

# National University of Computer and Emerging Sciences



## Applied Artificial Intelligence Assignment

Submitted By: Muhammad Mujtaba

## Assignment: Linear Regression

**Tool:** Google Colab

### Introduction:

Since, there is an enormous amount of people who use different services like Uber, Careem for their daily commute. We aim to improve the user experience by introducing machine learning to the service to predict in which region of the city M will be there least gap of demand and supply. Demand is the number of orders placed whereas Supply is the number of orders fulfilled.

### Implementation:

- **Data Collection:** From the training data folder we use order data files and cluster map file. Order data files contain order id, driver id, time, price, and region details. Cluster map file contains 66 distinct region hashes and their IDs. Firstly, we store all of this data in respective csv files. Then, we map these region hashes with the hashes in the order data csv file to produce another csv file that contains the supply-demand gap along with timestamps and region IDs.

### Order csv file:

order_id	driver_id	passenger	start_region	dest_region	price	time
97ebd0c6	dd65fa25	ced180d7d	4725c39a5	3e12208d	24	#####
92c3ac925	c077e0297	191a180f0	82cc4851f	b05379ac3	2	#####
abeefc3e2	86dbc1b6	7029e813b	fff4e8465	fff4e8465	9	#####
ch31d0be	4fadfa6ee	21dc133ac	4b7f6f4e2	4b7f6f4e2	11	#####

### Cluster map csv file:

region_hash	region_id
90c5a34f0	1
f2c8c4bb9	2
58c7a1888	3

### Supply-Demand csv file:

Region	Time Slot	Demand	Supply	Demand-Supply Gap
1	1	1625	1492	133
1	2	1395	1286	109
1	3	1285	1190	95
1	4	1150	1088	62
1	5	1083	1029	54
1	6	972	923	49
1	7	911	850	61

- **Linear Regression:** We apply Linear Regression from the sklearn library. Once the model is trained, we calculate Mean Absolute Error and use it to predict the values for each timestamp of each region. Graph is also plotted to give visual representation of Linear Regression analysis and performance on the dataset provided to it. Graph is plotted using matplotlib.

Graph:

