Tech Venture Challenge – RoFa

RoboFahrt (RoFa) – Autonomous Ride-Hailing for EU

Challenge description

RoboFahrt (RoFa) is building the **first EU-native autonomous ride-hailing service, developed in Europe for Europe**. The initial pilot region is a representative suburban municipality near Munich where mobility gaps are clearly visible. Our goal is to close major first-/last-mile and door-to-door mobility gaps for older adults, people with limited mobility, commuters, and institutions such as clinics or municipalities. In these regions, conventional public transport is often too sparse, and taxis are expensive or unavailable, especially outside peak hours. A successful pilot could be replicated across hundreds of municipalities and cities in Germany and Europe.Our core innovation is a map-light autonomous driving stack that does not depend on pre-scanned HD maps for every new operating region. This reduces rollout cost and time, improves resilience to road changes, and creates a credible path to scalable autonomous ride-hailing in Europe. On top of the autonomy stack, RoboFahrt is designed as a vertically integrated operator model: we aim to develop the technology, operate the fleet, and provide the mobility service directly to end users and institutional customers.

Thesis Focus

Within your thesis, you will work on one of the focus areas.

Technology focus areas: Development and evaluation of key components of a scalable autonomous driving stack, including:

- Reasoning foundation models for context-aware decision making in autonomous vehicles
- 3D object detection for urban environments
- BEV semantic segmentation
- Online vector map generation
- Spatiotemporal occupancy prediction
- Multi-object tracking
- RL-enhanced model predictive control (RL×MPC)

Business focus areas:

- Market entry strategy for autonomous on-demand mobility in Germany and later the EU
- Business model design for B2C, B2G, B2B mobility services
- Go-to-market strategy for pilot municipalities, clinics, and mobility partners
- Pricing and unit economics for ride-based, subscription, and shuttle-contract offerings
- Public sector procurement and partnership strategy for municipalities and transport associations
- Competitive positioning of an EU-native, map-light autonomy provider versus HD-map-dependent incumbents
- Regulatory commercialization strategy at the intersection of AI Act, autonomous driving approval, and mobility operations
- Customer discovery and demand validation for elderly, mobility-impaired, and suburban user groups

Profile and process

You apply with a motivation letter and a CV (but no project draft) and write a master thesis suitable to your study program. You should have:

- Entrepreneurial mindset and strong ownership
- Ability to work independently on ambiguous, real-world problems
- Strong analytical and structured thinking
- Interest in deep tech commercialization, not only academic output
- Clear communication and reliability
- Motivation to contribute to a mission-driven mobility startup with societal impact

For technical theses, experience in machine learning, computer vision, robotics, autonomous systems, or control is highly valued. For business theses, experience in strategy, operations, market research, entrepreneurship, or public-sector business development is particularly valuable.

You'll contribute to high-impact research with a real chance of publication. Former thesis students have published their work at the world's top conferences in robotics and control:

- Chenyang Wang: American Control Conference 2024 (Toronto, Canada): Stochastic NMPC with Uncertainty Horizon; IROS 2024 (AbuDhabi, UAE): Adaptive SNMPC with Look-ahead Deep Reinforcement Learning
- Marios Spanakakis: Intelligent Vehicles IV 2024 (Jeju Island, Korea): Safe RL-driven WMPC
- João Nunes: IFAC's NMPC 2024 (Kyoto, Japan) (Best Interactive Paper Finalist): R²NMPC with Ellipsoidal Uncertainty Sets

Upon successful application, you will become part of the TUM Entrepreneurial Masterclass and enjoy all its benefits.

TUM Entrepreneurial Masterclass
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