Course Project

Prediction of the electrical energy output of a Combined Cycle Power Plant (CCPP)

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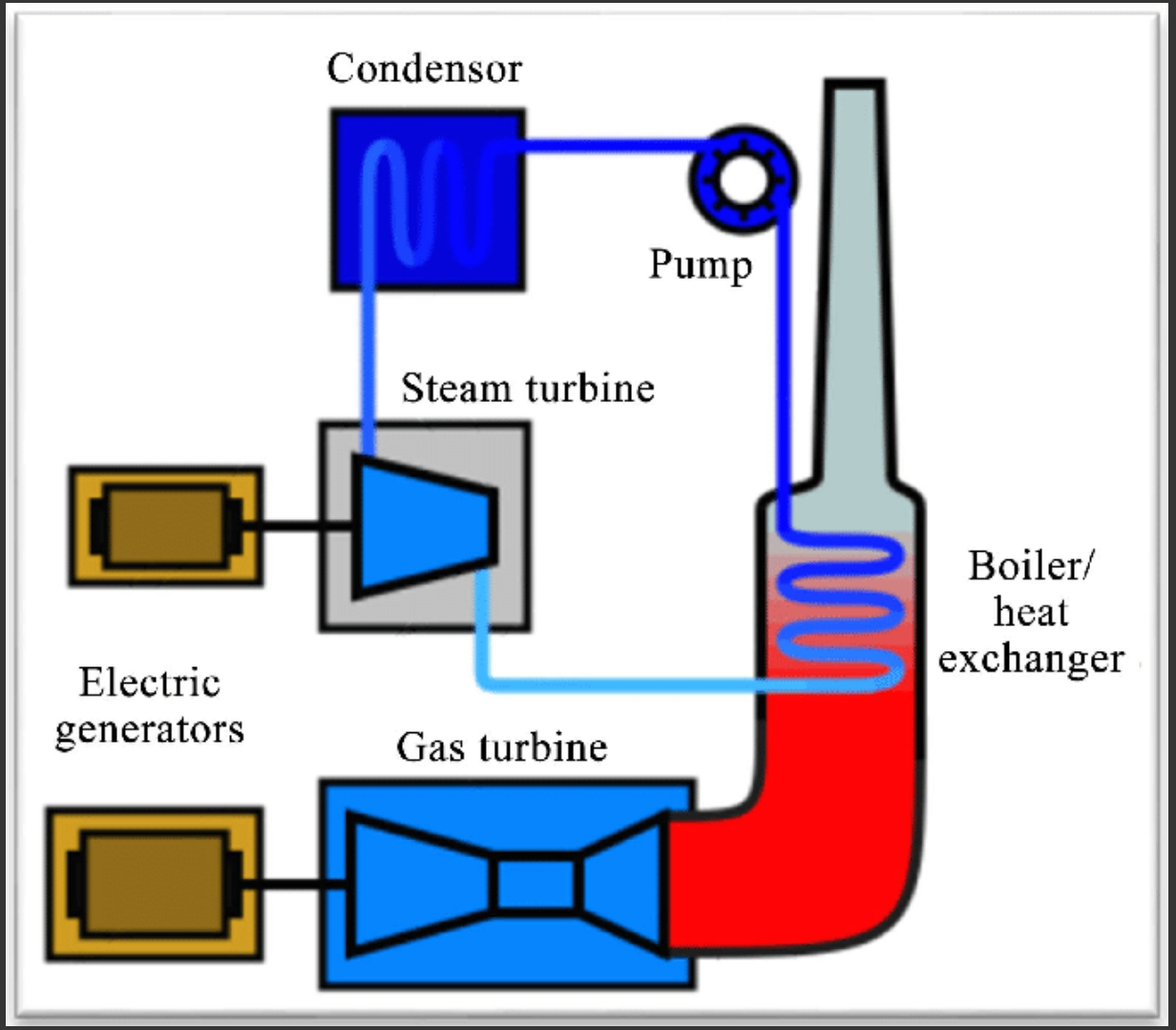
CCPP


Condensor
Pump
Steam turbine
Boiler/
heat
exchanger
Electric
generators
Gas turbine

Data

```
RangeIndex: 9568 entries, 0 to 9567
Data columns (total 5 columns):
 #   Column  Non-Null Count  Dtype  
---  ------  --------------  -----  
 0   T       9568 non-null   float64
 1   V       9568 non-null   float64
 2   AP      9568 non-null   float64
 3   RH      9568 non-null   float64
 4   PE      9568 non-null   float64
dtypes: float64(5)
```

Features

```
# Selecting features and target variable for the model
X = df_ccpp[['T', 'V', 'AP', 'RH']]
y = df_ccpp['PE']

# Split the new dataset into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(
    X, y, train_size=0.8)
```

Model

```
# Creating a Linear Regression model instance
model_lr = LinearRegression()

# Creating a Decession Tree Regression model instance
model_dt = DecisionTreeRegressor(max_depth=4, min_samples_leaf=0.1, random_state=3)

# Creating a Random Forest model instance
model_rf = RandomForestRegressor(random_state=42)
```

Evaluation

```
Linear MSE: 19.887672979361724
Decision Tree MSE: 31.194023107529635
Random Forest MSE: 10.432210448834946

Linear RMSE: 4.459559729318773
Decision Tree RMSE: 5.585160974182359
Random Forest RMSE: 3.229893256569781

Linear R-Square: 0.9325073807799998
Decision Tree R-Square: 0.8941371207319624
Random Forest R-Square: 0.964596300020782

Linear MAE: 3.663660894808539
Decision Tree MAE: 4.419752364221531
Random Forest MAE: 2.413862852664589
```

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