Optimakx : Data Driven Solution for Controller Performance assessment and Monitoring

Ganesh Sankaran
Software Developer
Gyan Data Private Limited
Chennai-600113 India
ganeshsankaran@gyandata.com

Rabboni Rabi
Software Developer
Gyan Data Private Limited
Chennai-600113 India
rabi@gyandata.com

Rajni Jain
Senior Process Engineer
Gyan Data Private Limited
Chennai-600113 India
rajni.jain@gyandata.com

About the Client

AKXA Tech Pvt. Ltd. is a technology driven industrial analytics company, initiated by technocrats with vast field experience in dealing with process plant equipment. This new technological venture promoted by **Aqua Alloys Pvt. Ltd.** is associated with research team at IIT Madras and is also a **"StartUp India Approved company"**. The main vision of the company is to develop and provide efficiency enhancing products and services to process plants.

Motivation

PID control loops are the building blocks of process automation and their performance has a significant impact on the production throughput and energy consumption of a process plant. The control loops in process plants are initialized at the time of plant commissioning for optimal performance. Over the course of operation, the control loop parameters which were initially set are no longer optimal due to changing process conditions and equipment wear. As a consequence, most control loops are either not run in auto-mode or are sub-optimally tuned affecting their overall performance. Typical process plant survey shows that around 30% of the PID controllers are run in manual-mode and almost 50% of the control loops which are set in auto-mode operate at less than 70% efficiency. The state of affairs can be attributed to the fact that the very act of analyzing control loops to

quantify their performance consumes considerable time and effort. The need of the hour was then to develop a tool which would allow process engineers to rapidly perform this assessment and correction with ease.

Problem

Though there are controller performance assessment tools that are available from vendors, most of them are exhorbitantly expensive. In order to keep costs down, the implementation stack had to be fully open-source. Furthermore, there are no off-the-shelf libraries which offer the necessary set of signal processing utilities needed for development of a controller diagnostic and performance assessment engine. Post diagnosis the application also had to provide the means to re-tune the controllers without adversely affecting the plant. Additional complexity emerged with the requirement that the developed solution should be capable of both on-site and cloud deployments.

Solution

We realized that a browser based web-application would address the deployment requirements. It was also understood that development of easily understandable key-performance-metrics was paramount towards the success of the application.

Leveraging our academic and industry experience in the field of process control, we created a diagnostic engine with over 20 different termination points, and a quantitative performance assessment engine with over 26 different key-performance metrics.

A tuning assist module was also developed which not only helps process engineers in identification of the plant process model using their data but also acts as a simulation sandbox, enabling them to tweak the controller

parameters till they obtain the desired behavior before implementation in the plant.
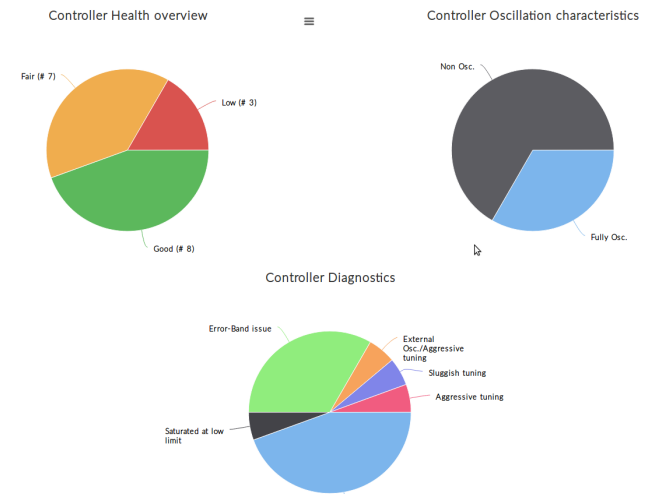
A preview of OPTIMakx diagnostics dashboard

OPTIMakx has been used in the field with remarkable results. **AKXA Tech** have reported that in one of their customer sites, use of the application has improved the production rate of cement mill by as much as 5% while in another product quality fluctuations have reduced by 15%. It is to be noted that OPTIMakx won the **National Award for Excellence in Energy Management 2017** and has been rated as an **Innovative Energy Saving Product** at the **CII Energy Efficiency summit**

We at **Gyan Data** continue to work with **AKXA Tech** towards providing innovative and cost effective solutions for process industries.