# ZHEKAI (SCOTT) JIN

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## EDUCATION

**The Cooper Union for the Advancement of Science and Art**

B.Eng in Electrical Engineering - Computer Engineering track *Projected June 2019*

Grades Major GPA: 3.84/4.00   Overall GPA: 3.66/4.00

Honors Eta Kappa Nu, Tau Beta Pi, Dean's List, School Honors, Half Tuition, Innovation Merit

**Hangzhou Foreign Languages School** *Sept. 2012 - May 2015*

Graduated as Class Valedictorian

## PUBLICATION

**A MultiSensor Data Fusion Approach For Simultaneous Localization And Mapping**

**Zhekai Jin**, Yifei Shao, and Minjoon So

IEEE Region 1 Annual Student Conference (StuCon), 2019, Manuscript Submitted

1st Place in the IEEE Region 1 2019 Student Papers Competition, Oral Presentation at StuCon

## ACADEMIC RESEARCH

**Cooper Mapper : Self-Driving Robot with MultiSensor Data Fusion** Sept. 2018 - Present

*github.com/ZhekaiJin/the-Cooper-Mapper*

· Implemented real-time 2D Lidar SLAM and Stereo Visual SLAM based on Cartographer & ORBSLAM
· Refactored and extended LOAM with map management, relocalization, and pose-graph optimization
· Working on robust resolution matching algorithms to reduce extrinsic multisensor calibration effort

**Cooper-IoT : Generic IoT Platform with Telepresence Utilty** Jun. - Dec. 2017

*github.com/ZhekaiJin/Cooper-IoT*

· Led a team of five designing IoT network for human traffic flow study with a stochastic queuing model
· Devised real-time WiFi & Bluetooth address tracking algorithm based on an implementation of wireless sensor network which is designed for peripheral environmental parameters acquisition
· Designed human detection algorithm with OpenCV to count and monitor human traffic flow
· Implemented real-time data-driven scheduler of lighting & heat and Achieved average 2% energy saving
· Realized Telepresence by presenting Mixed Reality and Stereo Rendering: integrating camera feed from robots & peripheral environmental data to head-mounted displays (S-PTAM, Unity, C#, C++)

## PROFESSIONAL EXPERIENCE

**Momenta.ai : Lidar Research & Development Intern** May - Aug. 2018

*Lidar Team & HD map Team on an end-to-end Lidar Perception system* *Beijing, China*

· Devised efficient Ground Detection & Semantic Road Segmentation algorithms with 98% precision
· Refactored Object Segmentation Modules with 20% memory usage drop by specialized structures
· Designed and implemented a robust real-time Object Tracking pipeline which is able to track even sparse point clouds based on 3D Interpolation, now deployed at Momenta's L4 self-driving solution.

**Totem Power Inc. : System Research & Development Intern** Jun. - Aug. 2017

*Independent Research Project on a complete wireless charging system for Drones* *Bedford Hills, NY*

· Implemented circuits to incorporate security into wireless charging technologies without firmware breach and agile enough to ensure stable power transmission with minimal weight on the drone.
· Designed monocular-vision-based precise landing algorithm to counter the charging range limitation
· Presented a fully autonomous wireless charging pipeline which could perform charging for multiple drones in a queuing fashion under its coordination. (ARM, C)
· Developed RESTful APIs and workflow in a distributed environment for the real-time charging status monitoring website with visualization. (D3.js, Python, C)

**Didi Chuxing Technology Co. : Software Research & Development Intern** Apr. - Jun. 2017

*Dispatch Team on intelligent dispatching and dynamic pricing* *Hangzhou, China*

· Worked on automatic feature extraction on probabilistic time series forecasting models (PCA, LSTM)
· Turned Redis sentinel mode to proxy + consistent hashing mode with Redis latency reduced by 20%
· Automated tests with TestNG and Mockito and reached code coverage of 99%

**Shanghai IC R&D Center Co., Ltd. : Research Intern**                    May - Aug. 2016
*Circuit Testing Team*                                                    *Shanghai, China*
- Designed PCB boards and circuits for CCTV cameras. (Altium, SystemVerilog, Cadence Virtuoso)
- Conducted various tests on performances of CCTV cameras PCB boards

## ACADEMIC PROJECTS

**EventPlus : Personalized Event Recommendation System**                 April. 2018 - Present
*github.com/ZhekaiJin/EventPlus*
- Developed an interactive web page which allows users to search events and purchase tickets (JavaScript)
- Improved personalized event recommendation based on search history and favorite records
- Designed content-based recommendation algorithms to implement curated event recommendations
- Created Java servlets with RESTful APIs to handle HTTP requests and responses

**Tap News : Real Time News Scraping and Recommendation System**         Mar. - May. 2018
*github.com/ZhekaiJin/Tap-News*
- Implemented a data pipeline which monitors, scrapes and dedupes latest news (Redis, RabbitMQ)
- Built a web application for users to browse news (React, Node.js, RPC, SOA, JWT)
- Implemented a click event log processor which collects users' click logs to update preference models
- Designed and built an offline training pipeline for news topic modeling (Tensorflow, DNN, NLP)
- Deployed an online classifying service for news topic modeling using the trained model

**Pass2act : Passive Voice to Active Voice Article Converter**           Mar. 2018
*github.com/ZhekaiJin/pass2act*
- Rated the best Natural Language Processing final project of the 2017 - 2018 academic year
- Designed decision tree able to handle conjugation & embedded passive sentences based on linguistics
- Built visualization rendering the transformation process with dependency parsing (spaCy, Python)

**Textcat : Text Categorizer based on Naive Bayes method on Unigrams**   Feb. 2018
*github.com/ZhekaiJin/Textcat*
- Ranked 3rd place in performance among 107 classifier implementations throughout course history
- Implemented novel smoothing on Naive Bayes method to achieve over 90% accuracy on test corpus

**Collaborative Online Judge System : Cooperative Online Editor**        Jan. 2018
*github.com/ZhekaiJin/Collaborative-OJ*
- Implemented a web-based collaborative code editor supports multiple access/editing (Socket.io, Redis)
- Developed a web application for attempting coding problems like Leetcode (MEAN, Auth0)
- Built a user-code executor service which builds and executes users code (Docker, Flask)
- Refactored system throughput to 150% by decoupling services (REST) and loading balancing (Nginx)

**Celestial Mechanics Application : Fuel-efficient Spaceship Trajectory Study**    May. 2017
*github.com/ZhekaiJin/Celestial-Mechanics-Application*
- Implemented solarsystem animation based on OpenGL GLUT (C++)
- Optimized fuel-efficient spaceship trajectory based on three-body model & four-body model (Python)
- Explored deterministic chaotic phenomenon within optimal path searching (OpenGL & C)

## LEADERSHIP & EXTRACURRICULAR ACTIVITIES

Cooper HyperLoop - Communication Team Lead                               Sept. 2018 - Present
Cooper Union Computer Center - System Administrator & Operator           Sept. 2017 - Present
Cooper Union SMAC$^2$ Lab - Initiator & Lead Research Assistant          Jun. 2017 - Present
HackCooper Hackathon - Software & Embedded Programming Mentor            Oct. 2018
Cooper Motorsport (Cooper Formula SAE) - Electronics Team Vice Lead      Sept. 2015 - Sept. 2017

## COMPUTER SKILLS

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|---|---|
| **Languages** | C++, C, Java, Python, Go, MATLAB, JavaScript, SQL, Shell Scripting |
| **Databases** | MongoDB, Cassandra, DynamoDB, Oracle, MySQL, PostgreSQL, MsSQL |
| **Technology** | MRPT, PCL, Ceres, g2o, gtsam, Webots, scikit-learn, NLTK, PyTorch, Kafka, Hadoop, Spark, Pig, Tomcat, AWS RDS/Lambda/EC2/EMR/S3 |
| **Training** | Robotics Engineer Nanodegree, Self Driving Engineer Nanodegree @ Udacity |