



SEMANTIC AI ENERGY OPTIMISATION

PHYSICS-GUIDED MACHINE LEARNING



DIGIFUSION'S PROVEN TECHNOLOGY

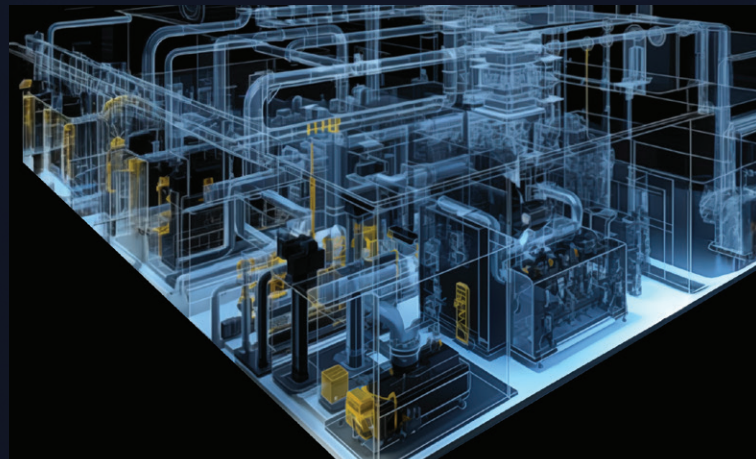
Our Cloud-based Chiller Plant Energy Management Platform is an award-winning solution at the Hong Kong ICT Awards 2019 in the category of “Big Data & Open Data Applications”. Leveraging big data analytics for achieving optimum performance and energy savings at chiller plants, DigiFusion's Dynamic Optimisation is built upon the basis of self-trained physics-guided machine learning (ML) models using actual operating data. This ensures accurate modelling and prediction of the actual performance of chiller plant equipment.



Advanced Data Management

Comprehensively collect, pre-process, enrich, store, and analyse data from various sensors of central chiller plants and relevant open data (e.g. HK Observatory's weather information)

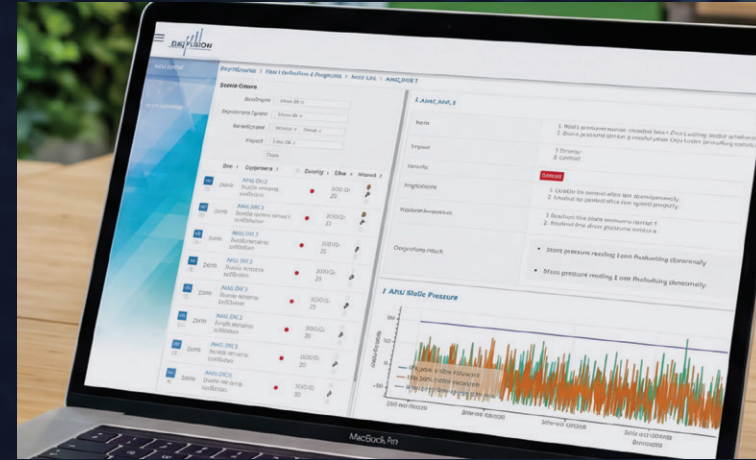
- Collection of high resolution BMS data in less than 30 seconds
- Data cleansing – filtering noise and abnormal data



Dynamic Optimisation

Fully optimise energy performance of the whole chiller plant in real-time using advanced physics-guided machine learning modelling and optimisation search techniques

- Real-time determination of optimal control setting
- Development of equipment models using actual data
- Enhanced control regulator
- Adaptive to any change in latest equipment status
- Flexible control constraint setting



Automated Fault Detection and Diagnostics

Automatically detect and diagnose abnormal plant operation, equipment deterioration, unnoticed faults as well as sensor biases to provide actionable intelligence

- Evaluation of individual temperature and flow sensor biases
- Evaluation of equipment deterioration



Energy Analytics and Data Visualisation

Continuously filter, analyse and visualise the performance data of major plant equipment through an interactive and modular visualisation platform

- Top-to-bottom energy use analysis
- Detailed equipment performance analysis
- Domain-specific data cleansing
- Interactive data visualisation

Physics-guided Machine Learning

Proven energy savings at Grade-A office buildings

- Implement at the office buildings certified as BEAM Platinum rating

The GREENEST way to achieve energy savings

- No need for equipment replacement

Empower managers with insights of latest building energy performance

- Automatically creates detailed profiles on weekly and monthly chiller plant operation and energy consumption

DigiFusion AI CHATBOT

▪ Intuitive Interface

Serves as the gateway to the advanced analytics platform, democratising complex data.

▪ Natural Language Query

Allows users to instantly query system performance using plain language.

▪ Accelerated Decision-Making

Provides immediate access to insights from DigiFusion Semantic AI Energy Optimisation and DigiFusion Big Data FDD, empowering proactive management of energy efficiency and fault resolution.



Limitations of Machine Learning

- Failure of machine learning due to the lack of full set of data
- Limited predictions can only be made
- Violation of the physical principles may occur outside the range of available data

Physics-guided Machine Learning

- Guided by the physical principles to ensure accuracy
- Current models can evolve as new data is accumulated
- Eliminate time-consuming manual calculation

