Postgraduate Seminar Series

Venue: Graduate Seminar Room

Date & Time: September 27, 2025 at 2:30 PM

Speaker Information

Sabab Aosaf (Std No. 0421052003) is a part time M.Sc. student in the department of CSE, BUET. He completed his undergraduate studies from Bangladesh University of Engineering and Technology (BUET) in 2018. His research interest lies in the field(s) of Metaheuristics, Genetic Algorithms, Bioinformatics, Unsupervised Learning, and Large Language Models (LLM). He is currently doing his master's thesis under the supervision of Dr. Rezwana Reaz. He will be speaking about his ongoing M.Sc. research in this talk.

Infusing Computational Intelligence in Land Use Allocation Process

Urban land-use allocation represents a complex multi-objective optimization problem critical for sustainable urban development policy. We proposed novel computational intelligence approaches for optimizing land-use allocation in mixed-use areas, addressing inherent trade-offs between land-use compatibility and economic objectives. We develop multiple optimization algorithms, including custom variants integrating differential evolution with multi-objective genetic algorithms. Key contributions include: (1) CR+DES algorithm leveraging scaled difference vectors for enhanced exploration, (2) systematic constraint relaxation strategy improving solution quality while maintaining feasibility, and (3) statistical validation using Kruskal-Wallis tests with compact letter displays. Applied to a real-world case study with 1,290 plots, CR+DES achieves 3.16% improvement in land-use compatibility compared to state-of-the-art methods, while MSBX+MO excels in price optimization with 3.3% improvement. Statistical analysis confirms algorithms incorporating difference vectors significantly outperform traditional approaches across multiple metrics. The constraint relaxation technique enables broader solution space exploration while maintaining practical constraints. These findings provide urban planners and policymakers with evidence-based computational tools for balancing competing objectives in land-use allocation, supporting more effective urban development policies in rapidly urbanizing regions