1. Hammerstein-Wiener Model (HWM)

Data: 80% Training 20% Validation

MSE: 35702235.74418667, R^2: -6.043527755178625

2. Artificial Neural Network (ANN)

We use Keras Sequential 1D CNN,

Data: 80% Training 20% Validation

hidden_layers: Dense(64), Dense(32), Dense(1)

activation: relu

optimizer: adam

Loss:

Metrics: mean

batch_size: 10

epochs: 5000

Epoch 5000: Loss = 395286.4375, MAE = 535.9312, Val Loss = 587948.8125, Val MAE = 636.2283

3. Convolutional Neural Network (CNN)

We use Keras Sequential 1D CNN,

Data: 80% Training 20% Validation

conv_layers: 1D Conv with 64 Filters

pool_size: MaxPooling size1D (2).

dense_layers: 50.

activation: relu

optimizer: adam optimizer

Metric: mae

Loss: mean square error

batch_size: 10

epochs: 5000

Epoch 5000: Loss = 571461.0000, MAE = 618.7280, Val Loss = 911596.1875, Val MAE = 779.9234

4. Long Short-Term Memory (LSTM)

Data: 80% Training 20% Validation

lstm_units:

dense_layers:

activation: relu

optimizer: adam optimizer

learning_rate: 0.002

batch_size: 10

epochs: 20

5. XGBoost

Data: 80% Training 20% Validation

n_estimators: 200

learning_rate: 0.01

max_depth: 6

MSE: 686721.2051523325, R^2: 0.8645199728325765

6. Random Forest

Data: 80% Training 20% Validation

n_estimators: 200

max_depth: 10

Metric: mae

random_state: 42

Epochs: 5000

Epoch 5000: Train Loss = 78523.4321, Train MAE = 208.3176, Val Loss = 557371.0125, Val MAE = 612.3485

NB: Same parameter is used for the SHAP of both XGB and RF