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PRESENTATION

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Smart Parking Navigation System

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Team Introduction

- Our team, consisting of Nikhil Kumar, Himangi Shakya, and Nikunja Pandey, is developing a **Smart Parking Navigation System.**
- In the upcoming slides, we will highlight the challenges drivers face while parking and demonstrate how our website simplifies and streamlines the process.
- We believe this platform will benefit both the public and the government by enhancing parking efficiency and convenience.

Discussion About Problem

- **Urban Traffic Congestion**: According to a **2021 report** ,the Indian cities rank among the world's most congested, with 2021 data showing traffic speeds in some metros averaging under 20 km/h due to parking issues.
- **Parking Shortage**:Indian urban areas face a 40-50% parking shortage during peak hours, especially in commercial and densely populated residential zones.
- **Time Spent Searching for Parking**:Drivers in Indian cities spend an average of 30 minutes searching for parking, impacting productivity and causing frustration.
- **Environmental Impact**: Parking inefficiencies in India cause 10-15% of urban vehicular emissions due to increased fuel consumption from vehicles searching for parking.
- **Projected Growth of Vehicle Ownership**:India's vehicle ownership is set to double by 2030, drastically increasing parking demand and worsening shortages and congestion.

Problem Statement

Problems In Parking Their Vehicle In An Unknown / New City

- **Difficulty In Locating Parking Spaces:**
  - Drivers Waste Time And Effort Manually Searching For Parking In Unfamiliar Area.
  - Frustrating Process.
  - Rush During Peak Hours Or In High-Demand Areas.
- **Insufficient Parking Spaces:**
  - Parking Spots Are Often Limited
  - Overcrowded Parking Lots
  - Parking Far From Their Destinations
- **Wasted Time Due To Disconnected Parking Systems**
  - Drivers Move Between Lots, Which Wastes Their Time
  - It Also Increases Traffic
- **Overpriced Parking Tickets**
  - Private Tenders
  - Different Dealers Set The Pricing According To Their Own Will
- **Underutilized Spaces:**
  - Drivers Unaware Of Available Spaces In Their Vicinity
  - Inefficient Use Of Valuable Urban Land

Proposed Solution

Phase 1 will include:

- **Interconnected Spaces:** A Unified Digital System Connecting Parking Facilities.
- **Real-Time Navigation:** Directing Drivers To Available Spots Based On Live Data.
- **Parking Information:** Displaying Availability, Rates, And Additional Services Like Ev Charging.
- **Smart Parking Optimization**: The Platform Will Use Digital Tools To Guide Drivers, Reduce Search Time, And Allow Parking Operators To Optimize Space Utilization.
- **Networked Smart Parking**:Our Proposed Solution Is To Implement A Smart Parking System That Interconnects Parking Spaces Across A Network.

Key Features of Phase 1

Interconnection of parking spaces:

How various parking lots will be digitally linked.

- **Interconnected Spaces:** A unified digital system connecting parking facilities.
- **Real-Time Navigation:** Directing drivers to available Parking Spaces based on live data.
- **Parking Information:** Displaying, rates, and additional services like EV charging
- **Sustainability**: Promotes eco-friendly initiatives by encouraging efficient parking and reducing unnecessary emissions from vehicles idling or searching for spaces.

Parking Space Interconnection

Implementation

We will establish a network of interconnected parking spaces

Facility Communication

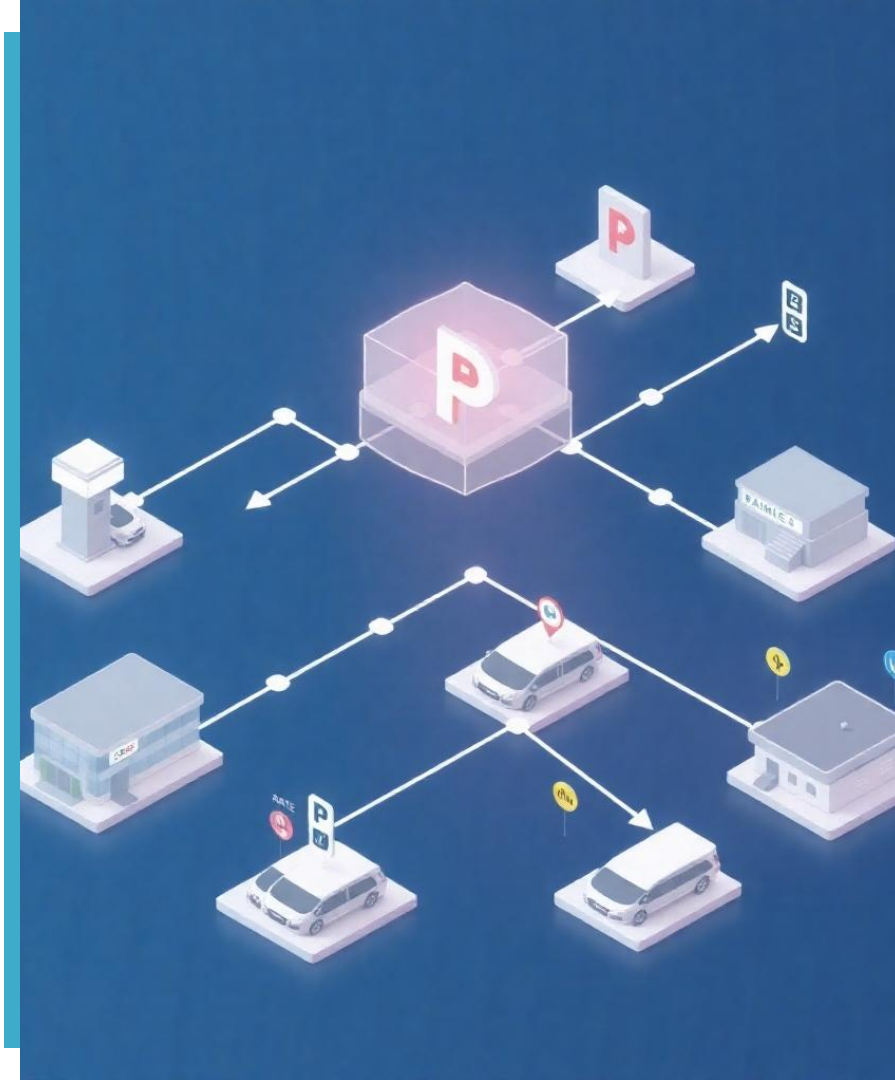
Parking facilities will communicate to optimize space usage and improve efficiency.

Enhanced Driver Experience

Drivers will receive up-to-date information, reducing search time and frustration.

Future Scalability

The system is designed to scale, allowing more parking areas to join the network seamlessly.



Navigation System

Route Optimization: The System Will Provide The Most Efficient Route To The Parking Spot, Reducing Time And Fuel Consumption.

User-Friendly Interface: The Navigation System Will Be Intuitive, Offering Clear Directions To Ensure A Smooth Parking Experience.

Phase 2 - User-Submitted Parking Spaces

1. User Submission Portal

A platform where drivers can report available parking spots or issues, enhancing real-time data collection and community participation.

2. Verification System

A method to ensure the accuracy of parking information, building user trust through ratings and partnerships with local authorities.

3. Dynamic Listings

Real-time updates on parking availability and pricing, helping users find spots quickly and reducing search times.

4. Revenue Opportunities for Landowners

Landowners can earn money by renting out unused parking spaces, benefiting both themselves and drivers looking for parking.

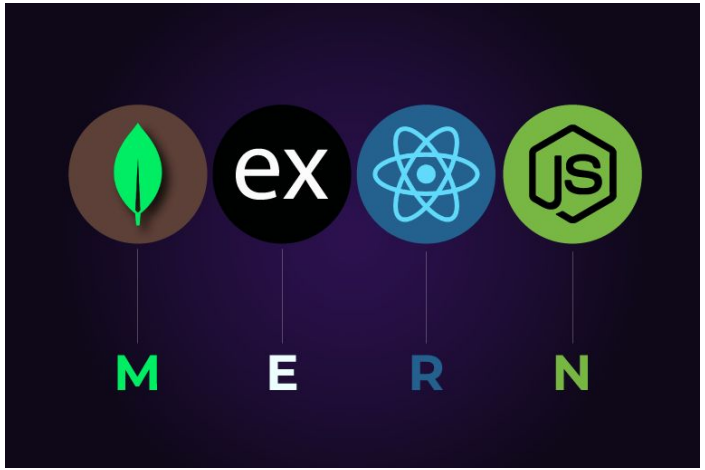
5. Community Engagement

Encouraging local involvement in parking solutions fosters collaboration and promotes responsible parking habits among residents.

Technology Stack

- **Frontend**: React JS, Tailwind CSS, Shadcn UI
- **Backend**: Node.js, Express
- **Database**: MongoDB
- OpenStreetMap Or Google Map Api Or Mappls

OpenStreetMap



Parking Challenges In Local Areas

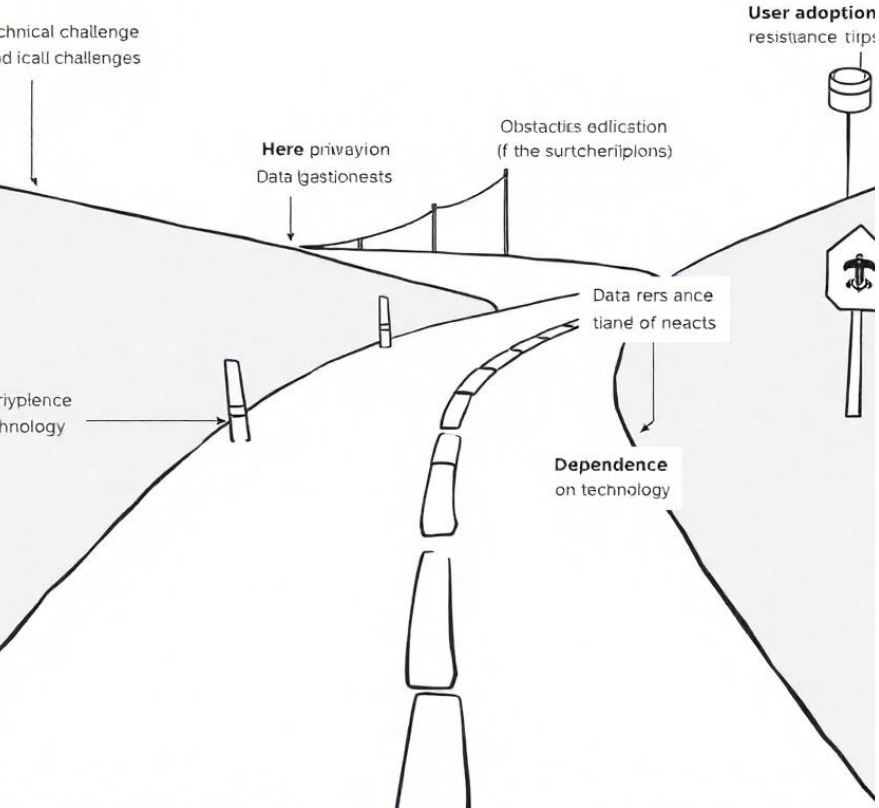
- **Congestion**: Parking congestion in busy areas leads to traffic jams, delays, and reduced road efficiency, impacting public transport and pedestrians.
- **High Emissions From Cars Searching For Parking**: Cars searching for parking emit excess pollutants, increasing the carbon footprint and harming air quality, health, and the environment.
- **Inconsistent Pricing**: Inconsistent parking fees frustrate drivers and lead to underused spaces when cheaper options are poorly advertised.

Expected Benefits, Social And Economic Impact

- **Reduced Congestion**: Efficient parking allocation helps reduce traffic jams, especially in high-demand areas.
- **Enhanced Public Safety**: Efficient parking reduces street congestion, decreasing accidents and promoting safer roads.
- **Better Accessibility**: Reserved spots and better information improve access for people with disabilities or special needs.
- **Increased Revenue for Operators**: Maximized space utilization and dynamic pricing boost revenue for parking operators and businesses.
- **Fuel Cost Savings for Drivers**: Reduced search time leads to lower fuel consumption, saving money for drivers.
- **Boost for Local Businesses**: Easier parking access encourages people to visit nearby shops, restaurants, and businesses, driving economic activity in the area.

Advantages of the Smart Parking Solution

- **Optimized Space Utilization**: Optimized space management for maximum occupancy and profitability.
- **Fuel And Cost Savings**: Efficient parking cuts fuel consumption and expenses.
- **Enhanced User Experience**: Simplified parking through navigation and automated payments.
- **Environmental Benefits**:Cutting idling and driving reduces pollution for a greener city
- **Contactless Payments**: Convenient, touch-free payments eliminate physical handling.



Limitations Of The Smart Parking Solution

- **High Initial Setup Costs:**Installing IoT infrastructure like sensors and cameras is costly, especially for large-scale parking setups.
- **Scalability Challenges:**Expanding parking networks demands significant investment and facility coordination.
- **Energy Consumption**: Continuous operation of sensors, cameras, and servers raises energy use and costs.
- **Limited Integration With Existing Infrastructure**: Older parking facilities struggle to integrate smart systems without expensive upgrades.
- **Maintenance And Technical Issues**: Regular maintenance is needed to avoid technical issues and disruptions in smart parking systems.


Thank you!