

Open Thesis / Project

AI-Driven Vehicle Data Integration

Embedded Learning and Sensing Systems Group

Motivation

Imagine a future where your car not only understands the road but also comprehends the entire driving environment, adapting in real-time to ensure the safest and most efficient journey. With autonomous vehicles and advanced driver assistance systems (ADAS) on the rise, the challenge lies in making these systems smarter and more responsive to the world around them. By leveraging the power of open-source Large Language Models (LLMs), which can run on-device (e.g., Llama2, Moondream2), presents an incredible opportunity to merge human-like understanding with machine precision. This project is your chance to pioneer the development of cutting-edge techniques that encode diverse inputs – such as speed, noise, gear status, and GPS data – into LLMs, transforming them into intelligent co-pilots that can make split-second decisions. If you're passionate about AI and eager to shape the future of driving, this thesis will put you in the driver's seat of innovation. **Interested? Please contact us for more details!**

Target Group

Students in ICE, CS or Software Engineering.

Thesis Type

Master Project / Master Thesis.



Image source: DALL-E

Goals and Tasks

- Conduct a comprehensive literature review on multi-modal data encoding and its application in LLMs.
- Develop methods for encoding and integrating sensory data (e.g., speed, symbols, noise levels, gear, map information, GPS) into LLMs.
- Implement and test these methods within a driving assistant prototype, focusing on real-time processing and accuracy.
- Evaluate the performance of the LLM-based driving assistant in simulated driving environments with various real-world scenarios.
- Present the results and compile the findings in a detailed report.

Requirements:

- Strong background in machine learning and natural language processing.
- Programming skills in Python.
- Familiarity with deep learning frameworks (e.g., PyTorch or TensorFlow).

Used Tools & Equipment

- A computation cluster at TU Graz.
- Relevant datasets.
- NVIDIA Jetson Xavier AGX

Contact Persons

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