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| **Sr. No.** | **Name of Chapter** |
| 1 | Introduction  -Problem Statement  -Objectives  -Application |
| 2 | Literature Survey   * Background * Existing Systems   (Study 3-5 standard research papers. Include their citations) |
| 3 | Methodology   * Hardware and Software requirement * System Design (Block Diagram) * Algorithm * Exploratory Data Analysis and Dataset Visualization (Dataset used and Visualization using PowerBI or Tablue) |
| 4 | Implementation Details   * Module wise description ( at each stage snapshot of work done and testing) * Module 1 * Module 2 * Module 3 |
| 5 | Results   * Dataset used (include citation) * Performance Metrics * Model Evaluation |
| 6 | Conclusion |
| 7 | References |

1. **Introduction**

Navigating large railway stations can be overwhelming, especially for first-time visitors or those unfamiliar with the layout. Traditional signboards and manual guidance are often inefficient, leading to confusion and delays. To address this, our project integrates **Augmented Reality (AR)** with **real-time pathfinding**, enabling users to navigate railway stations seamlessly through their smartphones.

* 1. **Problem Statement**

Railway stations are complex structures with multiple platforms, exits, ticket counters, and facilities. Commuters often struggle to find their way, leading to **missed trains, delays, and inconvenience**. Existing solutions, such as **static maps and signboards**, lack real-time adaptability and interactive assistance.

* 1. **Objectives**
* **Develop an AR-based navigation system to guide users efficiently.**
* **Implement real-time pathfinding using the A algorithm\*.**
* **Store and manage indoor maps dynamically using Firebase.**
* **Ensure accessibility for all users, including tourists and first-time travelers.**
  1. **Application**
* **Railway Stations** – Assist passengers in finding platforms, ticket counters, and exits.
* **Airports & Malls** – Expand AR navigation for large public spaces.
* **Hospitals** – Help patients and visitors locate departments efficiently.
* **Universities & Campuses** – Provide interactive campus navigation for students.

1. **Literature Survey**

**2.1 Background: Importance of Indoor Navigation**

* Large railway stations can be confusing for passengers, leading to delays and inconvenience.
* Traditional navigation methods like static maps and signboards often fail due to language barriers or complex station layouts.
* Augmented Reality (AR) provides a more interactive and real-time navigation experience.

**2.2 Existing Systems & Their Limitations**

| **System** | **Country/Area** | **Technology Used** | **Limitations** |
| --- | --- | --- | --- |
| **Tokyo Metro AR App** | Japan | AR Navigation for metro stations | Limited to metro, no real-time updates |
| **Indoor Google Maps** | USA, Europe, Japan | GPS, WiFi positioning | Requires pre-mapped locations, limited customization |
| **Navilens (For visually impaired users)** | Spain | QR Code-Based Navigation | Requires pre-installed QR markers |

**2.3 Limitations of Current Solutions**

* Dependency on pre-mapped layouts.
* No real-time crowd updates or dynamic rerouting.
* Lack of customization for different railway stations.
* Limited AR-based solutions available for railway stations.

**2.4 Related Research Papers**

1. **"Augmented Reality for Indoor Navigation"** – Discusses the potential of AR in large transport hubs.
2. **"AI-Powered Navigation for Smart Cities"** – Highlights the role of machine learning in optimizing routes.
3. **"Comparison of Indoor Positioning Systems"** – Reviews GPS, WiFi, and AR-based navigation approaches.
4. **"Enhancing Accessibility Through AR Navigation"** – Focuses on AR applications for visually impaired passengers.