

Jongseo Choi

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Education

Technical University of Chemnitz (Germany)

Oct 2018 – Sep 2020

M.Sc. Automotive Software Engineering

- Implementation of a communication system with Raspberry Pi and Arduino
- **Courses:** Design SW for Embedded Systems, machine learning, multi-core system, Real-time system, Dependable system, AUTOSAR, etc.

Chungbuk National University (S.Korea)

Mar 2008 – Jan 2015

B.Sc. Electronic Engineering

(including 2 years military service)

- Development of a line tracer robot using an infrared sensor, a DC motor, and an Atmega microcontroller
- Development of a mini-wheelchair controlled by a wireless helmet using an accelerometer and gyro sensor

Experience

Senior SW Engineer (ThorDrive, S.Korea)

Nov 2020 – Present

- Development of Autonomous Shuttle/Taxi Solutions
- Development of Automated Parking Path Planning Solutions
- Identification of Issues and Evaluation Scenarios for Multiple Autonomous Driving Systems
- Development of Risk Assessment and Safe Driving Solutions for Hazardous Areas
- Development of Trajectory Optimization Solutions for Autonomous Driving
- Development of a Logistics Automation Solution Using Tow Tractors at Incheon Airport (with Korean Air)
- Development of Automation Solutions Utilizing Mobile Robots in Warehouses

Intern, Autonomous Driving Department (IAV GmbH, Germany)

Sep 2019 – Aug 2020

- Development of Lane-change intention detection module using machine learning

QC/QA Engineer (Hyundai Mobis, S.Korea)

Jan 2015 – Mar 2018

- Analysis of ADAS Electronic Components Failures and Derivation of Improvement Measures
- Field Defect Management of ADAS Components in Korea and Europe

Projects

Autonomous Mobile Robot (ThorDrive)

2024.01 - Present

- Development of Automation Solutions Utilizing Mobile Robots in Warehouses
 - Period: 2024.01 - now
 - Result: a multi-agent system embedded in FMS
 - Skills: standard (VDA5050), task allocation (auction), MAPF (CBS, SIPP, ADG), robust execution and replanning (ADG), MQTT, Unit Test, Test-Driven Development (TDD), static analysis, dynamic testing, memory management
 - Tools Used: ROS, simulator (MVSIM, Isaac Sim), Eclipse Mosquitto, SW verification (GoogleTest, Valgrind, clang-tidy), CI/CD (Azure pipeline, Git, Docker)

Autonomous Vehicles (ThorDrive)

2020.11 - Present

- Development of Autonomous Shuttle/Taxi Solutions
 - Period: 1+ years (2020.11 - 2022.04)
 - Result: a jerk-minimized velocity planning module

- Skills: ST map, MPC, QP, LQR
- Tools Used: ROS, Carla simulator, optimization solver (OSQP), OpenCV
- Development of Automated Parking Path Planning Solutions
 - Period: 6 months (2022.04 - 2022.10)
 - Result: a path planning module for parking service
 - Skills: Reeds-Shepp, Kinodynamic-RRT*, Hybrid A*, QP
 - Tools Used: ROS, Carla simulator, OMPL (Open Motion Planning Library)
- Identification of Issues and Evaluation Scenarios for Multiple Autonomous Driving Systems
 - Period: 4 months (2022.07 - 2022.11)
 - Result: a paper published in Autumn Annual Conference of IEIE
 - Skills: deadlock scenario generation (double merge scenario, double overtake)
 - Tools Used: ROS, Carla simulator
- Development of Risk Assessment and Safe Driving Solutions for Hazardous Areas
 - Period: 10 months (2023.01 - 2023.10)
 - Result: an occlusion-aware risk assessment module, a paper published in RA-L (SCI)
 - Skills: uniform distribution, reachability set
 - Tools Used: ROS, Carla simulator, OMPL (Open Motion Planning Library)
- Development of Trajectory Optimization Solutions for Autonomous Driving
 - Period: 1 year (2022.12 - 2023.11)
 - Result: a trajectory optimization module, a paper submitted in T-ITS (SCI, paper under first review)
 - Skills: B-spline, swept volume, gradient-based planner, MPC, OCP, QP, L-BFGS
 - Tools Used: ROS, Carla simulator, optimization solvers (IPOPT, OSQP, L-BFGS, ACADOS), CasADi
- Development of a Logistics Automation Solution Using Tow Tractors at Incheon Airport (with Korean Air)
 - Period: 1 year (2024.01 - now)
 - Result: successfully completed approximately 10 km of autonomous driving within the airport, carrying the President of Korean Air
 - Skills: car-like tractor kinematics, collision avoidance, intersection handling (signals, unprotected turns)
 - Tools Used: ROS, Carla simulator

Autonomous Vehicle (IAV GmbH)

2019.09 - 2020.08

- Development of Lane-change prediction module
 - Period: 1 year (2019.09 - 2020.08)
 - Result: Lane-change prediction module, master thesis
 - Skills: HMM, potential field, deep learning (SVM, MLP, LSTM)
 - Tools Used: Python (TensorFlow, PyTorch, Scikit-learn), C++ (Eigen, Boost), ADTF

QC/QA (Hyundai Mobis)

2015.01 - 2018.03

- Analysis of ADAS Electronic Components Failures and Derivation of Improvement Measures
 - Period: 7 months (2015.03 - 2015.12)
 - Result: failure Analysis of 15+ Products, including SMK, BCM, MDPS, etc.
 - Skills: CAN, circuit analysis, ASIC swap test
 - Tools Used: VECTOR Tools (CANoe, CANape, etc)
- Field Defect Management of ADAS Components in Korea and Europe
 - Period: 2+ years (2016.01 - 2018.03)
 - Result: field monitoring of 30+ components and analysis and improvement of field defect causes for 10+


components

- Skills: FMEA, 6 sigma

Publications

Safe and Efficient Trajectory Optimization for Autonomous Vehicles using B-spline with Incremental Path Flattening 2023

Jongseo Choi, Hyuntai Chin, Hyunwoo Park, Daehyeok Kwon, Sanghyun Lee, Doosan Baek

[arXiv:2311.02957](#)  (under review from T-ITS)

Occlusion-aware Risk Assessment and Driving Strategy for Autonomous Vehicles Using Simplified Reachability Quantification 2023

Hyunwoo Park, Jongseo Choi, Hyuntai Chin, Sang-Hyun Lee, Doosan Baek

[IEEE Robotics and Automation Letters](#)  DOI: [10.1109/LRA.2023.3329627](#) 

The Design of a Test Scenario for Verifying Multi-agent based Edge Connected Urban Autonomous Driving Service 2022

Daehyeok Kwon, Jongseo Choi, Hyuntai Chin, Doosan Baek

[Autumn Annual Conference of IEIE](#) 

Lane Change Intention Detection (LCID) of other vehicles using interactive relationships of surrounding multiple objects 2020

Jongseo Choi

Technical University of Chemnitz & IAV GmbH

Development and Evaluation of Lane Change Intention Detection module in ADTF with real-time capability 2019

Jongseo Choi

Technical University of Chemnitz & IAV GmbH

Development of a mini-wheelchair controlled by a wireless helmet using an accelerometer and gyro sensor 2014

Jongseo Choi

Chungbuk National University

Technologies

Programming Languages

- C, C++, Python, Java

Technologies

- SW Development Process: Agile, Waterfall, V-Model
- SW Verification/Testing: GoogleTest, Valgrind, clang, clang-tidy, MIL, SIL, PIL, HIL
- CI/CD: Azure DevOps pipeline, Git, Docker
- Modularization and OOP: design patterns (e.g., singleton, factory, observer, etc)
- Communication Protocols: MQTT, TCP/UDP, Bluetooth, CAN

Miscellaneous Experience

Languages

- Korean (native), English (Professional working proficiency), German (Elementary proficiency)

Awards and Achievements

- Merit scholarship (2019): 3,600 Euro from the committee of the Faculty of Computer Science, the president of Chemnitz University of Technology.
- Merit scholarship (2014): 5,000,000 won from scholarship foundation of Taekwang.

- Merit scholarship (2012): 1,000,000 won from Chungbuk National University.

Certificate

- Driver's license 1st class; Regular