Detecting Cyclone Abnormal

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Data Science Project

1. Data Preparation:

(a) Converting Columns to Appropriate Data Types:

- The code ‘data[‘Cyclone_Inlet_Gas_Temp’]= pd.to_numeric(data[‘Cyclone_Inlet_Gas_Temp’], errors=’coerce’).
- Converts the ‘Cyclone_Inlet_Gas_Temp’ column to numeric data type.
- The eros=’coerce’ argument ensures that any invalid values are converted in NaN(Not a Number).

2. Analysis Strategy:

(a) Visualizing variable over time :

- The line plot is used to visualize the ‘Cyclone_Gas_Outlet_Temp’ variable over time.
- It helps to understand the overall trend and identify the abnormal periods.

(b) Selecting the variable for Anomaly Detection :

- Variable chosen for anomaly detection.
- It is used to identify abnormal periods based on deviations from the normal behavior.

(c) Handling Missing value :

- It is handle missing value in variable.
- The missing values are imputed with the mean of the available value.
- The ensures that the data is complete for anomaly detection.

(d) Isolation Forest Model :

- It is used for anomaly detection.
- It is a machine learning algorithm that identifies anomalies by isolating instances in a random forest.
- The Contamination parameter is set to 0.01, include approximately 1% data is expected normal.

3. Insights:

(a) Abnormal Periods Identification :

- Isolation forest model is applied to the variable to predict outliers.
- The predictions are stored in outlier column of the dataframe.
- Outliers are assigned value of -1.

(b) Plotting Abnormal Periods:

- Final steps involves plotting the variable over time.
- Abnormal periods are highlighted the scatter points with a red color.

Algorithm of Detecting cyclone abnormal are follows these steps:

Step 1: Converting Columns to Appropriate Data Types.
Step 2: Visualize the variables over time using line plots.
Step 3: Select the variable for anomaly detection.
Step 4: Handle missing values for dataset.
Step 5: Fit the Isolation Forest model.
Step 6: Predict outliers.
Step 7: Add outlier predictions to the DataFrame.
Final Step: Plot the variable with highlighted abnormal periods

Overview of Detecting Cyclone Abnormal :

- These steps provides a simplest approach to detect and visualize abnormal periods in All variables.
- According to assessment using 6 variables of dataset are below:
  1. Cyclone_Inlet_Gas_Temp
  2. Cyclone_Gas_Outlet_Temp
  3. Cyclone_Outlet_Gas_draft
  4. Cyclone_cone_draft
  5. Cyclone_Inlet_Draft
  6. Cyclone_Material_Temp

Thank You