# KAI-CHIEH MA (Mark)

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## EDUCATION

**University of Southern California (USC), Los Angeles, USA** Aug 2015 – May 2017
Master of Science in Computer Science (Intelligent Robotics), **Distinguished Student Award** GPA: 3.8/4.0

**National Taiwan University (NTU), Taipei, Taiwan** Sep 2008 – Jun 2012
Bachelor of Computer Science & Information Engineering (CSIE) Rank: 39/105

## SKILLS

**Language:** C++, Python, Matlab, Java, LaTeX **Tools:** ROS, OpenCV, Git, SVN, Linux, Docker, AWS, CI
**Skills:** Robotics, Motion Planning, State Estimation, Markov Decision Process, Machine Learning, Computer Vision

## WORK EXPERIENCE

**TuSimple** San Diego, USA
**Robotics Software Engineer** July 2017 – Present

- Worked on planner software system for autonomous trucks in highway scenarios
- Designed and developed state machines for autonomous driving decision making system
- Researched and implemented optimization-based motion planning algorithms for trajectory generation
- Hands-on experience on level-4 autonomous car/truck road tests on highways

**USC Robotic Embedded Systems Laboratory** USA
**Research Assistant** Oct 2015 – May 2017

- Researched on route planning and learning for aquatic vehicle in unstable and unknown aquatic field
- Designed and implemented "Informative Planning and Online Learning" using ROS (Robot Operating System) on an autonomous boat and did experiments on actual environment
- Published 3 conference papers and 1 journal paper as first author on ICRA 2017, IROS 2016, DARS 2016 and Journal of Field Robotics

**Cyberlink Corp.** Taipei, Taiwan
**Software Engineer, RD-ME-PowerDVD (19 team members)** Aug 2012 – Mar 2014

- Developed PowerDVD 12, 13, 14 products (PowerDVD 12/13 Taiwan Excellence Award 2013/2014)
- Handled PowerDVD specification requests from OEM clients within tight schedule (HP, Dell, Lenovo, etc.)
- Improved DVD/Blu-ray disc playback user experience by constructing various user-friendly GUI controls

## PROJECT EXPERIENCE

**Multi-Robot Simultaneous Localization and Mapping (SLAM)** Oct 2016 – Dec 2016

- Implemented particle-based FastSLAM2.0 for landmark-based mapping and 2D mobile robot localization
- Extended the particle filter to multi-robot SLAM with unknown initial poses
- Estimation of robot motion and measurement model parameters using maximum likelihood estimation
- Used C++ and ROS for the system implementation and visualization

**Machine Learning: Santander Customer Satisfaction Competition** Feb 2016 – Apr 2016

- 3rd place among all groups (21) in the class and 566th out of 5236 groups participating the competition
- Solved supervised binary classification using gradient boosting and decision trees

**RoboCup Standard Platform League** April 2012 – Jun 2012, Sep 2014 – Dec 2014

- Represented NTU Robot Perception and Learning Lab (5 participating students) and made to top 12 in the competition in 2012
- Built robot software system from scratch within 3 months
- Devised goal post & soccer ball object recognition algorithms
- Applied sonar-based Occupancy Grid Mapping for obstacle detection
- Implemented robot-to-robot (4 robots) communication via Wi-Fi
- Revised goal post detection for new rules in 2015 RoboCup (2014)
- Researched on motion planning under Partially Observable Markov Decision Process (POMDP) (2014)

**Extended Kalman Filter Localization** Dec 2011 – Feb 2012

- Solved localization problem for mobile robot in real environment
- Implemented line feature extraction via Hough Transform based on 2D-laser data points
- Associating features with given map features to achieve robot pose correction