**Approach for Water Consumption Prediction**

### **1. Problem Understanding**

The objective of this project is to predict household water consumption patterns based on various influencing factors such as humidity, period consumption index, number of guests, water price, and income level.

### **2. Feature Engineering**

Feature engineering plays a crucial role in improving model performance. The following steps were performed:

* **Correction of Entries**: Adjusted incorrect values in attributes such as Humidity, Period\_Consumption\_Index, Guests, Water\_Price, and Income\_Level.
* **Handling Missing Values**: Imputed missing data where necessary.
* **Outlier Detection and Removal**: Used statistical techniques to identify and remove anomalies.
* **Encoding Categorical Variables**:  
  + Applied **Label Encoding** for ordinal categorical features.
* **Feature Scaling**:  
  + Used **Standardization** to bring all numerical values to a common scale.

### **3. Tools Used**

The project was implemented using the following tools and libraries:

* **Python** as the programming language
* **Pandas, NumPy** for data manipulation
* **Matplotlib, Seaborn** for visualization and exploratory data analysis
* **Scikit-learn** for data preprocessing, model training, and evaluation
* **Tensorflow** for deep Learning Model

### **4. Model Training**

The dataset was split into training and testing sets to ensure proper evaluation. ANN models were trained and tested to find the best-performing model.

### **5. Prediction**

The trained model was used to predict water consumption for test cases, and performance metrics were evaluated to measure accuracy and effectiveness.

### **6. Included Files**

This archive contains:

* **Python source code**
* **Dataset**
* **This documentation explaining the approach**

This structured approach ensures a systematic prediction of household water consumption patterns while maintaining accuracy and interpretability.