Reinis **Cimurs**

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Summary

A Ph.D. graduate with a degree in Intelligent Robot Engineering and extensive experience in A.I. for real-life applications. Solid hands-on experience with machine learning for object classification, policy generation, and other decision-making methods through Imitation and Reinforcement learning. Adept to code in Python, C, and Matlab with demonstrated skills in deep learning modules on frameworks like Tensorflow and PyTorch. Adaptable to diverse work environments, with a proven ability to collaborate effectively with colleagues from different cultural backgrounds.

Experience

Robert Bosch GmbH *Stuttgart, Germany*

Machine Learning Research Engineer *Dec 2021 – Present*

- Developed graph neural networks for simulating realistic driver behavior in simulation
- Designed neural networks for learning motion policies through closed-loop differentiable simulation
- Implemented vectorized map topology representation with cross-attention
- Implemented node information exchange with transformer-based modules in graph neural networks
- Applied and tested large language model embedding guidance for scene understanding in autonomous driving
- Introduced and maintained MLflow experiment tracking service and programmed logging methods for it
- Maintained machine learning infrastructure and development pipelines with focus of hyperparemeter optimization and configuration management

Hanyang University *Seoul, Korea*

Post-Doctoral Researcher *Sep 2020 – Nov 2021*

- Lead of a fully autonomous goal-driven SLAM system development project
- Developed a Deep Reinforcement Learning-based mobile robot navigation models from lidar sensor inputs
- Deployed neural network policies to a fully autonomous goal-driven robot exploration system
- Integrated building evacuation plan information into ROS navigation stack through OpenCV
- Developed heuristics methods for AI-based navigation

Intelligence and Control for Robots Laboratory *Seoul, Korea*

Researcher *Sep 2015 – Aug 2020*

- Developed non-holonomic trajectory generation method with kinematic constraints in two and three dimensions
- Created end-to-end deep learning networks for robot navigation in dynamic environments
- Designed reward structures for machine learning considering human-based proxemics
- Deployed laser, camera, RGB-D sensor-based planning, and SLAM systems through ROS framework

AGV Serviss *Riga, Latvia*

Automation Engineer *Aug 2012 – Jul 2014*

- Serviced automation systems for food manufacturing plants and logistics centers
- Programmed PLC and SCADA devices for large scale refrigeration systems

Education

Hanyang University *Seoul, Korea*

Ph.D. in Intelligent Robot Engineering *Sep 2015 – Aug 2020*

- Received the Korean Government Scholarship to pursue the Ph.D. program
- Performed research in artificial intelligence for robotic sensors, platforms, optimization, and decision making
- Ph.D. thesis - Adaptive Motion for Planned and Reactive Robot Navigation

Riga Technical University *Riga, Latvia*

M.Sc. in Automation and Computer Control *Sep 2011 – Feb 2014*

- A professional M.Sc. degree program including a year-long internship in a related industry
- Covered theory of machine learning with computer vision applications
- M.Sc. thesis - Development of a Virtual Line Following Robot

Riga Technical University *Riga, Latvia*

B.Sc. in Automation and Computer Control *Sep 2008 – Jun 2011*

- Studied computer science, Pascal, C/C++, microprocessor programming with an emphasis on control theory
- B.Sc. thesis - Development and Control of Building Heating Systems

Skills

Programming:	Python, C, C++, Matlab, Ladder Logic
Technology:	PyTorch, Tensorflow, ROS, MLFlow, OpenCV, LaTeX, Linux
Machine learning:	DRL, CNN, Graph Neural Networks, Deep Learning, Convex Optimization
Navigation:	RRT, RRT*, A*, Boustrophedon Planning, Path Smoothing, Trajectory Optimization
Languages:	Latvian - Native, English - Fluent, Russian - Upper Intermediate, Korean - Intermediate, German - Beginner

Publications

Goal-driven autonomous exploration through deep reinforcement learning
International Conference on Robotics and Automation *May 2022*
A framework that combines deep reinforcement learning with goal-driven exploration to enable robot navigation in unfamiliar environments.

Information-Based Heuristics for Learned Goal-Driven Exploration and Mapping
International Conference on Ubiquitous Robots *Jul 2021*
Heuristics method for goal selection in an environment exploration algorithm, where navigation is performed by a neural network.

Goal-oriented obstacle avoidance with deep reinforcement learning in continuous action space
Journal Electronics *Mar 2020*
Using deep reinforcement learning, a robot learns to arrive at a goal while avoiding obstacles from depth camera inputs.

Proxemics-based Deep Reinforcement Learning for Robot Navigation in Continuous Action Space
Journal of Institute of Control, Robotics and Systems *Mar 2020*
Teaching motion behavior with a proxemics-based cost function

Time-optimized 3D path smoothing with kinematic constraints
International Journal of Control, Automation and Systems *Jan 2020*
Generation of a kinematically constrained trajectory from a path planner in three dimensions

Bezier curve-based smoothing for path planner with curvature constraint
International Conference on Robotic Computing *Apr 2017*
A path smoothing method for two-dimensional path planners with curvature constraints

Honors & Awards

Dec 2016	**Excellent Academic Achievement Award**, National Institute for International Education, Republic of Korea	*Seoul, Korea*
Nov 2016	**Certificate of Recognition**, Embassy of Republic of Latvia in Republic of Korea	*Seoul, Korea*
Jun 2014	**Korean Government Scholarship Program Scholar**, National Institute for International Education, Republic of Korea	*Seoul, Korea*

Interests

Deep learning, Robot navigation, Large Language Models, Reading, Trail running, American Football

Extracurricular Activity

Stuttgart Silver Arrows American Football Team *Stuttgart, Germany*
Baden-Wurttenberg Regional League *Jan 2022 - Present*
Player for Baden-Wurttenberg Regional League team Stuttgart Silver Arrows

Seoul Golden Eagles American Football Team *Seoul, Korea*
Korean National Football League *Jun 2018 - Nov 2021*
Player for Korean National Football League team Seoul Golden Eagles. Defense captain 2019 to 2021 seasons.