



**UTM**  
UNIVERSITI TEKNOLOGI MALAYSIA

**FACULTY OF COMPUTING**  
UTM Johor Bahru

## **SECP 1513: Technology Information System**

Semester 01, 2024/2025

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### **PROJECT PROPOSAL**

### **ARNAVI**

**Team Name: SINTECH ERROR (GROUP 6)**

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## 1. Introduction

# Navigation System for The Faculty of Computing: NABC Framework

### Need(N)

The proposed system, ARNAVI, addresses the challenge of navigating the Faculty of Computing, a large and complex academic environment. Students, staff and visitor often struggle to locate classrooms, labs, faculty offices and other facilities efficiently. For instance, surveys have shown that more than 60% of students sometimes have a problem navigating the faculty of computing [1]. This issue leads to wasted time, delays in classes or meetings and frustration for first time visitors or those unfamiliar with the layout.

### Approach (A)

ARNAVI leverages Augmented Reality (AR) technology to provide an immersive intuitive, and interactive navigation experience

#### How it works:

- User access ARNAVI through a mobile app compatible with both iOS and android devices.
- The app uses the device's camera and AR overlay to guide users in real time, projecting directional arrows, virtual signboards and contextual labels onto the live camera view.
- **Indoor navigation:** Employs beacon technology and AR markers placed strategically across the campus, enabling precise room level guidance even in multi-story buildings.
- **Interactive features:** Users can tap on AR objects to get additional information such as faculty member's office hours, details about labs or real time event updates.
- **Personalized routes:** The system creates routes based on the user preferences, accessibility needs such as wheelchair friendly path or proximity to amenities like elevators and restrooms.

### Benefit(B)

ARNAVI offers numerous benefits:

- **Immersive guidance:** AR overlays provide clear, visual directions, reducing confusion and making navigation effortless.
- **Enhanced accessibility:** The app caters to diverse user groups, including individuals with disabilities, through features like audio guidance and accessible route suggestions.

- **Improved engagement:** The navigation is really engaging especially with the AR interactive elements, especially for first time users and visitors.
- **Efficiency:** Save time and stress by finding their destinations quickly even if unfamiliar areas.

## Competitor(C)

- **Google maps:** Effective for outdoor navigation but unable to provide indoor room level guidance or AR enhanced directions [2].
- **Campus maps:** Outdated and non-interactive, these fail to meet the dynamic navigation needs of modern academic environment.
- **IndoorAtlas:** A sophisticated indoor navigation tool but does not integrate AR features for enhanced user engagement [3].

**ARNAVI** sets itself apart with AR based real time guidance, interactive features and focus on personalized, accessible and seamless indoor and outdoor navigation.

## 2. Existing Systems

### 1. Manual System

Currently, navigation within the Faculty of Computing building relies on:

- **Signage:** Physical signs indicating room numbers and facilities.
- **Issues:**
  - Can be confusing for first-time visitors unfamiliar with the building layout.
  - Lack of multilingual support.
  - Static information that doesn't adapt to changes, such as room relocations or event-based setups.
- **Directory maps :** Displays the building layout with a "You Are Here" marker to help users orient themselves.

#### Issues:

- Static and cannot provide real-time or interactive guidance.
- Difficult to update when room locations or building layouts change.
- Relies on users' ability to interpret the map, which can be confusing for first-time visitors.

- Limited accessibility, as users must locate the map on the wall to use it.

## 2. Existing Digital Systems

While no specific digital navigation system is tailored for the Faculty of Computing, broader solutions are used:

- **Google Maps:** Can guide users to the building but lacks detailed indoor navigation and context-specific features like finding specific rooms or labs.

### Issues:

- Ineffective for indoor navigation.
- Requires user knowledge of room labels and layout.

Table 1: Comparison of existing systems

Features	Manual signage	Directory maps	Google maps
Indoor Navigation	No	No	No
Real-Time Updates	No	No	Yes (outdoor only)
AR Capability	No	No	No
Multilingual Support	Limited	No	Limited

## 3. Proposed System

The **AR-based Navigation System (ARNAVI)** for the Faculty of Computing is an innovative platform that uses **Augmented Reality (AR)** to guide users through the building. It is designed to enhance user experience by providing real-time, interactive, and intuitive navigation assistance for students, faculty, staff, and visitors.

### Integration with a Larger System

The ARNAVI navigation system is part of a **smart campus ecosystem** and interfaces with existing university systems such as:

1. **Student Information System (SIS):**
  - a. Integrates schedules and room information for students and faculty.
2. **Event Management System:**
  - a. Displays directions to event venues like seminars, conferences, or workshops.
3. **Campus-Wide Navigation System:**
  - a. Offers seamless transitions between the Faculty of Computing and other buildings on campus.

## **System Description**

The ARNAVI navigation system overlays virtual directions, markers, and labels onto the user's smartphone or AR-enabled device screen, enhancing navigation with real-world interactivity.

### **Key Features:**

1. **AR Pathways:**
  - a. Displays virtual arrows and indicators in the user's camera view, guiding them to their destination.
2. **Location Search:**
  - a. Users can search for specific locations (example: "N28a-BT3" or "Dr. Iqbal's Office") and follow the directions.
3. **Personalized Schedules:**
  - a. Students and faculty members can access their schedules and receive AR guidance to their next location.
4. **Accessibility Routes:**
  - a. Highlights wheelchair-friendly pathways and elevators for differently-abled users.
5. **QR Code Integration:**
  - a. Users can scan QR codes placed outside rooms for quick access to inform that the room is occupied or navigation assistance.
6. **Offline Support:**
  - a. Allows users to download building maps for offline ARNAVI.

### **User and Their Roles:**

1. **Students:**
  - a. **Roles:** Access ARNAVI to classrooms, labs, study areas, and faculty offices.
  - b. **Functions They Can Perform:**
    - i. Search for and locate their lecture halls.

- ii. Use AR to visualize their path in real-time.

## 2. Faculty Members:

- a. **Roles:** Navigate to lecture venues, offices, and meeting rooms.
- b. **Functions They Can Perform:**
  - i. use AR directions to classrooms.
  - ii. Search for and collaborate with other staff members.

## 3. Administrative Staff:

- a. **Roles:** Manage room assignments and assist visitors using ARNAVI guidance.
- b. **Functions They Can Perform:**
  - i. Update room allocation and building maps.
  - ii. Guide visitors with AR-based directions.

## 4. Visitors:

- a. **Roles:** Use ARNAVI assistance to locate offices, seminar halls, or meeting room.
- b. **Functions They Can Perform:**
  - i. Search for specific locations and follow ARNAVI pathways.
  - ii. Access event details and find corresponding venues.

## Advantages of the ARNAVI system

1. **Enhanced Navigation:** ARNAVI provides an immersive experience for all users especially for the new student in UTM.
2. **Improved Accessibility:** Give an accessibility for differently-abled individuals.
3. **Real-Time Updates:** Can notified the user about room availability instantly.
4. **Reduce Headache:** ARNAVI system can easily help student to find specific room efficiently without any issue due to the complex infrastructure of faculty.

## 4. References

- [1] **Academic research paper:** problems in navigating the faculty of computing.  
[https://docs.google.com/spreadsheets/d/16ZTjKmbvZX5udJwaxEqI09FGPa\\_1h5OQ46i44ysEn\\_c/edit?usp=sharing](https://docs.google.com/spreadsheets/d/16ZTjKmbvZX5udJwaxEqI09FGPa_1h5OQ46i44ysEn_c/edit?usp=sharing)
- [2] **Google maps.** Retrieved from <https://g.co/kgs/r6vH7fr>
- [3] **Indoor atlas.** Retrieved from <https://www.indooratlas.com>

## Appendices

<https://www.zerogpt.com>

AI/GPT Detector

ZeroCHAT-4 & 5

Plagiarism Checker

AI Summarizer

AI Paraphraser

AI Grammar Check

AI Translator

Word Counter

AI Email Helper

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PROJECT PROPOSAL  
ARNAVI

Team Name: SINTECH ERROR (GROUP 6)

Detect Text

Upload File

8,701/15,000 Characters  
Check 125,000 characters, [Upgrade Here](#)

Your Text is Human written

3.58%  
AI GPT\*



