**Sri Sivasubramaniya Nadar College of Engineering**

**(An Autonomous Institution, Affiliated to Anna University)**

**Department of Information Technology**

**UIT2718 – PROJECT WORK PHASE - II**

**ABSTRACT**

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| **Title** | Floorplan Retrieval and Generator | |

This project presents an integrated AI-driven system for floor plan retrieval and generation, addressing the need for both rapid search and versatile creation. To enable quick and efficient floor plan retrieval, we utilize BERT embeddings to transform user prompts and floor plan metadata into high-dimensional vector representations that capture both semantic and spatial information. These embeddings are stored in a FAISS-based vector database, allowing for fast and accurate similarity searches. While this retrieval method provides an efficient way to find relevant floor plans, its accuracy depends on the quality of available data. To enhance generalization and diversity, we incorporate data augmentation techniques, improving the system's ability to align retrieved plans with user specifications.

For more precise and adaptable floor plan generation, we extend our approach by employing simulated annealing with Voronoi diagrams. We segment the floor plan interior into six directional regions and dynamically adjust the expansion rate to control room growth. Circular artifacts from Voronoi cells are rectified using minimum enclosing rectangles to ensure accurate room shapes. To preserve spatial integrity and maintain boundary conformity, we apply a flood-fill algorithm to remove any overflow beyond the boundary. This generation method allows greater flexibility in creating complex and realistic floor plans, although it requires more computational time compared to retrieval.

By combining these complementary techniques, our system provides a comprehensive solution for floor plan retrieval and generation.

Signature of Students Signature of Guide