YUE LINN CHONG

I believe intelligent robots are pivotal in solving global problems. I am a robotics Research Engineer and a Master of Engineering graduate with experience in deep learning, software engineering, mechanical design and fabrication, and electronics. My research interests include the field of machine learning for intelligent autonomous systems.

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Languages: Proficient: English and Bahasa Malaysia; Conversational: Mandarin
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1. WORK EXPERIENCE

Research Engineer @ Advanced Robotics Center, National University of Singapore (NUS) (2017 - 2021)

I am the lead of the perception team for the Autonomous Bus project. Our team developed and implemented the software stack which detects, classifies, tracks, and predicts trajectories of dynamic obstacles for a self-driving bus. I was the key contributor to the following:

- I developed the Robotic Operating System (ROS) sensor drivers for the embedded system on-board the bus.
- Using the Gazebo simulator, I developed the simulation of the autonomous bus.
- I wrote a custom plugin for the cost map for object detection.
- To track multiple detected objects across time, I implemented and tuned a Kalman filter-based tracker.
- I developed several methods for online future trajectory prediction of dynamic obstacles.
- I also headed the development of the Singapore Autonomous Bus (SGAB) dataset.

My non-technical contributions during this employment include the following:

- Writing grant proposals
- Event organisation management
- Student supervision and mentoring
- Outreach and demonstrations

2. INTERNSHIPS

Full-time Intern @ Special Vehicle Operations Unit, HOPE Technik Pte Ltd (May - Jul 2015)

During this internship, I had two projects.

- The main project was to retrofit a land rover for mobile DJ performances by incorporating a stage, speakers, and other performance equipment. My tasks included the mechanical design, procurement, in-house manufacturing, and assembly for this project.
- My second project was to conceptualize, design, manufacture, and test an air cannon and its ammunition.

Part-time Intern @ NUS in collaboration with National University Hospital (NUH) (Jul - Sept 2014)

This project aimed to develop an automated catheter to assist surgeons during non-invasive surgeries such as heart operations. The robot developed had to be small to fit into the arteries of a human yet move with high precision at the command of the surgeon. I was tasked with the following during my internship:

- I did a literature review on existing methods used in robotic catheters and related surgeries.
- I developed a prototype of the actuation system using soft robotics.

3. EDUCATION

National University of Singapore (2018-2020)

I did my Masters by Research (MEng) under Prof Marcelo H. Ang Jr. My thesis was entitled “Trajectory Prediction of Dynamic Obstacles for Autonomous Vehicles”. The following is the contributions of my thesis:

- Several methods for online trajectory prediction for deployment on an autonomous vehicle were studied and implemented.
- The deep learning method with the Autoencoder model using Gated Recurrent Units (GRUs) performed the best.

National University of Singapore CAP: 4.44/5.0 **(2013-2017)**

I was granted the Singapore-ASEAN scholarship to study my undergraduate degree under the following programs:

- Mechanical Engineering major (BEng)
- Innovation and Design Centric Programme (iDCP)
- Computer Science minor
- Awards: Dean Lister

Hong Kong University of Science and Technology **(2016)**

- NUS Student Exchange program (6 months)

4. SELECTED PROJECTS

Hydrone Project (2015-2016)

Hydrone is a UAV developed for water environments by a team of multidisciplinary students. The project was presented at Maker Faire Singapore. Our team also won the runner up at the Intel Invent 50. My work under this project was as follows:

- I did the mechanical design for the waterproof chassis of the UAV.
- I also did the fabrication of the chassis. The final prototype of the UAV could land on and take off from water.

Autonomous Underground Train Tracks Inspection Robot (2016 - 2017)

This robot performed the inspection of tunnels for underground trains. This is my Final-Year-Project for my undergraduate degree. The project was selected to present at the International Senior Project Conference 2017. My contributions to the project are as follows:

- I developed thermal image processing methods to automate the detection of leaks in train tunnels.
- I programmed the Arduino microprocessor to interface with the gyroscope and accelerometer sensors to automate the checking of the cross slope of the train rails.
- I designed and fabricated mounts for the sensors onto the robotic platform.

Donkeycar Project (2018 -2020)

This project introduces high school students to the field of robotics, through hands-on learning of electronics, Python, and deep learning. The curriculum is based on the Donkeycar project which aims to make remote control (RC) cars autonomous. My role as a mentor in this project includes the following:

- I assembled the hardware and soldered the electronics required for the project.
- I taught the students the implementation of the software to run the Donkeycars autonomously.

5. PUBLICATIONS AND ACADEMIC WORK

- Yue Linn Chong, Huiyu Leong, Christina Dao Wen Lee, and Marcelo H. Ang, Jr. ***"Benchmarking Sensing and Motion Planning Algorithms for Autonomous Driving"*** presented at IROS 2020 Workshop.
- Yue Linn Chong, Liushifeng Chen, Christina Dao Wen Lee, Chongjiang Shen, Marcelo H. Ang Jr., and Ken Kok Hoe Chan. "***Towards an Autonomous Bus: Dynamic Obstacle Detection, Tracking, and Prediction"*** submitted for ICRA 2021. (Under Review)
- Jiahao Chen, Yue Linn Chong, and Marcelo H. Ang, Jr. "***Data-oriented Trajectory Prediction for Road Vehicles"*** submitted for ICRA 2021. (Under Review)
- ICRA & RA-L 2021 reviewer

6. SKILLS

My programming skills are as follows:

- ROS, Tensorflow & Keras (deep learning), CUDA
- Languages: C & C++, Python, Arduino, Matlab/Octave

Other mechatronics skills include:

- Mechanical design with Computer-Aided Design (CAD) software such as Solidworks and Autodesk Inventor
- Electrical skills including soldering, programming for Arduino and Raspberry Pi, and signal processing