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Admission Committee
University of Oldenburg,
Faculty VI - Health Services Research
Department AI4Health, 26111 Oldenburg

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Dear Members of the Admissions Committee,

I am writing to express my enthusiastic interest in the PhD position focused on **Machine Learning for Medical Diagnostics** at the University of Oldenburg. With a strong foundation in computational mathematics, hands-on experience in AI-driven medical image analysis, and a passion for advancing explainable and efficient AI frameworks, I am eager to contribute to your mission of developing cutting-edge diagnostic systems.

During my **Master's in Computational Mathematics** (2019-2022), I specialized in **Generative Adversarial Networks (GANs)**, focusing on cross-domain style transfer. My thesis, *"GANs for Personal Style Imitation of Chinese Handwritten Characters,"* involved developing an end-to-end CycleGAN-based framework to replicate the calligraphic style of Shiling Shen Chern. By optimizing adversarial training and domain-specific preprocessing, I achieved **85% visual similarity** across 220 characters, surpassing baseline models by 10%. This project honed my expertise in structured data transformation and cross-domain adaptation—skills directly applicable to knowledge graph design, where heterogeneous data integration and semantic mapping are critical.

Post-graduation, I joined Sun Yat-sen University's **Computational Medical Imaging Lab**, where I led AI-driven projects with clinical impact. For instance, I developed a **multi-task learning model** to classify Placenta Accreta Spectrum Disorder severity using T2-WI MRI images, achieving an **AUC of 0.80**. In a separate project, I designed a CNN-based system to predict breast cancer metastasis in Sentinel Lymph Nodes via dual-energy CT scans, attaining an **AUC of 0.85** in cross-validation. Beyond algorithmic development, I curated heterogeneous DICOM datasets and deployed models on hospital servers, demonstrating my ability to manage complex data pipelines—a skill vital for building robust knowledge infrastructures. These efforts resulted in two first-authored papers (one accepted at **ISBI 2025**, one under revision).

Your program's focus on **self-supervised/label-efficient learning** and **explainability of deep neural networks** deeply resonates with my goal to advance rigorous, interpretable AI frameworks for medical diagnostics. I am particularly inspired by **Prof. Dr. Nils Strodthoff's work** on concept-based analysis of vision transformers (ViTs), which aligns with my interest in developing practical frameworks that ensure efficiency and transparency in AI systems. For instance, my CycleGAN project required quantifying stylistic fidelity—a precursor to evaluating generative models' adherence to user-defined constraints. Similarly, my medical imaging work involved validating models against clinician feedback, mirroring the iterative human-AI collaboration essential for refining diagnostic benchmarks.

The AI4Health Team, with its emphasis on **Interpretable and explainable learning algorithms** and **Artificial Intelligence**, provides an unparalleled environment to address challenges such as: (1) **Data Modality**: Enhancing single-modality prediction models and multimodal fusion for comprehensive diagnostics; (2) **Interpretability**: Designing robust algorithms for biomedical applications that ensure explainability and clinical trust; (3) **Efficiency**: Developing label-efficient and self-supervised learning methods to reduce reliance on annotated datasets.

Long-term, I aspire to pioneer **interpretable and efficient AI-driven clinical implementaions** that bridge theoretical rigor with real-world applicability, particularly in graph neural networks and multimodal learning. This PhD will equip me with the interdisciplinary expertise—spanning machine learning, deep learning, and medical science—to establish a research group focused on democratizing access to trustworthy AI diagnostic tools. The University of Oldenburg's translational research ethos and partnerships with healthcare leaders will be instrumental in realizing this vision.

I am confident that my technical expertise in AI/ML, experience in managing complex data workflows, and alignment with the AI4Health team's strategic priorities position me to contribute meaningfully to your program. I would welcome the opportunity to discuss how my background could support initiatives such as optimizing multimodal diagnostic pipelines or advancing interpretability in biomedical applications. Thank you for considering my application. I look forward to contributing to the University of Oldenburg's legacy of innovation in AI research.

Sincerely,

Hai Jiang