Dynamic Parking Pricing – Project Report

This project was about building a dynamic pricing system for 14 urban parking lots using real-time data.

What I Did

I built two models:

1. **Baseline Model:**
   Price increases slowly based on how full the lot is.
   It's a simple formula using occupancy and capacity.
2. **Demand-Based Model:**
   This model adjusts the price using more features:
   - Occupancy
   - Queue length
   - Traffic level
   - Special day or not
   - Vehicle type (car, bike, truck)

The demand score is calculated from these, and then the price changes accordingly.

Assumptions

- Traffic reduces demand
- Special days increase demand
- Vehicle type affects space usage, so prices are slightly adjusted
- Price should not jump too much (kept smooth and within a range)

Visualizations

I used Bokeh to plot the pricing over time.

- Green line = baseline model
- Blue line = demand-based model

Tools Used

- Python
- Pandas, NumPy
- Bokeh for plotting
- Google Colab

Final Thoughts

The demand-based model gave better, smarter pricing. Everything is in my Colab notebook with comments and plots.