Postgraduate Seminar Series

Venue: Graduate Seminar Room
Date & Time: July 26, 2025 at 2:30 PM

Speaker Information

Md Hasebul Hasan (Std No. 0422052020) is a part time M.Sc. student in the department of CSE, BUET. He completed his undergraduate studies from the same department in 2022. He is currently working at IQVIA as a Machine Learning Engineer. His research interest lies in the field(s) of NLP, Machine Learning Security and Computer system. He is currently doing his postgraduate thesis under the supervision of Dr. Tanzima Hashem. He will be speaking about his ongoing research in this talk.

AN EFFICIENT COMPOSITIONAL REASONING APPROACH FOR SOLVING GEOSPATIAL QUERIES USING LLMS

Agentic AI has significantly extended the capabilities of large language models (LLMs) by enabling complex reasoning and tool use. However, most existing frameworks are tailored to domains such as mathematics, coding, or web automation, and fall short on geospatial tasks that require spatial reasoning, multi-hop planning, and real-time map interaction. To address these challenges, we introduce MapAgent, a hierarchical multi-agent plug-and-play framework with customized toolsets and agentic scaffolds for map-integrated geospatial reasoning. Unlike existing flat agent-based approaches that treat tools uniformly—often overwhelming the LLM when handling similar but subtly different geospatial APIs—MapAgent decouples planning from execution. A high-level planner decomposes complex queries into subgoals, which are routed to specialized modules. For tool-heavy modules—such as map-based services—we then design a dedicated map-tool agent that efficiently orchestrates related APIs adaptively in parallel to effectively fetch geospatial data relevant for the query, while simpler modules (e.g., solution generation or answer extraction) operate without additional agent overhead. This hierarchical design reduces cognitive load, improves tool selection accuracy, and enables precise coordination across similar APIs. We evaluate MapAgent on four diverse geospatial benchmarks—MapEval-Textual, MapEval-API, MapEval-Visual, and MapQA—and demonstrate substantial gains over state-of-the-art tool-augmented and agentic baselines.