

# Manojpriyadharson Kannan

Automotive Engineer specialized in advanced vehicle dynamics and control systems, autonomous systems, test engineering, and model-based design & validation

## PROFILE

### Skills and Ambition

With over three years of experience in model-based design, validation, and software testing, I specialize in delivering high-performance solutions in the automotive and high-tech industries. My expertise includes developing advanced digital twin projects, optimizing system performance, and enabling predictive analysis for technologies like ASML lithographic machines and autonomous vehicle systems. Skilled in tools such as MATLAB Simulink, Python, dSPACE automation desk, and Vector CANoe, I excel in control strategy design, closed-loop simulations, and testing methodologies like MIL, SIL, and HIL. I have a strong background in autonomous vehicle systems, including path planning, obstacle avoidance, and localization, using platforms like PreScan, Autoware Auto, and ROS. Proficient in Agile methodologies and frameworks such as ASPICE and AUTOSAR, I ensure compliance with industry standards while leveraging tools like JIRA and GIT for efficient project management. ***With dual master's degrees in automotive engineering and systems, I aim to contribute to sustainable automotive technologies, such as battery management systems, connected car transportation, and autonomous vehicles. My passion lies in advancing innovative, reliable, and efficient automotive systems that drive the future of transportation.*** Through rigorous testing, algorithm optimization, and process automation, I am dedicated to enhancing system performance and scalability while aligning with sustainability goals.

### Personal Details

▶ Nationality	Indian
▶ Current Residence	Eindhoven, Netherlands
▶ Date of Birth	08-March-1995
▶ Availability/Notice Period	Two calendar months
▶ Driving License	Class B
▶ Work Permit	HSM Visa (till 2026)

### Key competences

▶ Programming Languages	MATLAB/Simulink (4+ years), Python (2+ years), C++ Basics
▶ OS	MS Office (5+ years), Linux (3+ years), Windows (3+ years)
▶ Management Tools	JIRA (3+ years), Git (3+ years), Github (3+ years), Bitbucket (3+ years), Polarion (3+ years), IBM Doors, Jenkins (3+ years)
▶ Hardware	Microcontrollers, GPS RTK system
▶ CAE software	ANSYS (2 years)
▶ CAD software	Catia (2 years), Creo (2 years),
▶ Other software	dSPACE tools, Siemens Prescan, Autoware Auto, ROS, Vector tools (CANoe & CANalyzer)
▶ Methodologies/Norms/Standards	ISO 26262, Agile methodology, V model, ASPICE, AUTOSAR, BDD, ROS
▶ Authorizations/Certifications	TMap certified test engineer Nanodegree on self-driving cars (UDACITY)
▶ People Skills	Stakeholder management, Team Collaboration, Agile Leadership

## PROJECTS

### UDACITY NANODEGREE ON SELF DRIVING CARS | October 2024 - Present | Expected Completion Date: April 2025 | [Project](#)

- Acquiring comprehensive knowledge of autonomous systems through hands-on-projects, focusing on sensor fusion, path planning and control algorithms.
  - Sensor fusion: Developing algorithm to integrate data from multiple sensors (e.g., LIDAR, radar, and camera) to enhance object detection accuracy and reliability.
  - Path planning: Designed and implemented a Google-Maps style routing algorithm using the A\* search technique.
  - Machine learning and Computer vision: Created a classification pipeline that processes traffic light images and classifies them as red, green, or yellow using advanced image recognition techniques.
- Extending prior research in autonomous driving for articulated vehicles in constrained spaces
  - Path planning algorithm redesign: Leveraging Model-Based-Design (MBD) principles to create a modular and reusable framework, with ongoing integration of machine learning techniques to optimize computational efficiency.
  - Modular Framework Development: Building a standardized architecture for path planning and obstacle avoidance, enabling easy customization for various vehicle types and operational domains.

### Technical Consultant | August 2021 - Present | 3+ years | Eindhoven, The Netherlands

#### Capgemini – ASML (Dec 2022 – ONGOING)

##### Digital twin Development of ASML machine

- **Developed and optimized digital twin plant models** of cutting-edge lithographic machines in MATLAB Simulink, adhering to MAAB guidelines, which led to a 20% improvement in simulation accuracy and ensured high-fidelity results.
- Designed and implemented **control strategies for closed loop simulations** of lithographic machine subsystems, ensuring alignment with system requirements and enhancing overall performance.
- Generated optimized **C/C++ code** from Simulink models for integration into Software-in-the-Loop (SIL) frameworks, bridging high-level modeling with embedded software testing.
- Analyzed low-level code to extract functionality and implemented equivalent behavior in high-level Simulink models, improving model accuracy and system understanding.
- Conducted in-depth **requirements analysis** and translated system requirements into actionable user stories in JIRA, aligning team deliverables with stakeholder expectations and boosting team productivity.
- Enhanced software reliability through **Model-in-the-Loop (MIL)** and **Software-in-the-Loop (SIL)** testing within the V-model, coupled with **TMap methodology**, ensuring compliance with industry standards.
- Automated model and machine interactions using **Python scripts**, reducing manual effort, increasing configurability, and improving testing efficiency by over 30%.
- Delivered key simulation features and comprehensive release notes under a rigorous three-month release plan, showcasing effective resource management and timely delivery of high-quality results.
- Leveraged **GitHub** for version control, **CI/CD** pipelines, and **Polarion** for maintaining requirements, design decisions, and other artifacts, promoting consistent project documentation and efficient collaboration.
- Collaborated with developers to expand the **BDD framework** for functional testing, improving test case accuracy and ensuring alignment with both business and system requirements.

#### Capgemini Engineering (Inhouse) – 7 months

##### Autonomous Valet parking system

- Enhanced the Stanley controller code, improving application performance, scalability, and reliability, significantly elevating the efficiency of the autonomous parking system within a short development lifecycle.

## Project Portfolio

### Manojpriyadharson Kannan

- Integrated PreScan scenarios with Autoware Auto for sensor simulation and autonomous driving logic, developing custom maps and routes to thoroughly test and validate vehicle behavior in varied environments.
- Configured and validated HIL setup by seamlessly linking PreScan, Autoware Auto, and the RCU, ensuring smooth operation, synchronization, and reliability of the entire autonomous driving system.
- Applied Scrum methodology throughout the project lifecycle, leveraging tools such as JIRA and GIT for agile project management and version control, while maintaining a solid understanding of Linux environments.

### Capgemini Engineering (Inhouse) – 4 months

#### Digital twin project - Racetrack

- Contributed to the development and testing of a digital twin for a racetrack, enhancing Python-based virtual simulations for improved performance and accuracy, while utilizing 2D visualizations to depict car positioning.
- Developed comprehensive test plans, scripts, and use cases, ensuring thorough system evaluation, while adhering to Scrum methodology and utilizing JIRA and GIT for agile project management.

### Student Researcher | 03/2020 – 01/2021 | Arnhem, The Netherlands

#### HAN Automotive Research Institute

#### Autonomous docking manoeuvring of articulated vehicles in the presence of obstacles

- Developed and optimized a bi-directional path planning algorithm for autonomous docking of articulated vehicles in confined areas, using A\* search and lattice-based motion planning.
- Designed and improved motion primitive libraries to enhance computational efficiency and reduce final pose error in path planning.
- Implemented advanced heuristic functions incorporating spatial obstacle information for optimized path cost estimation.
- Integrated static and dynamic obstacle avoidance modules ensuring collision-free path generation, including consideration of moving vehicles with rectilinear motion.
- Conducted real-world benchmark tests at a distribution center using GPS-RTK to study and replicate driver maneuvers for realistic validation.
- Validated path planning and tracking algorithms in both simulation (MATLAB/Simulink) and scaled model environments to ensure robust performance.
- Applied kinematic vehicle modeling techniques to enable low-speed, precise maneuvering of articulated vehicles.
- Collaborated with HAN Automotive Research (HAN-AR) to advance automation in logistics through innovative Connected and Automated Transport (CAT) solutions.

### Early career: Design Engineer Researcher | 02/2016 – 09/2017 | Chennai, India

#### Caresoft Global Private Limited

## ACADEMIC PROJECTS

### HAN-UAS, Arnhem, The Netherlands (Sep 2019 – Jan 2020)

#### Vehicle Vertical Dynamics Modeling and Analysis

- Developed a half-car vertical dynamics model in MATLAB/Simulink to analyse suspension performance.
- Derived and implemented the rear axle suspension system dynamics, combining air spring and leaf spring characteristics using differential equations.
- Conducted experimental validation through vehicle testing, including real-time data acquisition and post-processing to ensure model accuracy.
- Evaluated vertical dynamic response to determine the optimal speed for traversing road bumps, improving ride comfort and vehicle stability.

## Project Portfolio

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### HAN-UAS, Arnhem, The Netherlands (Sep 2019 – Jan 2020)

#### System Identification and Temperature Control Design

- Performed system identification using black-box and grey-box modeling techniques to determine the transfer function of a room temperature control system.
- Designed and implemented a feedback control system with specified transient and steady-state characteristics, ensuring precise temperature regulation.
- Validated system performance through simulation and experimental testing.

### Czech Technical University, Prague, Czech Republic (Mar 2019 – May 2019)

#### Suspension System Design and Structural Analysis

- Engineered a rear-driven double-wishbone suspension system with helical springs for a saloon car, adhering to specified load and performance criteria.
- Simulated vertical dynamic response using a quarter-car model to analyze suspension behavior under bump negotiation scenarios.
- Conducted finite element analysis (FEA) on critical suspension components to evaluate stress distribution, deformation, and safety factors under operational loads.