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STUDENT SEMINARS @ FSU Computer Science

EEG-RAGNet: Retrieval-Augmented Graph Structure Refinement for Clinical Seizure Diagnosis

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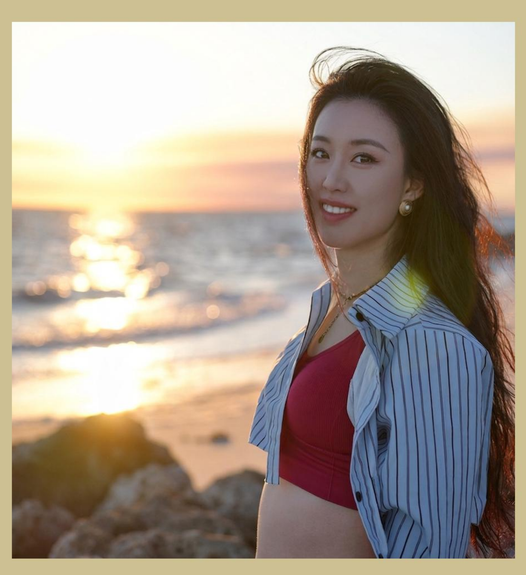
Presentation Abstract

Seizure diagnosis from EEG signals is a critical yet persistently challenging task, due to the complicated neural dynamics and the spurious connections in inter-channel modeling. While spatial-temporal graph neural networks (STGNNs) have advanced EEG brain network representation learning, the resulting graph structures suffer from low clinical plausibility and limited interpretability due to their purely data-driven nature. To this end, we introduce EEG-RAGNet, a retrieval-augmented graph refinement framework that incorporates external medical knowledge to calibrate noisy EEG graphs. We first construct a large-scale, domain-specific knowledge base derived from authoritative clinical guidelines. Leveraging large language models, we extract structured biomedical entities and relations to form a textual knowledge graph (KG), which serves as external knowledge source of clinical priors. Our framework performs alignment-aware query construction by projecting STGNN-generated EEG node embeddings into the semantic space of KG. Semantic queries are then executed via FAISS-based similarity search over knowledge triplets to retrieve relation evidence. Each predicted edge is assigned a confidence score based on retrieved similarity, relation type, and source reliability, enabling us to prune medically implausible edges from the originally predicted graph. Extensive experiments on TUSZ and CHB-MIT demonstrate that EEG-RAGNet not only improves seizure detection accuracy but also enhances interpretability by grounding each prediction in clinically validated knowledge.

Speaker's Profile



Lincan (Kelsey) Li is a 2nd-year PhD student in Computer Science at Florida State University, advised by Prof. Yushun Dong in the Reliable AI (RAI) Lab. Her research centers on Trustworthy AI, Agentic Safety, and Spatial-Temporal Intelligence. She also deeply interested in leveraging LLM-based approaches for AI for Science, including climate and natural disaster forecasting. Lincan's research has led to 10+ publications in top venues and journals such as KDD 26', KDD 25', SIGSPATIAL 25', ICASSP 24', etc, including a Best Paper Award at ACM SIGSPATIAL 2025. She have also contributed to open-source projects like TyphoFormer, STG-Mamba, and PyGIP, and served as the lead presenter at KDD 2025 tutorial. Beyond research, she has been actively serve as a reviewer for top-tier AI conferences/Journals. Her long-term research goal is to build AI models & algorithms that advance social good and strengthen interdisciplinary applications, aiming to make people's work and life better, more efficient, and more secure.

Seminar Time: 2026-04-07 Tuesday, 11:45 AM - 12:45 PM

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

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