

## Assignment 3

### Predicted XOR Output:

Epoch: 0, Loss: 0.2978

Epoch: 1000, Loss: 0.0010

Epoch: 2000, Loss: 0.0005

Epoch: 3000, Loss: 0.0003

Epoch: 4000, Loss: 0.0002

Epoch: 5000, Loss: 0.0002

Epoch: 6000, Loss: 0.0002

Epoch: 7000, Loss: 0.0001

Epoch: 8000, Loss: 0.0001

Epoch: 9000, Loss: 0.0001

Predicted XOR output:

[[0.99950743]

[0.99981859]

[0.99981722]

[0.99988554]]

### Predicting Trip Duration:

#### Features Used:

The below are the features used:

#### 1. Numerical Features

- passenger\_count: The number of passengers in the taxi ride.
- pickup\_longitude: Longitude coordinate of the pickup location.
- pickup\_latitude: Latitude coordinate of the pickup location.
- dropoff\_longitude: Longitude coordinate of the drop-off location.
- dropoff\_latitude: Latitude coordinate of the drop-off location.

#### 2. Categorical Features

- vendor\_id: Categorical variable indicating the provider of the taxi service.
- store\_and\_fwd\_flag: Binary categorical variable indicating whether the trip record was held in the vehicle memory before sending it to the vendor.

### Transformations:

Date and Time Features:

- The original pickup\_datetime column is converted to datetime format.
- Additional temporal features are extracted:
  - pickup\_hour: Hour of the day when the trip started.

- pickup\_day: Day of the month when the trip started.
- pickup\_month: Month when the trip started.
- pickup\_dayofweek: Day of the week when the trip started.

Distance Feature:

- The haversine\_distance function is applied to calculate the great-circle distance between pickup and drop-off locations. This feature represents the distance of the trip in kilometers.







