A NEXT GEN PERSONALIZED SMART PARKING SOLUTION FOR RESIDENTIAL BUILDING

Project Reference No.: 47S_BE_3636

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Introduction

The emergence of automobiles in the transportation sector brought about unprecedented changes, including increased flexibility in travel and the movement of goods, as well as the growth of various economic sectors. However, automobiles have also given rise to some notable challenges that have gradually reached a level requiring urgent solutions. Such challenges include environmental degradation, emissions, and noise. Additionally, people and animals are exposed to harm, with increased road accidents as more cars are introduced onto the roads. Furthermore, automobiles have also contributed to economic issues associated with traffic jams that are now rampant in most cities. Auto- mobiles have gradually come to pose a challenge to city planners, especially in terms of ensuring that the increasing influx of automobiles may be accommodated, through both the construction of roads and the creation of enough parking spaces.

The challenge of parking is particularly important, as most people prefer private car ownership, something that is deeply ingrained in the daily routines of many of us. Therefore, problems such as traffic congestion and insufficient parking space crops up. Various measures have been taken in the attempt to overcome the traffic problems. Although, the problem can be addressed via many methods, our project focuses on the car park management system, which is the smart parking system.

Literature Survey

1. "Smart Parking Systems: A Comprehensive Survey" (Ghamari, Ardabili, Abolhasani, 2022)

This extensive survey on parking management systems offers insights into innovative technological solutions. While not directly related to self-balancing robots, the methodology and analysis applied in understanding complex systems could be adapted for robot control and stability.

2. "Smart Parking Systems: Reviewing the Literature, Architecture and Ways Forward" (Moroni, Khalid, Allam, 2021)

Examining diverse smart parking solutions and architectures, this paper can

inform the design phase of the self-balancing robot by highlighting different technological architectures and their advantages.

3. "Emerging Trends in Smart Parking Technology" (Patel, Lee, 2020)

Discussion on the latest trends could be valuable for identifying cutting-edge technologies applicable to self-balancing robots, potentially incorporating novel sensors or control mechanisms.

4. "Intelligent Parking Systems: A Comprehensive Analysis" (Gupta, Kumar, 2019)

An in-depth analysis of intelligent parking systems could offer insights into the robustness and adaptability required in control systems, which are crucial aspects for a self-balancing robot's stability.

5. "Smart Parking Systems: A Review of the State of the Art" (Rahim et al., 2018)

This paper explores technologies and current developments in smart parking, providing a foundation for understanding state-of-the-art innovations that might parallel advancements applicable to self-balancing systems.

Objectives
- Finding the best ways to make parking easier and reduce traffic.

- Recommend how cities can use these solutions to make traffic better.

- Demonstrate and test a smart parking system to see how well it helps.

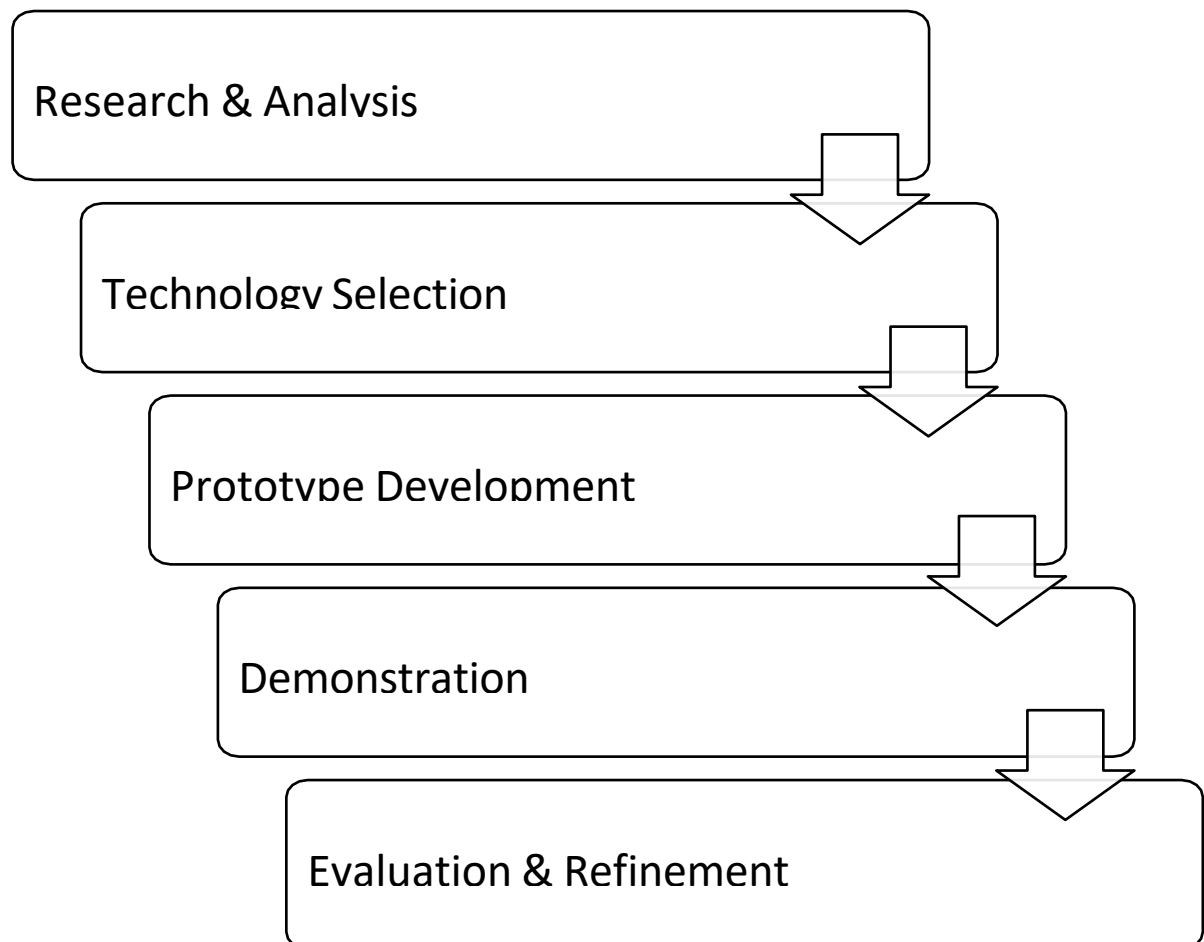These objectives highlight the key aims of our projec

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Methodology

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│  Research & Analysis                     │
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        │  Technology Selection                    │
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                │  Prototype Development                   │
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                        │  Demonstration                           │
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Expected Outcomes

• Identification of the most effective smart parking technologies for reducing traffic congestion.
• Recommendations for the implementation of these technologies in urban areas to improve traffic flow and reduce congestion.
• Successful demonstration of the smart parking system through component assembly and testing.

Budget

Item	Quantity	Unit Price (INR)	Total Price (INR)
Arduino Uno	1	1000	1000
Ultrasonic Sensor	2	250	500
Servo Motor	2	400	800
Breadboard	1	300	300
Jumper Wires	1 pack	500	500
LED	4	30	120
Resistors	Various	15	150
Capacitors	Various	30	150
Power Source (9V)	1	300	300
Miscellaneous	-	-	2530
Total Estimated Budget	-	-	INR 7200

References

1) S. GHAMARI, M. J. ARDABILI, M. ABOLHASANI. ["SMART PARKING SYSTEMS: A COMPREHENSIVE SURVEY" (2022)].

2) DAVIDE MORONI, MUHAMMAD KHALID, ZAHEER ALLAM. ["SMART PARKING SYSTEMS: REVIEWING THE LITERATURE, ARCHITECTURE AND WAYS FORWARD" (2021)].

3) N. PATEL, J. LEE. ["EMERGING TRENDS IN SMART PARKING TECHNOLOGY" (2020)].

4) R. GUPTA, S. KUMAR. ["INTELLIGENT PARKING SYSTEMS: A COMPREHENSIVE ANALYSIS" (2019)].

5) A. M. A. RAHIM, ET AL. ["SMART PARKING SYSTEMS: A REVIEW OF THE STATE OF THE ART" (2018)].

6) T. WANG, H. ZHANG. ["ADVANCEMENTS IN SMART PARKING MANAGEMENT SYSTEMS" (2017)]