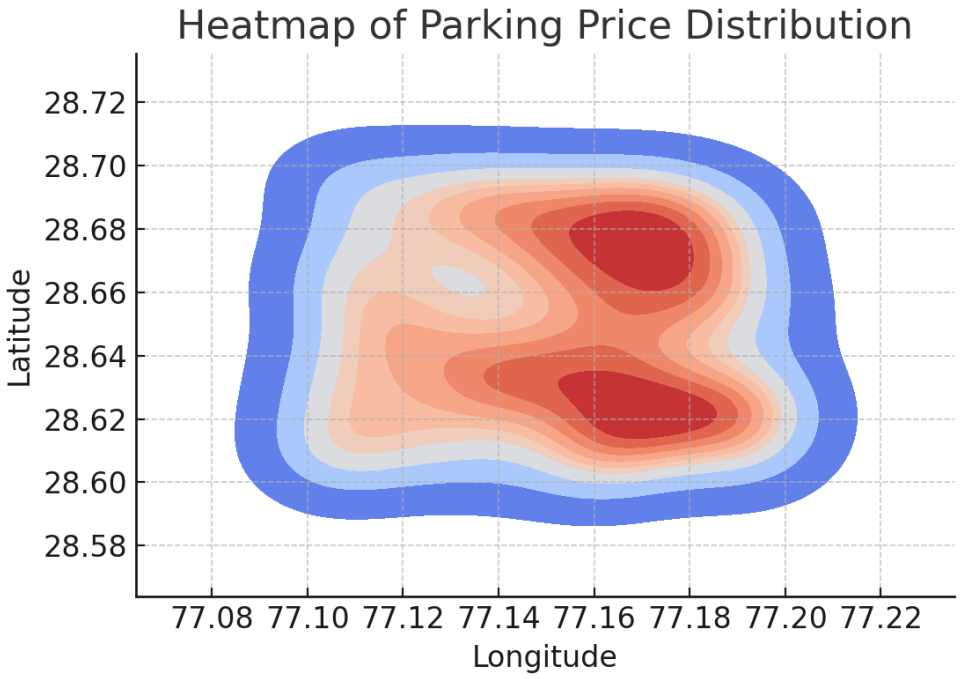
Competitive Pricing Model for Parking Lots

This documentation explains the implementation of a Competitive Pricing Model that adapts real-time prices for parking lots using geographic and demand intelligence. The model factors in occupancy, vehicle type, and competitor pricing in proximity.

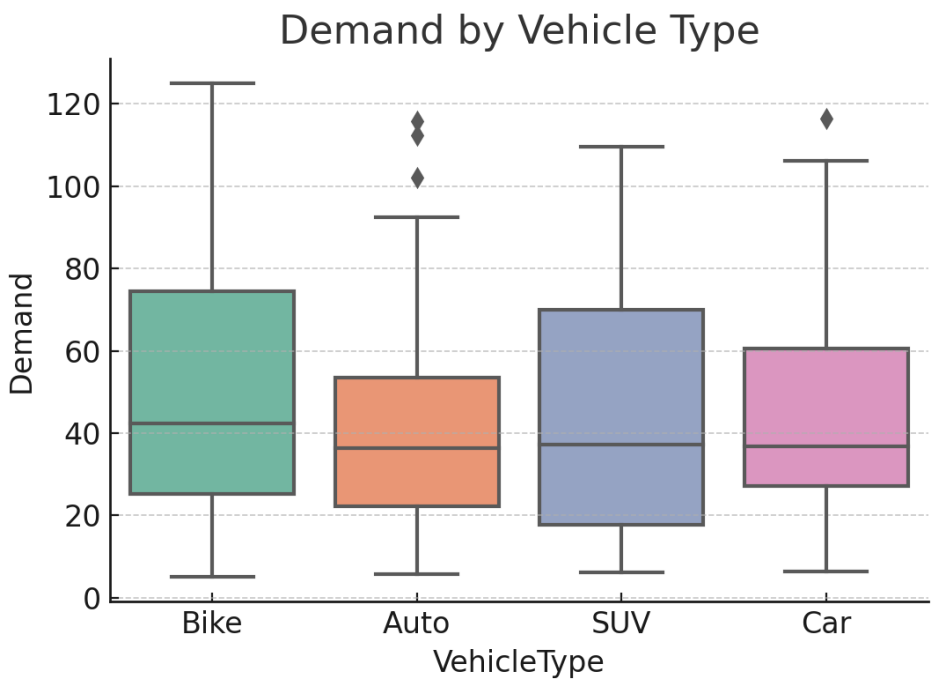
Key Features

- Calculates proximity using Haversine formula
- Adjusts prices based on nearby parking lots
- Incorporates demand dynamics and vehicle types
- Visualizes heatmaps and pricing behavior trends

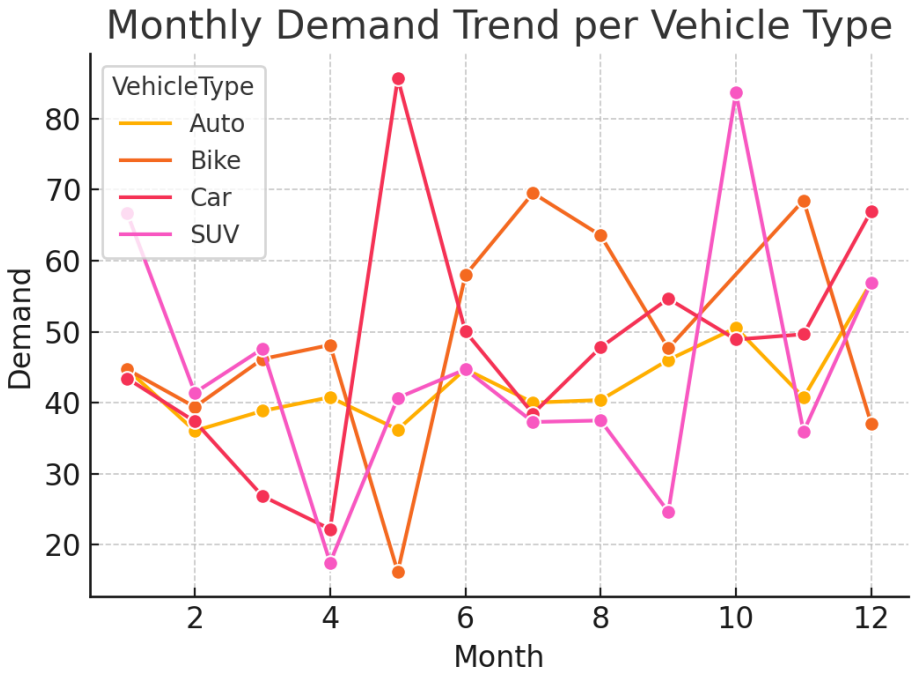
Heatmap: Price Distribution by Location



Demand by Vehicle Type



Monthly Demand Trend per Vehicle Type



How to Call Competitive Price for Parking Lot

To determine a competitive price for a given parking lot:
1. Collect the lot's coordinates (latitude, longitude), price, and occupancy ratio.
2. Scan nearby lots within a defined radius (e.g., 0.5 km).
3. Compare average competitor prices.
4. Apply the following logic:
   - If your lot is full and competitors are cheaper: reduce price.
   - If competitors are more expensive: slightly increase price.
5. Emit the adjusted price.

This logic can be deployed in real-time using Pathway and visualized via Bokeh.