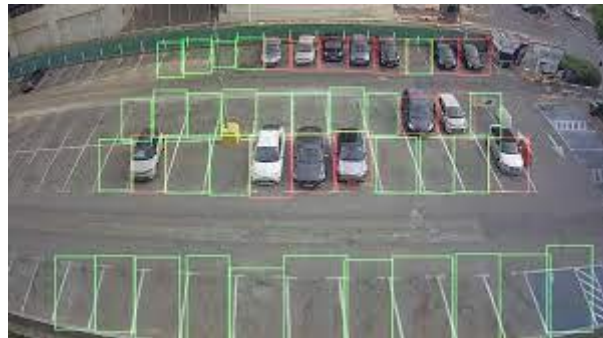




PROJECT: AI in Smart Parking



Submitted to
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In partial fulfilment for the requirements of the award of the degree of “**Bachelor of Technology** (B. Tech)”.

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❖ TEAM MEMBERS

Project Team Number: 22

Name of the Project: AI in Smart Parking

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ROLES AND RESPONSIBILITIES

1. Pratham Malviya - Backend and Coding part
2. Madhu Shalne D - Testing and bug Fixing
3. Roopam Kumar Roy - Frontend and Research

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❖ INTRODUCTION

- Smart parking is a system that uses advanced technology to make the process of finding and reserving parking spaces more efficient and convenient for drivers. One important application of Artificial Intelligence (AI) in smart parking is to use machine learning algorithms to analyze real-time data collected from sensors and cameras installed in parking lots and on streets to provide drivers with accurate and timely information about available parking spaces.
- AI algorithms can also be used to optimize the utilization of parking spaces and to reduce traffic congestion by guiding drivers to available spaces and suggesting alternative routes to avoid areas with high traffic volumes. This can help to improve traffic flow and reduce the time drivers spend searching for parking spaces, thereby reducing fuel consumption and air pollution.
- In addition, AI-powered smart parking systems can be integrated with other smart city technologies, such as public transportation, to provide drivers with real-time information on parking availability and transit options. This can encourage the use of public transportation and reduce the number of cars on the road, thereby reducing traffic congestion and improving air quality.

❖ Different Applications of AI in Smart Parking

Mainly the applications of AI in smart parking is to improve the efficiency, convenience, and sustainability of parking systems. Here are some of the different applications of AI in smart parking:

1. **Real-time parking availability:** AI algorithms can analyze data collected from sensors and cameras installed in parking lots and on streets to provide real-time information about available parking spaces. This can help drivers save time and reduce frustration by enabling them to quickly find and reserve parking spaces.
2. **Predictive parking:** AI can use historical parking data and machine learning algorithms to predict parking availability in specific locations and times of day. This can help drivers plan their trips in advance and avoid areas with high parking demand.
3. **Parking enforcement:** AI can be used to detect parking violations and issue tickets automatically. This can improve parking enforcement efficiency and reduce the workload of parking officers.
4. **Parking guidance:** AI can guide drivers to available parking spaces using digital signs and mobile apps. This can reduce traffic congestion and help drivers save time and fuel.

5. **Payment systems:** AI can automate payment systems and reduce the need for human interaction. This can improve payment efficiency and reduce the risk of fraud.
6. **Sustainability:** AI can optimize the use of parking spaces and reduce traffic congestion, thereby reducing carbon emissions and improving air quality.

❖ Impact of AI in Smart Parking

1. **Improved parking efficiency:** AI algorithms can optimize the utilization of parking spaces and reduce the time drivers spend searching for available parking spots. This can improve parking efficiency and reduce traffic congestion.
2. **Increased convenience:** AI can provide drivers with real-time information about available parking spots, enabling them to quickly find and reserve parking spaces. This can save drivers time and reduce the frustration associated with parking.
3. **Reduced environmental impact:** By reducing the time drivers spend searching for parking spots and optimizing parking utilization, AI can reduce fuel consumption and carbon emissions, thereby improving air quality.
4. **Enhanced safety:** AI-powered parking guidance systems can reduce the risk of accidents by guiding drivers to available parking spaces and helping them avoid collisions with other vehicles or pedestrians.
5. **Improved revenue generation:** AI can optimize parking pricing based on demand and occupancy, maximizing revenue generation for cities and parking operators.
6. **Reduced parking enforcement costs:** AI can automate parking enforcement, reducing the need for human intervention and reducing the cost of enforcement for cities and parking operators.

❖ Future Scope of Smart Parking in AI

1. **Real-time parking availability:** AI-powered sensors and cameras can be used to monitor parking spaces and provide real-time information about available parking spots to drivers. This can help drivers save time and reduce traffic congestion.
2. **Automated payment and ticketing:** AI can be used to automate the payment and ticketing process, eliminating the need for drivers to interact with parking attendants or kiosks. This can make the parking experience more seamless and convenient.

3. **Predictive maintenance:** AI can be used to monitor parking structures and equipment, detecting issues before they become major problems. This can help reduce downtime and maintenance costs.

4. **Parking enforcement:** AI-powered cameras can be used to monitor parking violations and issue citations automatically. This can help ensure that parking rules are being followed and deter illegal parking.

5. **Personalized parking recommendations:** AI can analyze a driver's habits and preferences to provide personalized parking recommendations based on their location and destination. This can help drivers find the most convenient and efficient parking options.

Source code

```
#include <LiquidCrystal.h>
LiquidCrystal lcd(A0, A1, A2, A3, A4, A5);
#include <Servo.h>

Servo myservo1;

int ir_s1 = 2;
int ir_s2 = 4;

int Total = 5;
int Space;

int flag1 = 0;
int flag2 = 0;

void setup() {
  pinMode(ir_s1, INPUT);
  pinMode(ir_s2, INPUT);

  myservo1.attach(3);
  myservo1.write(100);

  lcd.begin(16, 2);
  lcd.setCursor (0,0);
  lcd.print(" Car Parking ");
  lcd.setCursor (0,1);
  lcd.print(" System ");
  delay (2000);
  lcd.clear();

  Space = Total;
}

void loop(){
```

```

if(digitalRead (ir_s1) == LOW && flag1==0){
if(Space>0){flag1=1;
if(flag2==0){myservo1.write(0); Space = Space-1;}
}else{
lcd.setCursor (0,0);
lcd.print(" Sorry not Space ");
lcd.setCursor (0,1);
lcd.print("     Available     ");
delay (1000);
lcd.clear();
}
}

if(digitalRead (ir_s2) == LOW && flag2==0){flag2=1;
if(flag1==0){myservo1.write(0); Space = Space+1;}
}

if(flag1==1 && flag2==1){
delay (1000);
myservo1.write(100);
flag1=0, flag2=0;
}

lcd.setCursor (0,0);
lcd.print("Total Space: ");
lcd.print(Total);




lcd.setCursor (0,1);
lcd.print("Have Space: ");
lcd.print(Space);
}

```

❖ Conclusion

Smart Parking in AI has a lot of potential to improve the parking experience for drivers, reduce traffic congestion, and increase efficiency in parking management. With the use of AI-powered sensors, cameras, and algorithms, we can expect real-time parking availability, automated payment and ticketing, predictive maintenance, parking enforcement, and personalized parking recommendations. These advancements can greatly enhance the convenience, safety, and sustainability of urban mobility as AI technology continues to evolve and become more accessible, we can expect to see even more innovative solutions for smart parking in the future.

❖ **Gantt Chart:-**

Tasks Name	05-feb, 2023	20-feb, 2023	7-mar, 2023	23-mar, 2023	8-apr, 2023
Planning					
Research					
Coding					
Testing				