Project Title

Intellinavi: Intelligent Campus Navigation System for Chanakya University

Abstract

Navigating a large university campus can often be challenging, especially for new students and visitors unfamiliar with its layout. IntelliNavi is an intelligent campus navigation system designed for Chanakya University. It digitally represents the campus as a graph-based model, where buildings and pathways are treated as nodes and edges. Search algorithms such as BFS, DFS, UCS, and A\* are implemented to calculate the most optimal routes between locations. In addition to route planning, IntelliNavi integrates an interactive chatbot (Dialogflow/Rasa) to provide step-by-step guidance, answer frequently asked questions, and share essential information about campus facilities. The goal is to minimize confusion, save time, and enhance the overall campus navigation experience for students, staff, and guests.

Introduction

Chanakya University, with its diverse academic blocks, hostels, administrative offices, and recreational facilities, can be complex to navigate, especially for newcomers. Traditional static tools such as campus maps and signboards offer limited assistance and lack interactivity. With increasing campus activities and expanding infrastructure, the need for a smart, interactive, and optimized navigation system has become essential. IntelliNavi addresses this need by combining graph theory algorithms with an AI-powered chatbot interface, enabling real-time assistance and efficient route discovery within campus boundaries.

Problem Statement

Students, staff, and visitors often face difficulties in navigating the Chanakya University campus because:

Current solutions (maps, signboards) are static and non-interactive.

There is no system to calculate the shortest or most efficient path between two points.

Newcomers spend excess time searching for buildings and services.

This leads to time delays, missed events or classes, and overall inconvenience. Hence, there is a strong need for an intelligent campus navigation solution that offers optimal pathfinding and real-time interactive support.

Objectives

1. Graph-Based Navigation – Digitally model the campus using a weighted graph (nodes = buildings, edges = pathways).

2. Campus Infrastructure Digitization – Include all academic blocks, hostels, cafeteria, library, sports complex, auditorium, and administrative buildings.

3. Optimal Pathfinding – Implement and compare BFS, DFS, UCS, and A\* algorithms for shortest path determination.

4. Interactive Chatbot Integration – Build a chatbot (Dialogflow/Rasa) to handle queries like: “How to reach the library from the main gate?”.

5. User-Friendly Interface – Design a web/mobile interface (Streamlit or lightweight app) for ease of use.

6. Improved User Experience – Save time, reduce confusion, and enhance first-time visitor convenience.

Scope

Covers entire campus layout: main gate, academic blocks, hostels, library, cafeteria, auditorium, sports complex, parking zones, etc.

Provides step-by-step navigation and FAQ-based information.

Designed for students, faculty, visitors, and administrative staff.

Accessible via web or mobile platforms.

Limited to on-campus navigation only (no external GPS).

Requirements

1. Campus Layout Data – Digital map with building locations, pathways, and distances.

2. Graph Data Structure – Nodes representing locations and weighted edges representing paths.

3. Database – MySQL for storing facility information, routes, and FAQs.

4. Chatbot Framework – Dialogflow or Rasa for natural language query handling.

5. Optional APIs – Google Maps API (for visual representation, not external navigation).

6. Frequently Asked Questions Repository – Common user queries and answers.

Literature Review (Similar Systems)

Google Maps & Assistant – Offers navigation but lacks campus-specific details and indoor pathways.

Indoor Navigation Systems – Effective but often complex and expensive to deploy in university settings.

Existing Campus Apps (Static) – Provide maps but lack interactive routing and intelligent query response.

Tools & Technologies

Programming Language: Python

Algorithms: BFS, DFS, UCS, A\*

Chatbot Framework: Dialogflow / Rasa

Frontend/UI: Streamlit or lightweight mobile/web interface

Database: MySQL

Optional Visualization: Google Maps API for map display

Deliverables (week 1)

1.project synopsis draft – title,abstract,introduction,problem,objectives,scope.

2.Requirement document-campus layout,departments,faqs

3.tool/technology list-python, mysql, streamlit/dialogflow, search algorithms