

Zhengwei Bai

POSTGRADUATE STUDENT · ELECTRONIC INFORMATION AND ENGINEERING

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Summary

I'm now a postgraduate student in Beijing Jiaotong University (BJTU) and majoring in ITS (Intelligent Transportation System) especially in CAV (Connected and Autonomous Vehicle) technology and IVICS (Intelligent Vehicle Infrastructure Cooperative System). My core skills are the application of machine learning algorithms, autonomous control algorithm, and development of software and embedded system. I'm interested in devising a better problem-solving method for challenging tasks and learning innovation technologies which will enhance the development of the intelligent control system.

Education

BJTU(Beijing Jiaotong University)

Beijing, China

M.S. IN TRANSPORTATION INFORMATION ENGINEERING AND CONTROL

Oct. 2017 - Jul. 2020

- Majored in the I-VICS (Intelligent Vehicle Infrastructure Cooperative Systems) and CAV (Connected and Autonomous Vehicle).

BJTU(Beijing Jiaotong University)

Beijing, China

B.S. IN ELECTRONIC INFORMATION AND ENGINEERING

Oct. 2013 - Jul. 2017

- Majored in Rail Transportation Signal and Control.
- Awarded the title of outstanding graduates in Beijing Jiaotong University.

Skills

Programming

Python: Application of Deep Learning and Reinforcement Learning Algorithms

C: Application of the embedded systems

C++: Application of the MFC software development

C#: Application of the Unity-ML Based Simulation Environment Development

Java: Application of a spring framework based Java EE project (Siemens: ITIMS)

HTML/CSS/Javascript: Application of the Personal Website development

Embedded Systems

STM32: Application of the Novel CTCS (Chinese Train Control System) simulation system

C51/MSP430: Application of the Beijing Electronic Design Competition

Algorithms

Deep Learning: Application for A Research About The Steering Angle Control Method (Spatiotemporal LSTM Network)

Reinforcement Learning: Application for a Research About The High Level Driving Policy Determination Method

Deep Neural Network: 2D-CNN, 3D-CNN, Faster-RCNN, Mask-RCNN, RNN, LSTM, ConvLSTM

Research & Work Experience

Siemens Ltd. – ITIMS (Intelligent Transportation Information Management System)

Zhuhai, China

SOFTWARE ENGINEER

Jun. 2018 - Oct. 2018

- Designed and Developed Five Software Modules of the ITIMS including bus, taxi, intersection, traffic signal,s and flow detection modules.
- Developed several high-reliable multi-source data API (Application Programming Interface) which connects to major transportation information database such as The Traffic Police Database in Zhuhai.
- Management and maintenance overall service infrastructure utilizing remote controller(Using Teamviewer, Xshell and Xftp), Oracle & Mysql database.

BJTU ITS Lab. – Machine Learning Based Autonomous Vehicle Control Methods

Beijing, China

PROJECT RESEARCHER & SOFTWARE ENGINEER

Oct. 2017 - PRESENT

- Proposed a deep neural network called spatiotemporal LSTM to generalize the steering angle output by fitting in the raw image data.
- Proposed a deep Reinforcement Learning (deep RL) based high-level driving behavior decision-making algorithm.
- Developed a simulation environment based on the Unity3D Engine for the training and testing processes of the deep RL algorithm.

Siemens Ltd. – Sangtian Island Autopilot Test Site Construction Proposal (Winning bid)

Suzhou, China

PROPOSAL AUTHOR

Jul. 2018 - Aug. 2018

- Analysis of equipment layout requirements (such as video perceptive equipment, V2X communication equipment, geomagnetic sensors, etc.) of the Sangtian Island test site.
- Designed the automatic driving test scenarios based on site characteristics (such as the car-flowing scenario, overtaking scenario, obstacles recognition, etc).
- Wrote the most part (over 80%) of the whole proposal (20134 words in total) and made a presentation to the local transportation department.

BJTU GNSS Lab. – High-speed Railway Based BeiDou Fusion Positioning Performance Test

Shenyang, China

SOFTWARE ENGINEER

May. 2018 - Jun. 2018

- Setup the test environment for the testing of the performance of the GPS, BeiDou and IMU fusion positioning under high-speed motion scenario.
- Using device SPAN, UB380 recorded IMU and GPS/BeiDou information separately.
- Continuous testing on the Beijing-Zhangjiakou Railway (On the CR400 Train) for 7 days, 10 hours a day.

China Railway Urumqi Railway Administration Group Co.,Ltd – Field Strength Test System

Urumqi, China

PROJECT RESEARCHER & SOFTWARE ENGINEER

Sep. 2016 - Jun. 2017

- Design and developed a MFC framework based windows software (about 15000 lines of C++ code) for the novel wireless field strength test (FST) system.
- Developed and tested the hardware system (collecting and packaging the sensor data such as ODO, GPS and TAX) of the FST system.
- Testing the whole FST system between Urumqi railway station and Akesu railway station (2018km in total).

Honors & Awards

HONORS

2017	Graduate students first-class scholarship , Beijing Jiaotong University	Beijing, China
2017	Outstanding graduates , Beijing Jiaotong University	Beijing, China
2015	China National Scholarship , Beijing Jiaotong University	Beijing, China
2015	Merit Student , Beijing Jiaotong University	Beijing, China
2015	Excellent Student Cadre , Beijing Jiaotong University	Beijing, China

AWARDS

2018	2nd Prize , "BJTU Huiguang Cup" Graduate Academic Culture Festival Essay Competition	Beijing, China
2016	1st Prize , "Nokia Cup" Innovation Competition Final	Beijing, China
2016	3rd Prize , College Students' innovation and entrepreneurship projects	Beijing, China
2016	2nd Prize , Beijing Electronic Design Competition Final	Beijing, China
2014	3rd Prize , BJTU C Language Programming Competition Final	Beijing, China
2014	3rd Prize , National College Student Physics Competition Final	Beijing, China
2014	3rd Prize , BJTU Mathematical Modeling Competition Final	Beijing, China

Papers

Z. Bai, B. Cai, W. Shangguan and L. Chai, "Deep Learning Based Motion Planning For Autonomous Vehicle Using Spatiotemporal LSTM Network", Chinese Automatic Congress, Dec 2018

Accepted by CAC2018

Oct. 2018

- proposed a deep learning based control modal (named as spatiotemporal LSTM network), which is able to generate a real-time steering angle reflection based on raw image input.
- Compared with the Geo Hotz's method (Comma.ai open source method) and got a better performance.
- The experimental demonstrate that the proposed model can generate a robust and accurate visual motion planning results for autonomous vehicle.
- Dataset : The comma.ai driving dataset (<http://research.comma.ai/>)

Z. Bai, B. Cai, W. Shangguan and L. Chai, "Deep Reinforcement Learning Based High Level Driving Policy Determination Under Hybrid Traffic"

Submitted to CCC2019

Jan. 2019

- Proposed a deep reinforcement learning based method that can generate the high level driving policy to make the CAV driving through a hybrid dense traffic flow at a higher speed with less lane change.
- Developed a Unity ML based simulation environment for the training and testing processes.

Z. Bai, Design and Implementation of Novel Wireless Field Strength Test System

Undergraduate Thesis

May. 2017

- Designed a novel wireless field strength test system and implemented in China Railway Urumqi Railway Station.
- Developed a embedded system that pre-processes the multi-sensor data (Encoding the multi-sensor raw data).
- Developed a windows software system for package decoding (Multi-sensor data transition), data analysis (Fusion position) and results visualization on the monitor (Mileage and field strength real-time curve).

Webpage & Blog

ZhengweiBai : A Personal Website

FOUNDER, DEVELOPER & WRITER

- Introductions & Tutorials about personal research, machine learning algorithm, and autonomous vehicle development

www.zhengweibai.com

Mar. 2018 - PRESENT

Github Page

FOUNDER & WRITER

- Open source to share the code and tutorials with developers all around world.

github.com/zwbai

Mar. 2017 - PRESENT

CSDN Blog : Tutorials for Developers in Start-up

FOUNDER & WRITER

- Tutorials for developers in simulation development, Autonomous Driving and Linux based development.

blog.csdn.net/Michael_Bzw

May. 2018 - PRESENT

Presentation

Suzhou Autonomous Driving Test Field

Suzhou, China

PRESENTER FOR <THE INTEGRATED SOLUTION FOR SUZHOU AUTONOMOUS DRIVING TEST FIELD>

Jul. 2018

- Introduced the integrated solution for Suzhou Autonomous Driving Test Filed (Research Background, Current development, Proposed solution, Development Planning)

Deep Learning Based Motion Planning For Autonomous Vehicle Using Spatiotemporal LSTM Network

Xi'an, China

PRESENTER FOR <CHINESE AUTOMATIC CONGRESS 2018: UNMANNED CONTROL SYSTEM SESSION>

Dec. 2018

- Introduced the proposed framework for motion planning for autonomous vehicle (Self Intro., Project Intro., DL algorithm, Experiment & Result, Conclusion)

Extracurricular Activity

China International P&E

Beijing, China

VOLUNTEER

Apr. 2015

- Volunteer work during the 18th China International Photograph and Electrical Imaging Machinery and Technology Fair.
- Got a special award for the contribution to the 18th China International P&E.

APEC Youth Program

Beijing, China

VOLUNTEER

Nov. 2014

- Volunteer work during the 2014 APEC Youth Program, which was successfully held in Beijing during 3-10 November, 2014.
- Got a special award for the contribution to 2014 APEC Youth Program.

References

Dr.Baigen Cai (Advisor)

Beijing Jiaotong University

SCHOOL OF ELECTRONIC AND INFORMATION ENGINEERING

Professor

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Dr.Wei ShangGuan (Advisor)

Beijing Jiaotong University

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Professor

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