AI ML ASSIGNMENT REPORT WEEK 2

TITLE

BotGuide: Distance Mapping and Pathfinding for Campus Navigation

ABSTRACT

BotGuide is an AI-powered chatbot designed to assist with campus navigation at Chanakya University. In Week 2, the project extends its functionality by including real-world distance data between key campus locations. These distances are represented as a weighted graph, enabling more accurate route calculations. With Google Earth used to measure distances and Sigma applied for visualization, the dataset becomes suitable for implementing BFS, DFS, and UCS. This enhancement allows BotGuide to suggest efficient and shortest routes, making navigation smarter and more practical for students and visitors.

INTRODUCTION

Navigating a large campus often requires not just directions but also knowledge of the most efficient path. In Week 1, BotGuide introduced a chatbot-based navigation model using graph theory and search algorithms. Week 2 builds upon this foundation by integrating distance measurements into the system. By modeling the campus as a weighted graph, BotGuide now shifts from simple path discovery to more accurate path optimization.

PROBLEM STATEMENT

The initial version of BotGuide suggested paths without considering real distances, which limited its accuracy. Students and visitors need the shortest possible route, not just any available one. The challenge in Week 2 is to map actual distances between campus buildings and apply search algorithms like BFS, DFS, and UCS to identify efficient paths.

OBJECTIVES

- Collect real-world campus distance data using Google Earth.
- Represent locations and connections as a weighted graph.
- Implement BFS, DFS, and UCS for pathfinding.
- Visualize the mapped campus using Sigma.
- Enhance BotGuide's ability to guide students and visitors with accurate routes.

SCOPE

In Scope

- Distance mapping between gates, admin blocks, hostels, food court, staff quarters, and sports area.
- Weighted graph representation of the campus.
- Pathfinding with BFS, DFS, and UCS.
- Visualization of the campus map with Sigma.

Out of Scope

- Indoor navigation within classrooms or offices.
- Areas beyond Chanakya University's main campus.

DATA REQUIREMENTS

- Campus Distance Data: Distances between Gate 1, Gate 2, Admin Blocks, Hostel, Food Court, Parents' Stay Area, Staff Quarters, and Sports Ground.
- Graph Representation: Nodes (locations) and weighted edges (distances).
- Visualization Input: Data formatted for Sigma mapping.

TOOLS & TECHNOLOGIES

- Google Earth – for measuring and validating distances.
- Sigma – for creating and visualizing the campus map.
- Search Algorithms: BFS, DFS, UCS for pathfinding.