



ECOMAI

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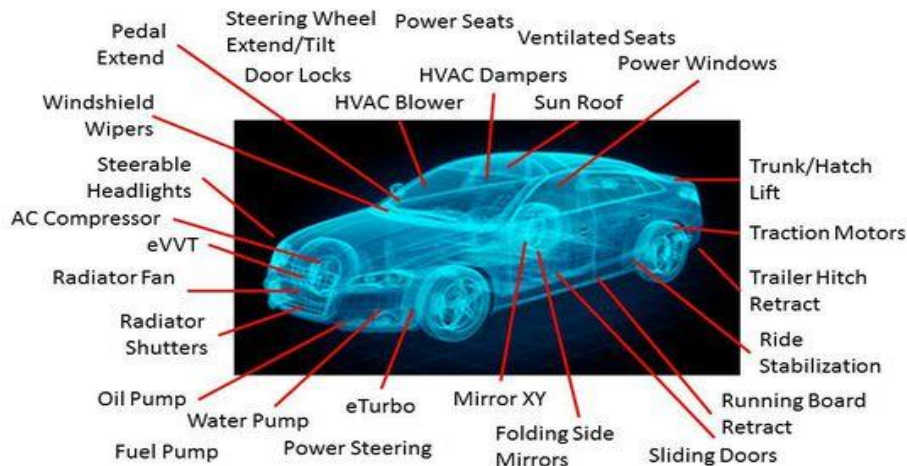
TÜBİTAK
EUREKA Ulusal
Koordinasyon Ofisi

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Ecological Motor Control and Predictive Maintenance with AI

A modern car can alone contain about 40 motors for various functions.

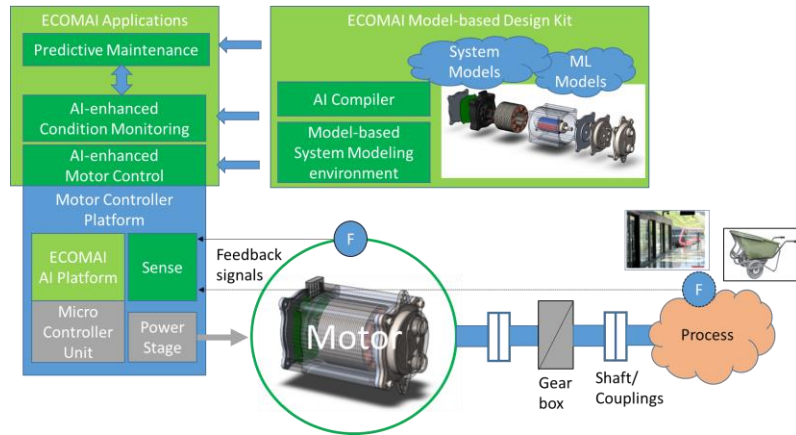


Electric motors account for 40% of worldwide power consumption and 20% of CO₂ emissions¹

ECOMAI project is developing technologies that enhance electric motor drive systems with an embedded AI system running on a specialized AI hardware platform.

Objective of ECOMAI -> reduce energy consumption and enable development of more 'ecological' systems

Technological objectives of ECOMAI



Specialized motor control AI hardware for motor systems

Innovative Model-based Design and Automation Framework: Development toolkit with AI compiler

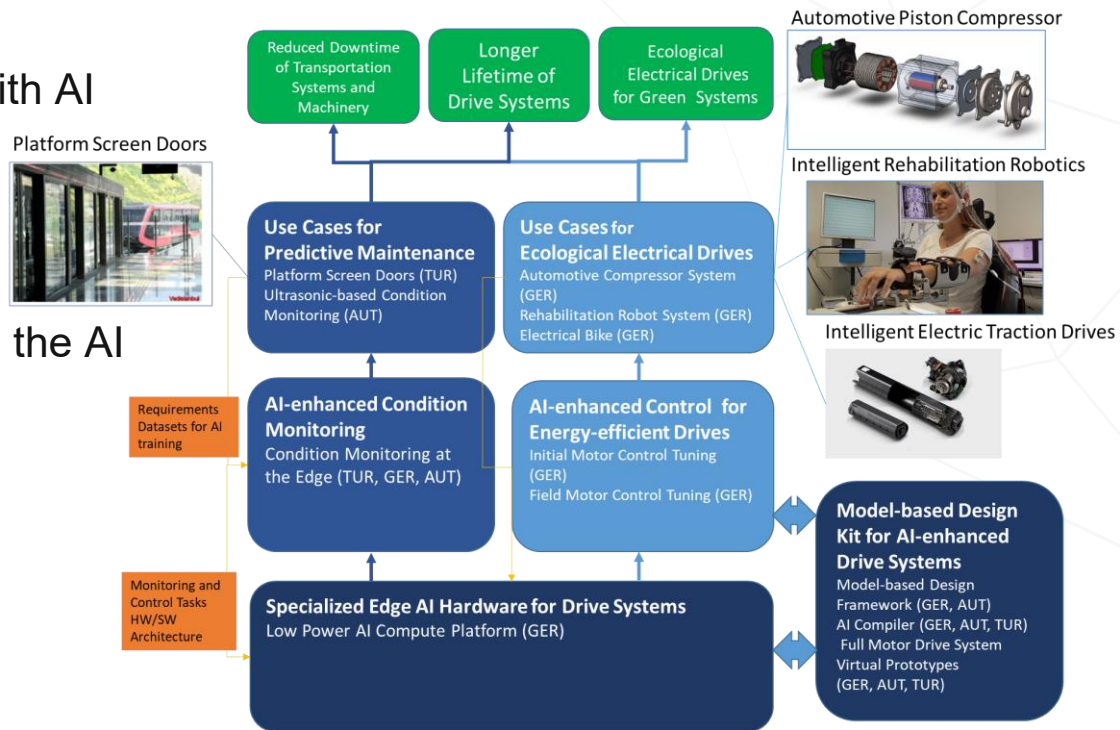
Demonstrations of the ECOMAI Model Based Framework implementing certain use cases and new modelling techniques

- AI-enhanced Ecological Electrical Drive Systems
- Reduced energy demand by at least 5%
- Prolonged lifetime
- Reduced downtime of systems due to AI-enhanced predictive maintenance
- Lead role in Europe on AI technology for electrical motor drives

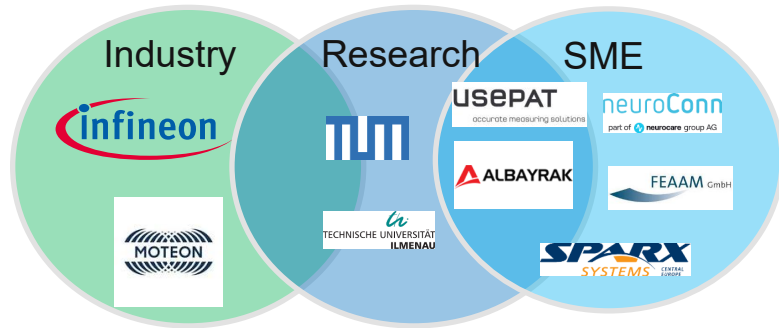
ECOMAI approach: Holistic value chain

Improving electric motor systems with AI requires:

- A technological value chain
- AI-hardware
- Design methodology captured in the AI design kit
- And finally use cases



Cooperation in the project



Germany

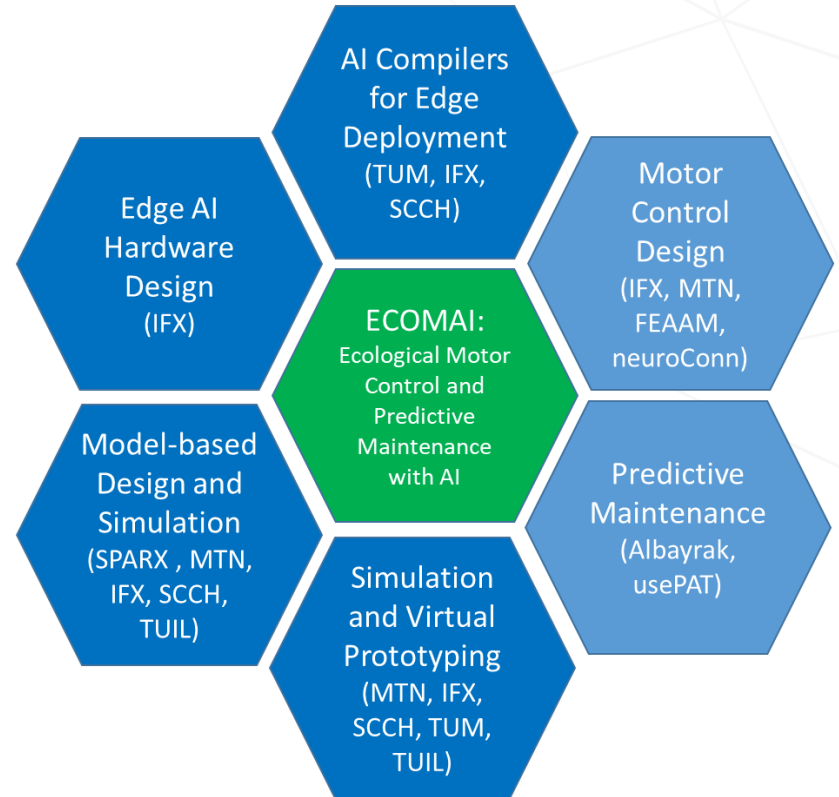
- Infineon Technologies AG
- MOTEON GmbH
- neuroConn GmbH
- FEAAM GmbH
- Technische Universität München
- Technische Universität Ilmenau

Austria

- Sparx Systems Software GmbH
- usePAT GmbH

Turkey

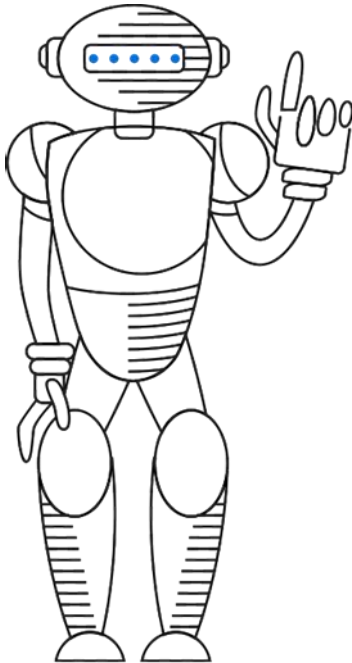
- ALBAYRAK Makine Elektronik Sanayi ve Ticaret A.Ş.



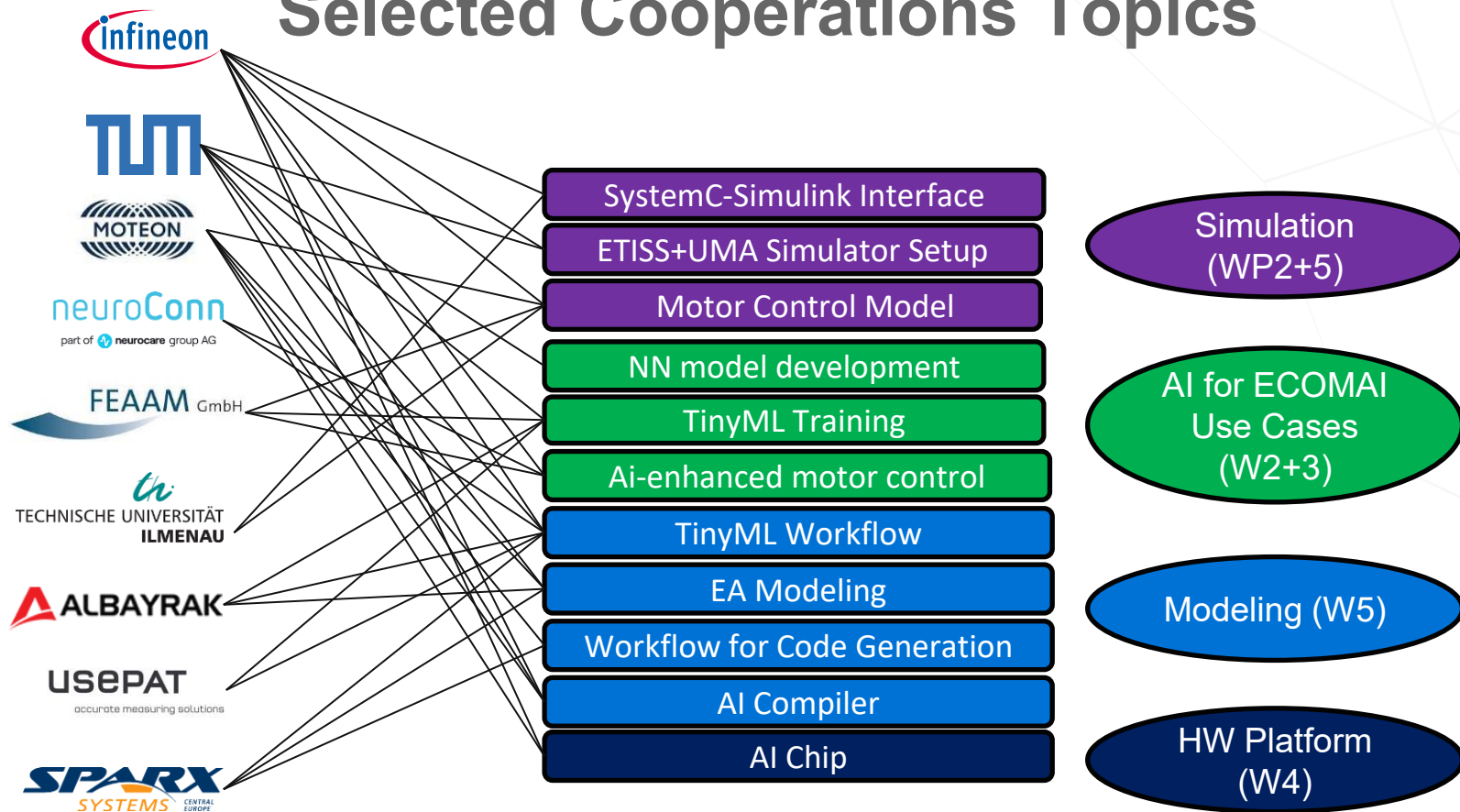
Great Cooperation between ECOMAI partners!



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Selected Cooperations Topics



Highlight: Dissemination

**Embedded World Conference and Exhibition:
Bringing it all together 11.-13.03.2025**



Exhibition booth 4-410, community booth State Development Corporation of Thuringia

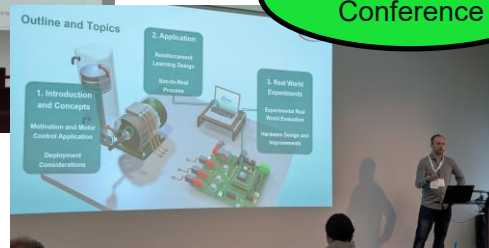
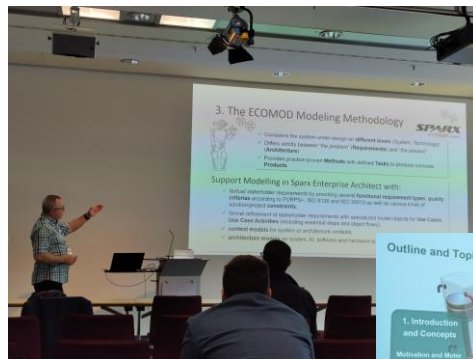
- MOTEON GmbH: Demonstrator
- neuroConn GmbH: Embedded Plattform
- SparxSystems Europe: ECOMOD
- Infineon

Booth on the Exhibition Floor

tinyML Class



2 Talks at the Conference



Exploitation Activities Academia

- ✓ 1 PhD, another PhD is in preparation
 - ✓ 8 Master Thesis
 - ✓ 1 Bachelor
 - ✓ 8 Scientific Papers
 - ✓ 6 Scientific Conference Papers, 2 conferences in autumn 2025
 - ✓ 1 Best Paper Award
-
- ✓ The research work conducted for ECOMAI at TU-Ilmenau also provided motivation for **the creation of a new Professorship at TU-Ilmenau** related to the efficient implementation of AI on different computing platforms.
 - ✓ Conferences are listed on the ECOMAI Homepage, scientific papers when published officially.



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Highlights & Key Learnings

Key Driver Exploitation

Innovative market offerings

Perspectives:

- ✓ A base for further research and development
- ✓ collaboration planned among the partners

Academic Achievements

1 PhD, another PhD is in preparation
8 Master Thesis, 1 Bachelor, 8 Scientific Papers, 6 Scientific Conference Papers
1 Best Paper Award

Roles, Responsibilities &
Project Cycle of
Consortium Members

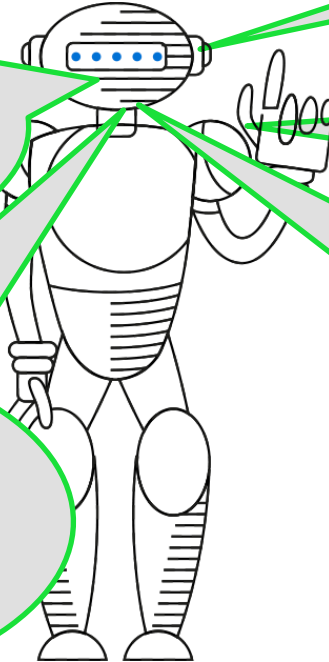
- ✓ **Enhance Knowledge Sharing**

Further Industry Collaboration

- ✓ Sparx elaborate the ECOMOD with Albayrak (Design of Predictive Maintenance Systems)
- ✓ MOTEON and FEAAM elaborate the traction drive systems for other industries and markets.

Diversity

- ✓ SMEs & Large Cooperations on eye level
- ✓ Project Members 40% Women





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Thank you for your attention!