Outline Assignment 2

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Data visualisation and analysis associated with the CMI industrial furnace

A picture containing indoor

Description automatically generated

1. The aims & objectives (the data supplied to students can be used in many different ways)

The aim of this project is to create python code to collect, format and visualise process data from the CMI furnace rather the current method which uses Excel (slow, limited and inefficient).

With the intention to deploy this method/strategy to other industrial furnaces such Future Forge furnaces and AFRC members furnaces.

1. Sources of data: where is data located (e.g. databases, spreadsheets)

The source data is available and recorded on a NAS (network attached storage) and consists of multiple CSV files (one per sensors / per ~day)). (process value vs time stamp). The total data size is very large and can go up to several GB depending on the duration of the heat treatment.

Moreover, if time allows, I would like to use data recorded (from SQL database) via the Ignition platform (setup this year as part of Resume project) and do some comparative performance analysis depending on the source of the dataset.

1. Data cleansing: what processing will be needed to create uniform/consistent datasets

Data cleansing should be minimal as process data is pretty cleaned (process value vs time stamp)

1. Data carpentry: how will the data need to be changed to enable analysis & visualization

Data processing/carpentry will consist of multiple appending, grouping and potentially filtering (decrease recording frequency) to reduce dataset when possible.

1. Data analysis: what analysis will be performed on the data to answer the question

Data analysis will consist on various curve fitting, create calculated tags with moving average, etc…

Calculation will be done to estimate gas consumption.

1. Data visualization: what images will be used illustrate the data and results

Ideally, we should be able to visualise sensors/tags of interests for a specified period, relate this to physical events such as door opening, part loading, burners cycling, etc…

Potential Additional task:

Merge furnace process data with instrumented part data recorded with another logger (issue with different time stamp etc…)