liu, Shih-Chung Kang, Ching-Sheng Li, Tzong-Dar Wu, Shun-Chung Tsung, Wen-Sheng Lin, Chih-Chung Chou, **Yao-Yu Yang**, Ya-Wen Tang, Yi-Ju Chen, "Device and Method for Measuring Water Surface Flow Speed Based on Combination with Smart Mobile Device", Taiwan Patent Number I522619, Feb. 21, 2016.
- **Yao-Yu Yang**, Shih-Chung Kang, "Flow Velocity Measuring Method Participated in by Multiple Observers", Taiwan Patent Number I522620, Feb. 21, 2016.

PATENTS APPLIED

- **Yao-Yu Yang**, Chia-Ming Chang, Fang-Yao Yeh, Shih-Chung Kang, "Joint Structure and Method for Assembling a Joint Structure", US Application Number 17/167,339, Feb. 4, 2021.

¹ Expected graduation date.

LEADERSHIP & MANAGEMENT EXPERIENCE

- Robotic Lab Manager**, Department of Civil Engineering, National Taiwan University. *Feb. 2016 – Jul. 2018*
Maintained the laboratory safety, health, and equipment. Developed robotics courses for external and internal use. Organized internal training for lab members, for example, hands-on lectures on a robotic arm and 3D printer. Planned a guided tour for visitors around the world. Refined the lab-item borrowing process and developed a google-API based application for borrowing and tracking items.
- Community Service Club President**, Kind Kid Club, National Taiwan University. *Feb. 2012 – Aug. 2012*
Determined the elementary school for a 2-years service with my team. Sought support from neighbors around the school. Communicated with external stakeholders. Allocated the resources for project managers.
- Deputy Chief Technology Officer**, Microsoft Student Partners, Microsoft Taiwan. *Aug. 2009 – Jun. 2010*
Cooperatively organized 18 developer roadshows with 100 participants on average. Planned internal training for roadshow presenters with my team. Presented Microsoft robotic platform in 5 roadshows.

WORK EXPERIENCE

- Robotic Engineer Intern**, Smart Building Tech Co., Ltd., Taiwan. *Jan. 2020 – Dec. 2020*
Cooperated with a software engineer and a field engineer. Designed, built, and verified the small-scale automatic manufacturing machine for modular timber structures. Conducted market research in robotics education. My team won the grant award from 2020 national entrepreneurial SBIR-Stage 1.
- Student Researcher**, National Center for Research on Earthquake Engineering, Taiwan. *Jan. 2018 – Dec. 2019*
- Prototyping Engineer Intern**, GMTIB, Germany. *Oct. 2014 – Jul. 2015*
Developed a RaspberryPi-based device and a web-based UI for structure health data remote monitoring.
- Student Researcher**, Taiwan Instrument Research Institute, Taiwan. *Aug. 2013 – Dec. 2013*
- Student Researcher**, National Center for High-Performance Computing, Taiwan. *May 2013 – Oct. 2013*
Developed an Android APP measuring surface flows with a smartphone integrated with a portable laser device.
- Field Engineer Intern**, RSEA Engineering Corp., Taiwan. *Jul. 2011 – Aug. 2011*
- Field Engineer Intern**, You-Pin Construction Co., Ltd., Taiwan. *Jul. 2010 – Aug. 2010*
- Lab Intern**, Robotic Lab, Dept. of Civil Engineering, National Taiwan University, Taiwan. *Feb. 2009 – Aug. 2012*

RESEARCH EXPERIENCE

- Robust Active Vibration Control Using On/Off Actuation for Rotary Cranes** *Jan. 2019 – present*
Designed and built an electric rotary crane model for experimental use. Identified the crane dynamic system theoretically and experimentally. Implemented a real-time active vibration control with acceleration sensor feedback using LQG. Developed a simplified LQG-based on/off control with theoretical and experimental proof.
- Robotic Solution for Timber Framing** *Jan. 2020 – Dec. 2020*
Designed, built, and verified an innovative solution from scratch. The solution includes a magnetic frame supporting base and a duo-tool end effector integrated with a pneumatic gripper and a pneumatic nail gun.
- Autonomous Erection System: structural component, rigging mechanism, and control** *Jan. 2016 – Dec. 2019*
- Crane Guidance System for Sway Reduction** *Oct. 2017 – Sep. 2019*
Developed a guiding control system using a smart camera tracking the payload for stationary mounted cranes. Organized and executed lab-scale and full-scale experiments. Led the lab team and cooperated with a construction company. Identified external resources and customer needs.
- Clickstream Analytical Tool for Video Lectures** *Jan. 2016 – Feb. 2016*
Developed an analytical tool visualizing students' learning behavior with designed curves on a massive open online course.
- Real-time Data Visualization Tool for Geographic Data** *Oct. 2015 – Apr. 2016*
Cooperated with 2 software engineers to develop a web dashboard for slope-land monitoring. Built Nodejs server on AWS EC2. The server was capable of accessing AWS RDS MySQL database and fetched data for data visualization using d3.js on the client-side.
- Portable Device and UI Prototyping for Structure Health Data Remote Monitoring** *Oct. 2014 – Jul. 2015*
Developed a portable device recording and visualizing structural vibration data in real-time. The recorded data is downloadable via WIFI access.
- Crowd-Based Velocity Measuring Method for Surface Flows** *Oct. 2013 – Jul. 2014*
Developed a vision-based surface flow measurement method taking advantage of techniques including video-based motion magnification, crowdsourcing, statistical visualization.
- Portable Device for Surface Flow Velocity Measurement** *May 2013 – Dec. 2013*
Developed a vision-based real-time surface flow measuring Android-APP. The APP runs on a smartphone equipped and connected with a laser module.
- Affordable Warning Device for Wheelchair Rearward Safety** *Mar. 2011 – Aug. 2012*
Cooperated with a cross-functional team consisting of members coming from product design, marketing, civil engineering, and mechanical engineering background. Developed a vision-based Android APP real-time detecting the backward condition for wheelchair users. The APP runs on a smartphone equipped and connected with a laser module.

TEACHING

Teaching Assistant, National Taiwan University, Taiwan.

CIE5124 – Sky Classroom: Global Team Project (Spring 2018)

CIE5082 – Automation and Robotics in Construction (Fall 2016, 2017)

Workshops and Technical Presentations

- **Summer School of Robotics in Construction**, National Taiwan University (2016, 2017, 2018)
- **Development of Video Analysis APP**, National Center for High-Performance Computing, Taiwan (2013)
- **Robotics Solution Presentation**, Microsoft Student Partners, Microsoft Taiwan (2010)

SKILLS

- **Languages**: Mandarin Chinese and Hokkien (native), English (TOEIC: 845 Reading:415/495 & Listening:430/495), German (elementary).
- **Research**: Computer vision, Data visualization, Mechanical design and manufacture, Prototyping and experiment design, Real-time control design, Signal processing, System identification, Vibration measurement and control.
- **Programming Languages and tools**: Android, Arduino, C, C++, C#, Git, Java, LabView, Matlab, OpenCV, Python, VBA, Web: AWS(S3, EC2, RDS)/Node.js/CSS/D3.js/HTML/JavaScript.
- **Software**: Abaqus, AutoCAD, Fusion360, OS: Linux/Mac/Windows, ROS, Simulink, Sketchup, Tableau, TensorFlow,
- **Hardware**: 3D-printing, Arduino, dSpace, NI cDAQ/cRIO, Raspberry Pi, Robotic arm.

ONLINE COURSE CERTIFICATE & RELEVANT COURSEWORK

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|---|---|
| • Digital Signal Processing (in progress, Coursera, 2022) | • Digital Control System |
| • Deep Learning Specialization (Coursera, 2019) | • Digital Electronics |
| • Machine Learning (Coursera, 2016) | • Digital Visual Effects |
| • Elements of Structures (Edx, 2016) | • Object-Oriented Programming in C++/Java |

HIGHLIGHTED PUBLICATIONS

Y. Y. Yang, C. M. Chang, S. C. Kang, F. Y. Yeh (2021). Study on beam to beam structural connector for automated temporary bridge construction. *Journal of the Chinese Institute of Civil and Hydraulic Engineering*, 33(7), 529-534. doi: 10.6652/JoCICHE.202111_33(7).0006

F. Y. Yeh, **Y. Y. Yang**, B. H. Lee, S. Y. Shiao, C. M. Chang, K. C. Chang (2020). Study on truss-type segmental composite structure for temporary rescue bridge. *Journal of the Chinese Institute of Civil and Hydraulic Engineering*, 32(8), 683-691. doi: 10.6652/JoCICHE.202012_32(8).0002

Y. Y. Yang, & S. C. Kang (2017). Crowd-based velocimetry for surface flows. *Advanced Engineering Informatics*, 32, 275-286. doi: 10.1016/j.aei.2017.03.007

S. C. Kang, C. H. Tseng, W. T. Tsai, **Y. Y. Yang**, Y. H. Huang, *動起來！百變樂高機器人*. 精誠資訊 2009. ISBN: 9789866348143

