Postgraduate Seminar Series

Venue: Graduate Seminar Room
Date & Time: 31 Oct 2026 at 3:00 PM

Speaker Information



Md. Nahid Hasan (Student ID: 0422052047) is a part-time M.Sc. Engg. student in the Department of Computer Science and Engineering (CSE), BUET. He completed his undergraduate studies in Computer Science and Engineering from Khulna University. His research interests include Artificial Intelligence (AI), Machine Learning (ML), Image Processing, and Point Cloud Processing. He is currently pursuing his postgraduate studies under the supervision of Dr. Muhammad Abdullah Adnan. He will be speaking about her ongoing research in this talk.

MULTI-LABEL OBJECT CLASSIFICATION IN POINT CLOUDS USING GRAPH CONVOLUTIONAL NETWORK

Point clouds are a fundamental representation for 3D perception in robotics, autonomous systems, and augmented reality; however, despite progress in single-label classification, multi-label object recognition in point clouds—where multiple object categories inherently co-exist—remains underexplored. This paper proposes Multi-ContexPoint-GCN, a context-aware framework that formulates point cloud classification as a multi-label problem by employing Binary Cross-Entropy loss with sigmoid activation and integrating a Graph Convolutional Network (GCN) branch — chosen for its ability to exploit sparse, structured label co-occurrence through localized message passing over a data-driven label graph — to model inter-label dependencies arising from the physical layout constraints of indoor 3D scenes. Extensive experiments on the S3DIS and ScanNet datasets demonstrate the effectiveness and generalizability of the proposed approach across different backbone architectures. On S3DIS, the GCN branch improves mean Average Precision (mAP) by 3.18% with PointNet and by 1.39% with PointNet++, while on ScanNet, gains of 2.05% and 1.33% mAP are achieved using PointNet and PointNet++ backbones, respectively. These results confirm that explicitly modeling label correlations consistently enhances multi-label point cloud recognition, establishing a robust paradigm for context-aware 3D scene understanding.