Project Architecture and Workflow

This project aims at addressing, analyzing and predicting the parking prices as well to dynamically adjust the prices according to the real-time and historical demand. This is based on building an model with our ML knowledge and apply it in a very rewarding field.

We load the dataset consisting of 18367 rows of records with columns providing the information on ID, SystemCodeNumber, Capacity, Latitude, Longitude, Occupancy, VehicleType, TrafficConditionNearby, QueueLength, IsSpecialDay, LastUpdatedDate and LastUpdatedTime.

We declare a schema to describe the structure of the incoming data.

We have modelled the first part by using the Ocuupancy and Capacity. We have set the datetime in t and have evaluated and trained the model with **Price = base + alpha × (Occupancy / Capacity)**. We have captured the changed in a day using the .pathway and have used delta_window to grab are the data assiciated with it. We then used the Bokeh plot to observe the trend in order to conclude our results.

While Model 1 provides a simple linear estimate based on occupancy, Model 2 captures multiple real-world influences, making it more robust for scenarios with varying external factors like special events or traffic congestion

We have modelled the second part by using the Ocuupancy and Capacity along with some factors that affect the demand. We have set the datetime in t and have evaluated and trained the model with **Price = BasePrice × (1 + λ × NormalizedDemand)**. We created the demand function based on various factors:The demand function considered factors like queue length, traffic level, special day and vehicle type with different weightages. We have captured the changed in a day using the .pathway and have used

delta_window to grab are the data assiciated with it. We then used the Bokeh plot to observe the trend in order to conclude our results.

This project was a highly engaging and valuable experience that challenged us to apply our machine learning knowledge with the collaboration with .pathway and Bokeh plotting. A lot more can be done in the future by more efficient model and usage of further more resourses for a good and useful prediction.