TECH OFFER

AI-Powered Co-Pilot for Reduction of Energy and Carbon Emissions

KEY INFORMATION

TECHNOLOGY CATEGORY:
Infocomm - Artificial Intelligence
Infocomm - Computer Simulation & Modeling
Sustainability - Low Carbon Economy

TECHNOLOGY READINESS LEVEL (TRL): TRL7
COUNTRY: SINGAPORE
ID NUMBER: TO174749

OVERVIEW

Manufacturing plants constantly seek opportunities to save energy, reduce cost, and be more environmentally sustainable. However, achieving these goals is complex often requires heavy expenditure in the form of hiring teams of experienced engineers, who then perform cost-reduction tasks manually - this method is time-consuming, costly, and prone to inaccuracies due to the complexity of manufacturing operations.

This technology offer provides an Artificial Intelligence (AI) powered software platform with co-pilot system that monitors and optimise energy consumption, carbon dioxide (CO_2) emissions, and operational expenditures (OPEX) in real-time. The AI co-pilot builds a virtual cognitive model (digital twin) of a physical asset, e.g. a manufacturing plant or a piece of machinery. Simulations are carried out on the model to predict operational inefficiency i.e. high energy usage, equipment breakdown, etc, and improvement opportunities. Upon detection of inefficiencies, the AI co-pilot will suggest the best operating parameters to resolve the inefficiency.

The technology owner is looking for manufacturing plants in the chemical and pharmaceutical sectors to adopt the technology and to collaborate with machinery owners in the chemical and process industries, as well as original equipment manufacturers (OEM) and digitisation/digital transformation companies on co-development projects.

TECHNOLOGY FEATURES & SPECIFICATIONS

Monitoring and Diagnosis:

- Tracks real-time operational data through sensor data from every equipment
- Monitors the equipment lifecycle and manufacturing performance (energy usage, carbon emission, operational expenditure)
- Predicts and alerts to potential operational inefficiency and equipment failures
- Generate reports on the causes of operational inefficiency and equipment failures

Optimisation:

- Autonomously recommends insights that optimise the operations in the form of setpoints and parameter adjustment to prevent operational failures, reduce downtime, energy usage and carbon emission based on a user-defined thresholding value

Simulation:

- Software comprises a simulation capabillity to test if changes in specific operating parameters can cause knock-on issues or increase efficiency

The software platform can be deployed securely on-premise, private cloud, or public cloud. The technology can be paired with sensor solutions and process modelling software as end-to-end solutions to build digital capabilities in optimising and visualising operations/processes.

POTENTIAL APPLICATIONS

This technology offer provides an AI-powered co-pilot optimization system and cognitive digital twin that is applicable for all types of machinery used in manufacturing operations, and refineries in the following industries:

- Chemical
- Oil and gas
- Pharmaceutical
- Energy/Power

This AI-powered solution is intended to assist in the autonomous reduction of downtime, OPEX, energy consumption, and CO_2 emissions.

UNIQUE VALUE PROPOSITION

In comparison with conventional digital twin software which virtually represents physical assets with 3D models, and are commonly used as simulation, prediction, and life cycle monitoring tools. This technology can be differentiated in the following

ways:

- Operates autonomously and self-maintaining
- Does not need to be operated by specialised engineers with technical experience; workforce reduction
- Is not simply a complementary tool for analysis, operational oversight and decision-making
- Built-in AI engine generates insights autonomously to empower engineers in optimising manufacturing performance