# Ted Li

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Robotics enthusiast.
Hack it, break it, and make it better.
A perceptive engineer who is always providing different perspective to problems with cross-domain knowledge.

Interests: Robotics | Machine Learning | Embedded System Design

## SKILL

| Software | Application | Tool |
|---|---|---|
| • Python | • RTOS | • Git, Docker |
| • Embedded C | • ML (TensorFlow, PyTorch) | • PyCharm, VS Code |
| • Visual C++ | • Image Processing (OpenCV) | • Raspberry Pi, STM32, ESP32 |
| • SQL | • Manipulator Motion Control | • Ubuntu, macOS, Windows |

## WORK EXPERIENCE

**Artesyn Embedded Technologies, Senior Firmware & Software Engineer** Jan 2019 – Jun 2022, 3Y6M

- Proposed an automatic tuning system via Proximal Policy Optimization (PPO) of reinforcement learning (RL) approach for server power supply (PSU) controllers by developing a data pipeline through dataset generation, model training, and deployment. Developed a Multilayer Perceptron (MLP) model as an RL environment model using PyTorch, TensorFlow, Python, and C. Achieved **87% accuracy** compared with Hewlett Packard Enterprise (HPE) PSU 3000 watts model output behavior and **reduced development time from 3 weeks to 8 hours**.
- Implemented a common security platform on a PSU embedded system in Embedded C for global R&D centers with dual bootloader stage and secure firmware image updating/verification/crypto; also developed a security toolchain.
- Developed a script-based automatic environmental chamber testing system in Python for a variety of conditions and sequences in collaboration with the EE team and **saved R&D time** from manual instrument testing.
- Consulted and provided **5+ training courses** on FreeRTOS RTOS system in Embedded C and utilized it in the PSU firmware system.
- Developed a PSU calibration framework in Python for a various calibration procedures and protocols of clients including Lenovo, Dell, HPE, and CRPS.
- Developed an Excel-based programming testing system on device protocol stress testing, behavior testing, and error exception handling testing in collaboration with the DQ team in Python. The system has become an essential tool for new project development.
- Initiated a general automated instrument control framework using Python to implement object-oriented programming architecture for better flexibility in software development which **supported 10+ instruments** of various type and brands, such as AC/DC Source, Power Meter, Electronic Load, Data Acquisition (DAQ). This framework can be easily implemented in different applications, especially for PSU calibration, automatic testing procedures, stress testing, and PSU controller automatic tuning.

**Signatude Co., Ltd, Firmware Engineer** Nov 2015 – Sep 2018, 2Y11M

- Established a versatile multi-channel analog/digital signal measurement system which channels' measurement and arithmetic calculation between channels were set by scripts. Realized the system using 3-stages of analog multiplexers to 24-bit Sigma-Delta ADC through controlling in MCU*2 and FPGA*1 and programming in CoOS RTOS and Embedded C.

- Developed an automatic calibration system in Python for the aforementioned measurement system and designed a calibration PCB board with a multi-stage relay. Used Python to control the PCI D/A card to provide accurate voltage and controlled the PCI I/O card to config the relay on/off to determinate source route. Also used GPIB protocol to control 6½ multimeter to compensate wire resistance. With this design, the system calibrated measurement, such as voltage, high/low current, and 2-wire/3-wire/4-wire resistance measurement.
- Established an IoT device of message integration platform for Big Data applications in Python and used MySQL database as a storage for data acquisition, firmware update, and IoT device configuration setup. Synchronized extra functionality of MySQL to SQL Server for special usage.

## EDUCATION

**The University of Electro-Communications, Tokyo, Japan** Apr 2014 – Mar 2015, 1Y

**The Japanese University Studies in Science & Technology (Exchange Study)**

- Research Project: Convolutional Neural Network based on Embedded System
- Focus: Machine Learning, Classification, Image Processing, Embedded System

**Tamkang University, New Taipei City, Taiwan** Sep 2012 – Jun 2015, 2Y10M

**M.S in Robotics Engineering**

- Thesis: Picture-Based Drafting System for Robot Manipulators
- Focus: Robotics, Manipulator Motion Control, Path Planning, Image Processing

**Feng Chia University, Taichung, Taiwan** Aug 2008 – Jun 2012, 3Y10M

**B.S in Automatic Control Engineering**

- Undergraduate Project: The Heating Constant Temperature Control System Design for New Strapping Machine
- Focus: Linear Control System, System Identification, Embedded System, Circuit Design

## RESEARCH EXPERIENCE

**Tamkang University Intelligent Automation and Robotics Center, Research Assistant** Jun 2012 – Aug 2015

- Innovated a manipulator drawing system in Python that recognizes complex line segments from sketches or pictures by image processing algorithms, such as Canny, Gaussian Blur, Contour Extraction … etc, and converts them into the manipulator's moving route with B-spline algorithm to eliminate jitter movements. Reduced manual design drawing track **from 16 hours to 3 minutes.**
- Developed a force sensor-free gripper system with high stability in Embedded C. The system calculates the torque needed to catch various objects by sensing the motor driver's current without needing extra definition parameters.
- Built a manipulator calibration system in Visual C++ that increases repeatability by using a joint resolver to eliminate backlash errors of the reducer and utilizes inverse kinematics calculation to improve precision.
- Devised a constant drawing force system on a non-flat surface using Fuzzy algorithm and Embedded C to compensate z-axis offset and design an analog device for z-axis compensation.

**Feng Chia University, Taichung, Taiwan** Sep 2011 – Jun 2012

- Built a new type of heater with a mathematical model. Designed a PID controller using Simulink and Autoregressive-Exogenous (ARX) system identification algorithm to estimate the parameters of the mathematical model. Used LabVIEW to control the heater system and reduced **42.9%** of steady-state time with steady-state error **<±0.6°C**.