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STUDENT SEMINARS @ FSU Computer Science

FAST-CAD: A Fairness-Aware Framework for Non-Contact Stroke Diagnosis

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Presentation Abstract

Stroke is an acute cerebrovascular disease, and timely diagnosis significantly improves patient survival. However, existing automated diagnosis methods suffer from fairness issues across demographic groups, potentially exacerbating healthcare disparities. In this work we propose FAST-CAD, a theoretically grounded framework that combines domain-adversarial training (DAT) with group distributionally robust optimization (Group-DRO) for fair and accurate non-contact stroke diagnosis. Our approach is built on domain adaptation and minimax fairness theory and provides convergence guarantees and fairness bounds. We curate a multimodal dataset covering 12 demographic subgroups defined by age, gender, and posture. FAST-CAD employs self-supervised encoders with adversarial domain discrimination to learn demographic-invariant representations, while Group-DRO optimizes worst-group risk to ensure robust performance across all subgroups. Extensive experiments show that our method achieves superior diagnostic performance while maintaining fairness across demographic groups, and our theoretical analysis supports the effectiveness of the unified DAT + Group-DRO framework. This work provides both practical advances and theoretical insights for fair medical AI systems.

Speaker's Profile

I'm Tianming (Tommy) Sha, an undergraduate student researcher at Stony Brook University (B.S. in Applied Mathematics and Statistics) focused on building reliable, secure, and interpretable AI systems. I'm currently a research intern at Microsoft Research Asia (MSRA), where I work on RD-Agent with an emphasis on agent automatic post-training—building training/evaluation loops, feedback signals, and reliability tooling that help agents improve from experience and run end-to-end autonomous R&D workflows more robustly. My current interests center on multi-agent automation design and world models for long-horizon reasoning and decision-making, especially when agents must plan under uncertainty. In parallel, I'm also interested in 3D medical data generation under scarcity, where high-fidelity synthesis and representation learning can unlock stronger downstream performance with limited annotations.

Seminar Time: 2026-02-17 Tuesday, 11:45 AM - 12:45 PM

Location (In-Person Only): Room 353, LOVE Building

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