LIST OF TERMINOLOGY

- **AI** : Artificial Intelligence. Simulation of human intelligence processes by machines and computer systems.
- **ML** : Machine Learning. A subset of AI involving algorithms that improve automatically through experience.
- **AV** : Autonomous Vehicle. A vehicle capable of sensing its environment and operating without human input.
- **OR** : Object Recognition. The computer vision task of detecting, identifying, and classifying objects.
- **AMLAS** : Assurance of Machine Learning in Autonomous Systems. A lifecycle framework for assuring ML safety.
- **GSN** : Goal Structuring Notation. A graphical notation for representing structured safety assurance cases.
- **GSN v2.0** : GSN Community Standard Version 2.0. The formal standardized version of GSN used in this thesis.
- **CAE** : Claims-Argument-Evidence. A pattern for structuring assurance cases linking claims to supporting evidence.
- **SACM** : Structured Assurance Case Metamodel. A formal metamodel standard for expressing structured assurance cases with modular and dialectical features.
- **CPPS** : Cyber-Physical Production System. Integrated systems combining computation, networking, and physical processes in manufacturing.
- **SAE J3016** : A standard defining levels of driving automation for on-road motor vehicles, including Level 2 (Partial Automation).
- **YOLOv8** : You Only Look Once version 8. A real-time object detection model architecture used for perception tasks.
- **ESP** : Espressif Microcontroller. A family of low-cost microcontrollers used for IoT and robotics applications.
- **mAP** : mean Average Precision. A common metric to evaluate object detection models' precision-recall performance.

- **Roboflow** : A cloud-based platform for managing, annotating, and deploying computer vision datasets and models.
- **Donkey Car S1** : A small-scale, open-source, customizable robotic car platform used for autonomous driving experiments.
- **Dialectical Argumentation** : Modelling of structured arguments that explicitly represent claims, counterclaims, assumptions, and evidence to support safety assurance.