KALAISELVAN THANGARAJ

Autonomous Systems Engineer

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EXPERIENCE

Research Intern (Master Thesis)
Thoughtworks

📅 Nov 2023 – Feb 2024   📍 India

- Developed a novel framework for automating the formal verification of neural network-based object detection modules in autonomous vehicles
- Created a tool to automatically generate formal specifications using ontologies and leveraged vision-language models to verify them formally
- Implemented a prototype tool to demonstrate the feasibility of the proposed approach on a German traffic sign detection module

Robotics Engineer
Corning

📅 Dec 2021 – July 2022   📍 Germany

- Contributed to the development of robotic cells to automate the assembly process for optical communication modules using a robotic manipulator
- Optimized path planning and computer vision algorithms to increase system performance and reliability
- Designed and implemented an intuitive GUI for controlling the assembly process, focusing on user experience and improved efficiency

ACADEMIC PROJECTS

1. Distributed State Estimation
   - Implemented distributed state estimation by fusing data from multiple sensors for accurate object localization
   - Developed a Kalman-consensus filter-based system for multi-sensor object tracking

   Keyword/Stack: MATLAB   State Estimation

2. Optimization-based Robot Control
   - Utilized Deep Reinforcement Learning techniques (DQN) to implement a controller to stabilize an inverted double pendulum

   Keyword/Stack: Python   Robot Control
   Reinforcement Learning

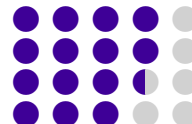3. Multi-robot Path Planning and Evacuation
   - Developed a grid-based global path planning algorithm for efficient multi-robot evacuation
   - Generated collision-free Dubins paths by considering robot and obstacle positions dynamically

   Keyword/Stack: ROS2   Python   Path Planning
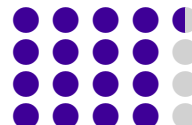
SKILLS

Autonomous Systems
Computer Vision
Sensor Fusion and State Estimation
Robot and Vehicle Control
Localization, Mapping & Path Planning

Software and Programming
Python
C++
ROS, ROS2
Git, Docker

AI/ML
Deep Learning
Reinforcement Learning

Others
Rust, MATLAB
Web Development, UI/UX
Rapid Prototyping

EDUCATION

M.Sc Autonomous Systems (Dual Degree)

Technische Universität Berlin

📅 Oct 2020 – Mar 2022   📍 Germany

Univeristy Of Trento

📅 Oct 2022 – July 2024   📍 Italy

LANGUAGES

Tamil	Native
English	C1
German	A1