Letter of Recommendation

Date: October 1, 2025

To Whom It May Concern,

I am writing to provide a recommendation for **Pradeep Gopi** (Matriculation Number: 273099), who completed his Master's thesis in the M.Sc. Smart Systems program during the Winter Semester 2024/2025. I served as his Second Supervisor for his thesis on "Zero-Shot Anomaly Detection with Foundation Models," conducted under the primary guidance of Prof. Dr. Christoph Reich.

Throughout his thesis work, Mr. Gopi demonstrated exceptional technical competence and a remarkable aptitude for cutting-edge artificial intelligence research. His performance was consistently outstanding across all aspects of this challenging project.

Key Achievements and Competencies

During his thesis, Mr. Gopi successfully accomplished the following:

- **Technical Excellence in Modern AI Models:** Demonstrated profound expertise with current vision and multimodality models such as PaliGemma, CLIP, and RF-DETR, particularly in zero-shot and anomaly detection contexts. Notably, he optimized and fine-tuned a powerful LLM with 3 billion parameters for deployment on edge devices.
- **End-to-End Pipeline Development:** Independently designed and implemented complete AI pipelines covering data preparation, training, inference, model evaluation, and visualization.
- **Application of Zero-Shot and Few-Shot Learning Methods:** Successfully employed modern learning approaches to handle scenarios with limited data volumes, contributing valuable insights for practical industrial applications.
- **Analytical Precision and Evaluation Competence:** Systematically applied performance metrics including mAP, IoU, Precision, Recall, and F1-Score for objective model evaluation and optimization.
- **Software Engineering Professionalism:** Developed modular, maintainable, and scalable code structures meeting the highest standards of quality and sustainability.
- **Research-Oriented Enthusiasm for Experimentation:** Conducted systematic comparison and critical analysis of multiple model architectures for data-driven selection of optimal methods.
- **Practical Problem-Solving Skills:** Successfully processed challenging datasets from industrial and medical domains, effectively bridging academic research with practical requirements.

Mr. Gopi's ability to combine theoretical understanding with practical implementation, along with his professional approach to software development and research methodology, makes him an exceptional candidate. His work on zero-shot anomaly detection with foundation models represents a substantial contribution to the field.

Please note: This letter represents my personal assessment and recommendation. I am not authorized to issue official certificates on behalf of the Hochschule, and this should be considered a personal reference based on my supervision experience.

Should you require any further information or wish to discuss Mr. Gopi's qualifications in more detail, please feel free to contact me.

Manav Madan
Second Supervisor, Master Thesis
Topic: Zero-Shot Anomaly Detection with Foundation Models
Winter Semester 2024/2025

Contact Information:
Professional Email: manav.madan@hs-furtwangen.de
Personal Email: madan.manav@outlook.com

Manav Madan, 01.10.2025