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Admission Committee
University
Department
Group

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To whom it may concern,

I am writing to express my enthusiastic interest in the PhD position in **Machine Learning and Game Theory at the Technical University of Munich (TUM)**. My academic trajectory, research experience in AI/ML, and alignment with TUM's interdisciplinary vision make me a strong candidate to contribute meaningfully to your research group.

During my Master's in Computational Mathematics (2019), I specialized in Generative Adversarial Networks (GANs), implementing Cycle-Consistent Adversarial Networks (CycleGAN) to replicate the handwritten Chinese characters of Shiling Shen Chern. By innovating an end-to-end style-transfer learning trajectory, I achieved a 85% visual similarity score across 220 characters—a significant improvement over baseline models. This work culminating in my Master's thesis, *"GANs based Personal Style Imitation of Chinese Handwritten Characters."* This experience provided me with hands-on expertise in GANs, data preprocessing, manuscript analysis, and code replication.

Post-graduation, I joined Sun Yat-sen University's Computational Medical Imaging Diagnosis Lab, leading AI-driven medical imaging projects. For instance, the first project focuses on diagnosing Placenta Accreta Spectrum Disorders, aiming to classify the severity of the disease using T2-WI MRI images. By implementing a multi-task learning method, our proposed model achieving an averaged AUC score of 0.80. Moreover, I developed a CNN-based model to predict metastasis in Sentinel Lymph Nodes (breast cancer) using dual-energy CT images, achieving an averaged AUC score of 0.85 among three-fold cross-validation. My role involved end-to-end pipeline design, from preprocessing heterogeneous DICOM data to deploying models on hospital servers. These projects underscored my ability to translate theoretical ML frameworks into real-world applications, resulting in two first-authored papers (one of them currently under revision).

Your program's focus on **Game Theory and Multi-Agent Systems** deeply resonates with my goal to explore strategic decision-making in AI. I am particularly inspired by Prof. [Name]'s work on [specific paper/topic], which aligns with my interest in developing cooperative GAN frameworks where agents optimize Nash equilibria. During my PhD, I aim to investigate how game-theoretic principles can enhance robustness in generative models—a direction that bridges my expertise in adversarial networks with TUM's strengths in algorithmic foundations.

I aspire to pioneer ethical AI systems that harmonize mathematical rigor with societal impact, ultimately establishing a research lab focused on trustworthy ML. TUM's emphasis on interdisciplinary collaboration, access to the [specific lab/facility], and partnerships with institutions like the Munich School of Robotics provide an ideal ecosystem to advance these ambitions.

- **Technical Depth**: Proficiency in PyTorch, TensorFlow, and optimization frameworks, validated by peer-reviewed publications.
- **Interdisciplinary Agility:** Experience spanning theoretical ML, medical AI, and ethical implications.
- **Vision**: A clear research agenda that synergizes with TUM's focus on foundational AI and real-world applications.

I am eager to contribute to ongoing projects in your group, such as [specific project or initiative mentioned on TUM's website], and would welcome the chance to discuss how my background aligns with your priorities. Thank you for considering my application. I look forward to the possibility of joining TUM's vibrant academic community.

Sincerely,

Hai Jiang