Software requirements Specifications Document

MLOps enabling anomaly detection in real-time data streams.

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BRIEF PROBLEM STATEMENT:

Sensors (sensing flow and pressure) monitor the water distribution network and generate high-velocity data that must be examined for abnormalities in real-time. Sensor data streams are aggregated into cohorts and evaluated together for aberrant behaviour by DeepAR or TFT. Using machine learning, we are meant to find and categorise abnormalities in high-granularity data streams.

SYSTEM REQUIREMENTS:

- Kubernetes (For deploying containerized applications)
- Kube Flow (To make deployments of machine learning (ML) workflows on Kubernetes)
- Azure VM
- Docker
- Python + Flask
- React JS
- MongoDB
- Frappe
- Javascript

USERS PROFILE:

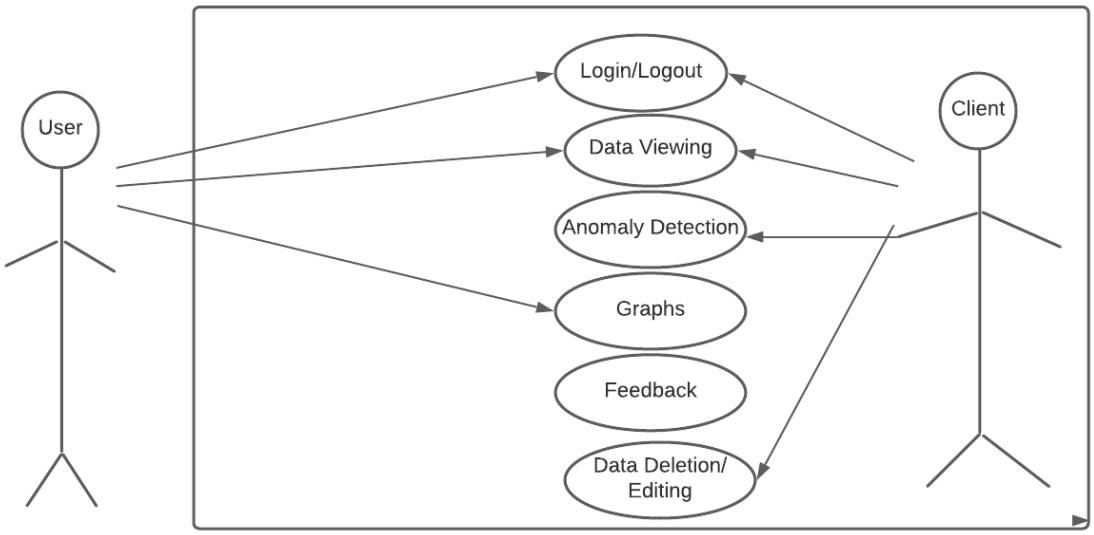
- The Users with water pipelines data can upload and view graphs and processed data signalling errors or anomalies.
- The Client will be able to access the graphs of water flow and pressure of different pipelines and will be able to detect the anomaly analysis of all the water pipelines in the

website. Can access to the database of any location without restriction and inform the necessary people of errors and leakages.

FEATURE REQUIREMENTS:

No.	Use case name	Description	Release
1	Login/Logout	The client should be able to Login to/Logout of the website.	R1
2	Data viewing	The user can access data of pipelines at any instant.	R1
3	Anomaly Detection	Anomalies should be visible to the user.	R2
4	Graphs	The data when asked should be displayed in terms of graphs.	R2
5	Feedback	Take feedback for the anomaly detection system.	R2
6	Data deletion/Editing	The user will be able to remove inconsistencies in the data or edit the data.	R2

USE CASE DIAGRAM:



USE CASE DESCRIPTION:

Use Case Number	UC - 01
Use case Name	Login/Logout
Overview	Users can login into the website using their credentials and easily logout.
Actors	Users, Clients
Pre Condition	None
Flow	Credentials are checked against a database to authenticate the user.
Post condition	The User is logged in and can access the website depending on his/her access level.

Use Case Number	UC - 02

Use case Name	Data Viewing
Overview	Users, Clients can access the data of pipelines at any instant
Actors	Users, Clients
Pre Condition	1) The users and the clients must be logged in to view the data 2) The actor must have access to requested data
Flow	1) To view the actor must click on the data tab 2) We fetch data from our database and display it to the actor
Post condition	None

Use Case Number	UC - 03
Use case Name	Anomaly Detection
Overview	The data is tested by the ML engine against a trained model.
Actors	None
Pre Condition	Users upload data to the database successfully in a certain format.
Flow	ML engine checks the data for irregularities against previous statistics and suggests possible errors.
Post condition	Feedback

Use Case Number	UC - 04
Use case Name	Graphs
Overview	The data when asked should be displayed in terms of graphs.
Actors	Users, Clients
Pre Condition	1) Users and clients must be logged in 2) The actor must have access to the respective data
Flow	1) To view the user must select graph in the tab 2) We fetch the data and display it in graphs
Post condition	None

Use Case Number	UC - 05
Use case Name	Feedback
Overview	Gives a report of possible errors and leakages.
Actors	None
Pre Condition	The data should be processed and tested.
Flow	
Post condition	The User/Client can see a report of estimated irregularities in the data submitted.

Use Case Number	UC - 06
Use case Name	Data Deletion/Editing
Overview	The user will be able to remove inconsistencies in the data.
Actors	Clients
Pre Condition	The actor must be logged in
Flow	1) The actor must select delete/edit the data either of the options 2) Then the respective data must be selected 3) The new value of data should be selected in case of editing
Post condition	None

Test Backlog:

No backlog as of yet