

## **CHONG YUE LINN**

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### **1. WORK EXPERIENCE**

**Research Engineer @ National University of Singapore (NUS) (Sept 2017 - Jan 2021)**

- Perception lead on the Autonomous Bus project
  - The objective is to detect, classify, track and predict trajectories of dynamic obstacles for a self-driving feeder bus. Please see Section 4 for more details.
  - Attached to the Advanced Robotics Center (ARC)
- Other tasks:
- Grant proposals and MOUs writing
  - Organisation and management of events
  - Student supervision and mentoring
  - Outreach and demonstrations
  - Lab occupational first aider
  - ARC webmaster and server management

### **2. INTERNSHIPS**

**HOPE Technik Pte Ltd (Special Vehicle Operations Unit) (May – July 2015)**

- Design and manufacture vehicle modifications/add-on features for the RedBull landy
- Conceptualize, design, manufacture and test air cannon and projectiles

### **3. EDUCATION**

**National University of Singapore (NUS) (2018-2020)**

- Masters by Research (MEng)
- Thesis title: Trajectory Prediction of Dynamic Obstacles for Autonomous Vehicles

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

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

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

- Student Exchange Programme under NUS

### **4. PROJECT WORK/ COMPETITIONS**

**MEng thesis: Trajectory Prediction of Dynamic Obstacles for Autonomous Vehicles (2018-2020)**

Predicting future positions of dynamic obstacles is critical for safe and robust path planning in autonomous vehicles. This thesis studied and implemented several methods for online trajectory prediction for deployment on an autonomous vehicle. The deep learning method with the Autoencoder architecture using Gated Recurrent Units (GRUs) performed the best.

**Autonomous Bus Project (2017 - 2021)**

This is a 3-year project awarded by the Land and Transport Authority (LTA) of Singapore to develop autonomous buses for a feeder service. My team focused on the task of dynamic obstacles detection, tracking and trajectory prediction for these autonomous buses. My contribution during the project are as follows:

- Integration work, including development of sensor drivers for the embedded system on-board the bus
- Simulation development of the autonomous bus in Gazebo for ROS
- Costmap for object detection
- Kalman filter track-by-detection multi-object tracker
- Dynamic object trajectory prediction

## **Donkeycar Project**

**(2018 -2020)**

This project aims to introduce 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:

- Preparing the hardware and electronics required
- Teaching and implementing the software to run the cars, as well as to make them autonomous

## **MRT Inspection Robot**

**(2016 - 2017)**

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

- Thermography and image processing of tunnels for leak detection using OpenCV-Python
- Programmed Arduino microprocessor for gyroscope and accelerometer sensors
- Design and prototype sensor mounts and relevant equipment

## **Hydrone Project**

**(2015-2016)**

- The Hydrone is an UAV developed for water environments which I did mechanical design for in 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

## **Engineering Good Student Chapter (Technology Development Programme)**

**(2016-2017)**

- Design, prototype and test a system for wheelchairs to overcome the stairs in front of older HDB flats
- We worked closely with SPD to design a solution for their wheelchair bound clients living in older Housing and Development Board (HDB) flats which have 2 to 4 steps leading up to their front door.

## **HackUST (HKUST Hackathon)**

**(2016)**

- Developer for team FLUSH, which aims to solve the excessive queuing problem at female toilets
- Developed prototype for solution using Android screen displays indicating queues at nearby toilets

## **Project Nancy**

**(2016)**

- During the summer term break, I looked into user interfaces on laptops for the elderly.

## **Electric bicycle generator exhibition**

**(2016)**

- I worked in a multidisciplinary team of undergraduate and postgraduate students to simulate electricity generation from exercise bicycles.

## **HEAL Hackathon**

**(2015)**

- Under the HEAL Hackathon, I was part of a team who aimed to provide an intuitive user interface for data entry and analysis during post disaster relief efforts for Save the Children.

## **Adipose Stem Cells Harvesting**

**(2014)**

- This project was done during an internship under NUS in collaboration with Biopolis. This project aims to assist scientists by automating the stem cell preparation prior to extraction.

## **Catheter Robotics**

**(2014)**

- This project was done during an internship under NUS with collaboration with the NUH. This project aims to develop an automated catheter to assist surgeons during non-invasive surgeries.
- I was tasked to develop an actuation system using soft robotics as a means of actuation for catheters used in non-invasive surgeries such as in 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.

## 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\*, Christina Dao Wen Lee\*, Liushifeng Chen, Chongjiang Shen, Marcelo H. Ang Jr, Ken Kok Hoe Chan. *Perception Pipeline Implementation on NVIDIA Drive PX2 and NVIDIA Drive AGX Xavier*, will be presented at Nvidia GTC 2021.
- 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 IEEE International Conference on Robotics and Automation (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)
- Zhikai Li, Krittin Kawkeeree, Yue Linn Chong, Christina Dao Wen Lee and Marcelo Ang. *ALOT: Augmented Localization with Obstacle Tracking*, submitted to [\*16th International Conference on Intelligent Autonomous System \(IAS-16\)\*](#) (Under Review)
- ICRA & RA-L 2021 reviewer

## 6. SKILLS AND INTEREST

### Programming

- Proficient libraries/tools: ROS, Tensorflow & Keras (deep learning), CUDA
- Languages (Advanced Proficiency): C & C++, Python, Arduino, Matlab/Octave
- Languages (Practical Proficiency): Latex, HTML & CSS, Android

### Design and Prototyping

- Mechanical design — Computer Aided Design (CAD)
  - Experienced: Solidworks, Autodesk Inventor
  - Elementary: Autodesk Maya, Autodesk Fusion 360
- Design-centric rapid prototyping
- Elementary electronics: Soldering, Raspberry Pi, Arduino, signal processing, etc.

### Other Skills

- Language: Proficient in English and Malay
- Formal/ legal Writing: Grant proposals and MOUs

### Research Interests

- Machine learning for robotics
- Precision agriculture
- Robotics in agriculture