Data Pre-processing

FlowDataAnalysis.m/PressureDataAnalysis.m

Compute the **Pipe Flow velocity**(Flow)

**Reduce** the number of nodes/pipes to match the data in Reduced Node Set (200 or 500)

Compute the data: Use the min/max for Flow/Pressure to compute the difference and establish pattern for AI models

Use the P

FlowAIModel.m/

PressureAIModel.m

Set Threshold

(P1,P2,P3,P4)

Upload Stoner Data

Leak data for all scenarios

Anomaly Free Data

Reduced Node Set Data

Input for AI models : MyMatrix.txt

Names of all nodes from reduced node set: FlowPipeNames.txt, PressureNodeNames.txt

Input

Output

Set Color Matrix

Output in Command

Window

Compute NVD/NPD

Set local variables

Classify data into different thresholds (each bucket refers to a cell in the color matrix)

Runs 20 times.

Anything not in these 20,

Goes to blue

D1,D2,D3,D4,D5

D1: Threshold that repeats atleast for a day

D2: Threshold that repeats atleast for 2 days

D3: Threshold that repeats atleast for 3 days

D4: Threshold that repeats atleast for 4 days

D5: Threshold that repeats for atleast 5 days

Runs 4 times

Runs 5 times

Compute Actual Data

Compute SVM Data

Compute ANN Data

Check if all ysvm = 0

Run SVM:

Gather performance data

Yes

Save all 0s, Do not run SVM

Compute percentage of Reds, oranges, yellows, greens and blues

Output to Excel and

Matlab Command Window

Write all results to Excel -FinalLabels.xls

Output consists of

Actual, SVM, ANN,

Comparison between actual and predicted

Consolidated Result sheet

Run ANN:

Display the Confusion matrix

Gather performance data

No