# Weekly Mini Project:

**T5**

## Project Members and roles :

- **Sarah Aljuwayr : choosing an existing dataset and project presentation, train the models**
- **Aliah Alotaibi : project report, EDA, Preprocessing**
- **Najla Aldhubaib: particbited in report, models evaluation**

| Project Title: | **Traffic Volum Prediction using Time Series** |

# Description

**Project Overview:**

The project aims to predict traffic volum based on a dataset downloaded frrom UC Irvine website. The project will explore different aspects of time series, including model design, hyperparameter tuning, overfitting handling, and visualization techniques.

**Dataset:** Traffic Volum Prediction from UC Irvine

**Download Dataset Link:** https://archive.ics.uci.edu/dataset/492/metro+interstate+traffic+volume

**Tasks:**

**1-Data Loading and Preprocessing:** Download the Traffic Volum Prediction dataset and load it into google colab environment (Python). Preprocessed the data by 1-missing values: We had
missing values in one column and this column was dropped.
2-duplicates:After checking duplicates we recognized that we have duplicates and where handled using (drop_duplicates). 3-Normalize: we choose to apply Min-Max Scaling: Rescale the data to a fixed range (usually 0 to 1). 4- Applying label encoder on categoricl columns.

**2-Design and implement RNN, LSTM and GRU:**
Design and implement the RNN, LSTM and GRU models using (Keras)TensorFlow. The breakdown of the Recurrent Neural Network (RNN) model architecture contains : input layer, 3 RNN layers, 3 dropout layers, dense layer. Also, for LSTM model: input layer, 2 LSTM layers, dense layer. Finally, GRU model: input layer , 2 GRU layers, 2 dense layers. Group members chose number of target size,batch size, neurons per layer, and epochs number because it is sutiable for the dataset and after run the code multiple times.

**3-Splitting the data :**

- S plitting the data into train and test. Applying MinMaxScaler .
- Function (create_dataset) was used to prepare the data. Reshape the data for LSTM input

**4-Training the Model and Evaluation:**
Train and evaluate the model's performance using: mean squared error.

# Conclusion

After applying three models, LSTM has the best performance based on model evaluation.