

Online Energy Monitoring & Data Analytics with Artificial Intelligence

HKPC TechDive - Environmental Technology

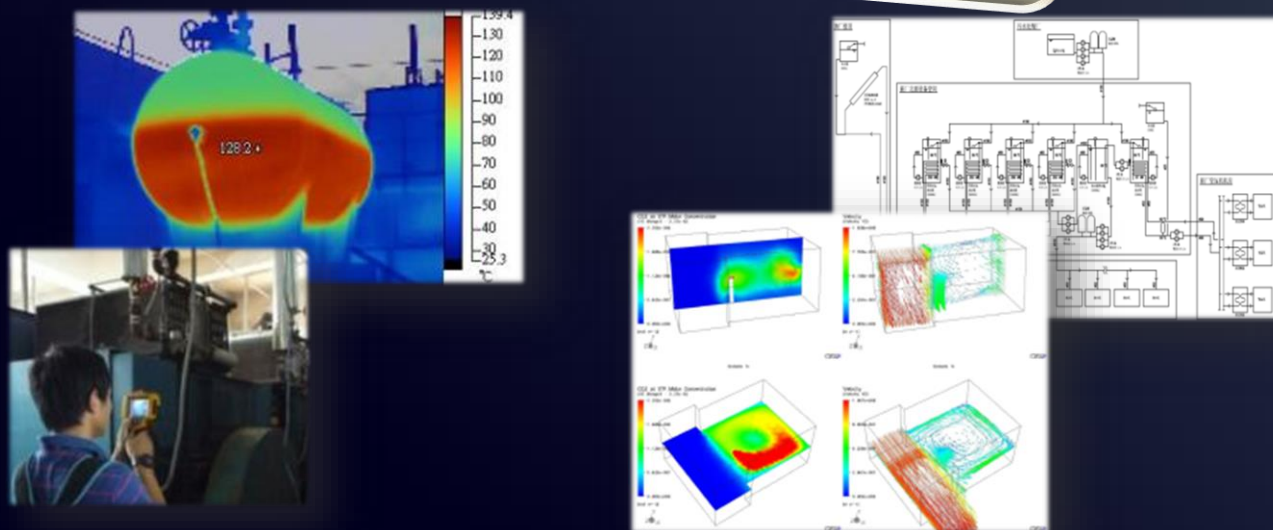
9 Jul 2020

David LO

Senior Consultant

Green Living and Innovation Division

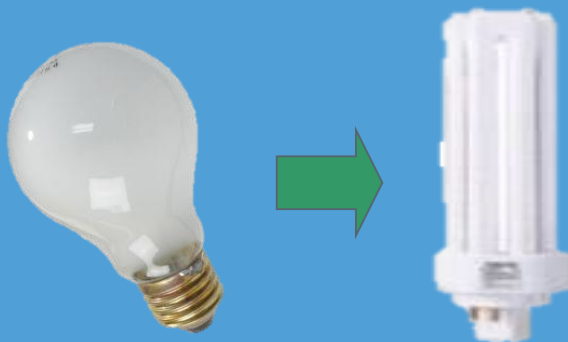
Hong Kong Productivity Council



We offer Consultancy Services on Energy Management

Energy Saving

Retrofitting



Saving Potential:
10% ~ 30%

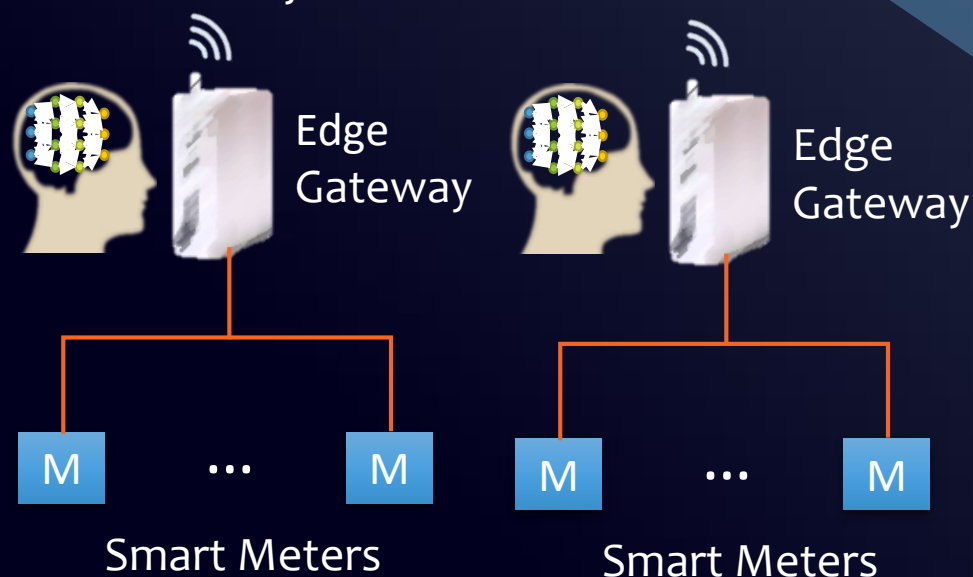
Monitor & Manage



Saving Potential:
5% ~ 20%



Cloud Platform
for Data Analysis & Visualisation

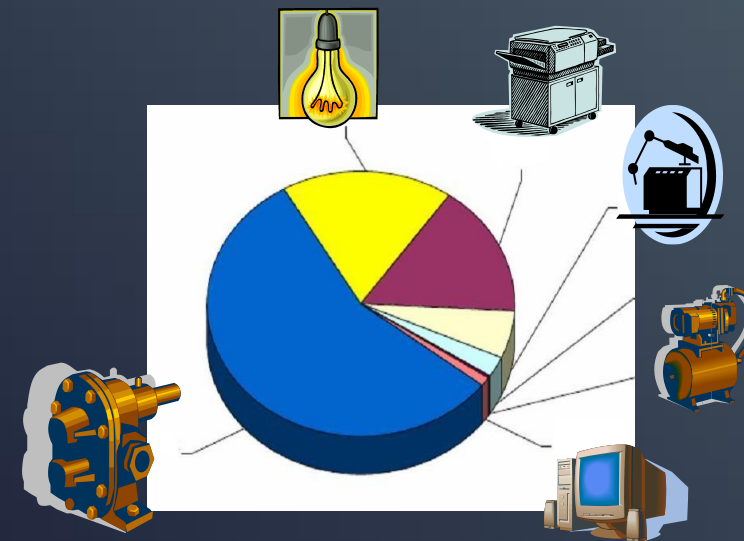
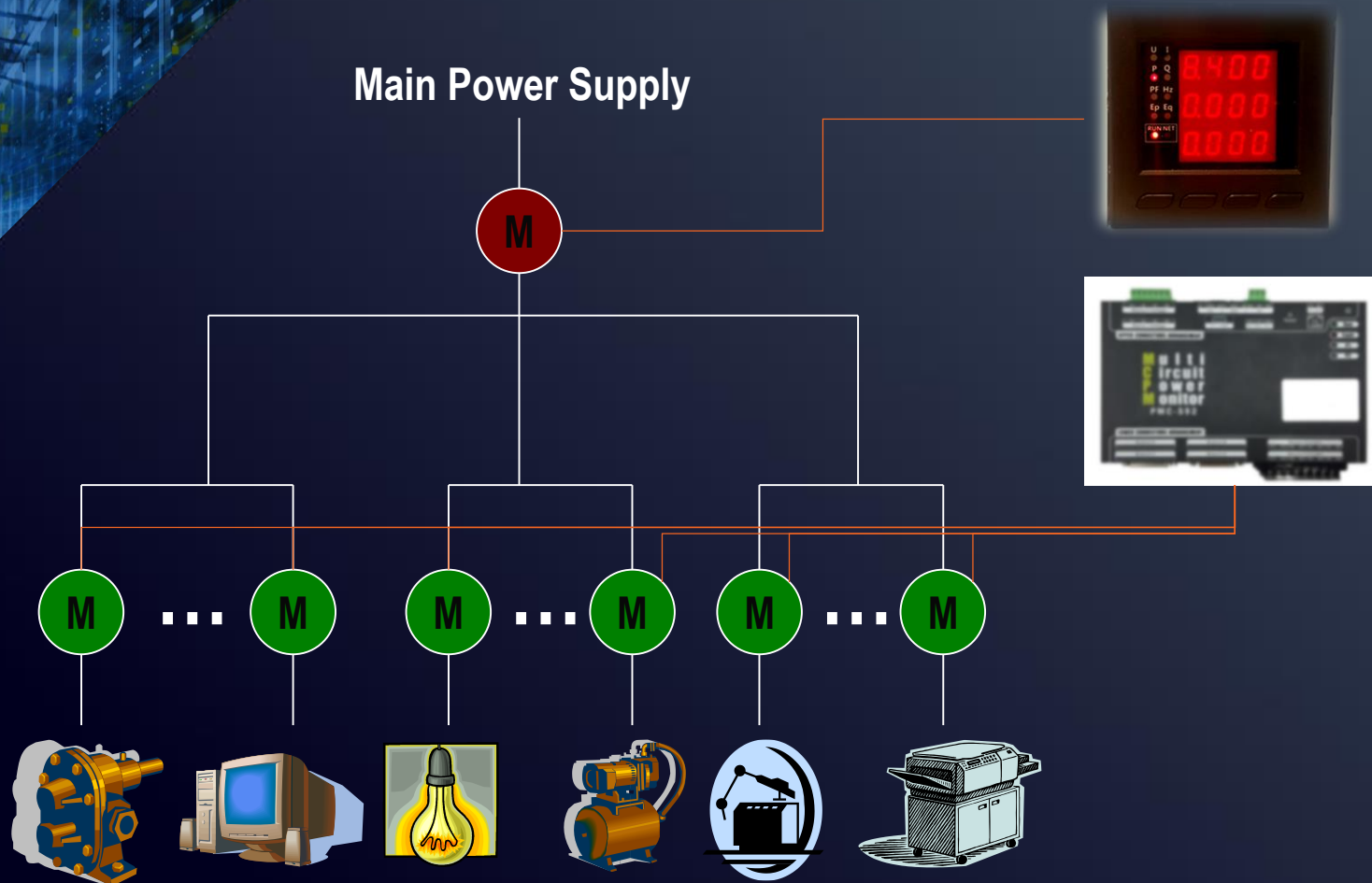


We build Intelligent Energy Monitoring Systems

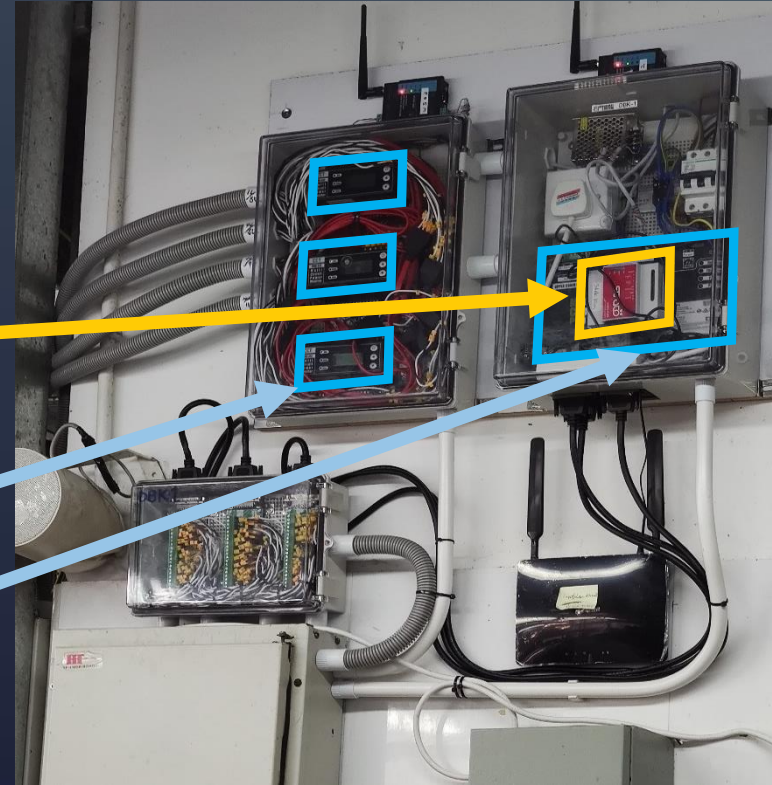
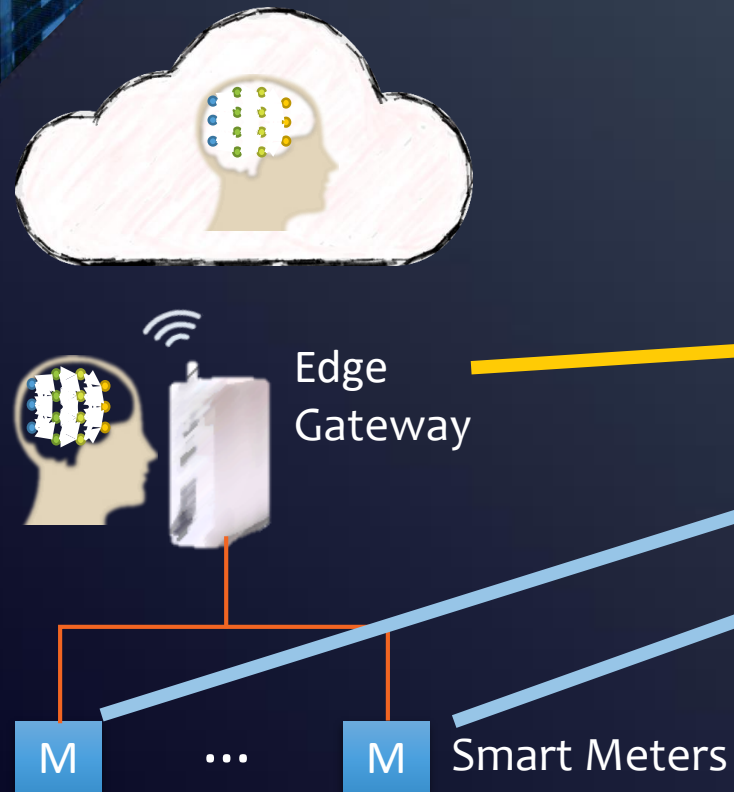
Minimal-yet-Powerful System Design

- Fast & Simple Installation
- Minimize power suspension time
- Cost effective
- High data sampling rate
- Robust data sampling and storage
- Ready for data analysis automation using A.I.



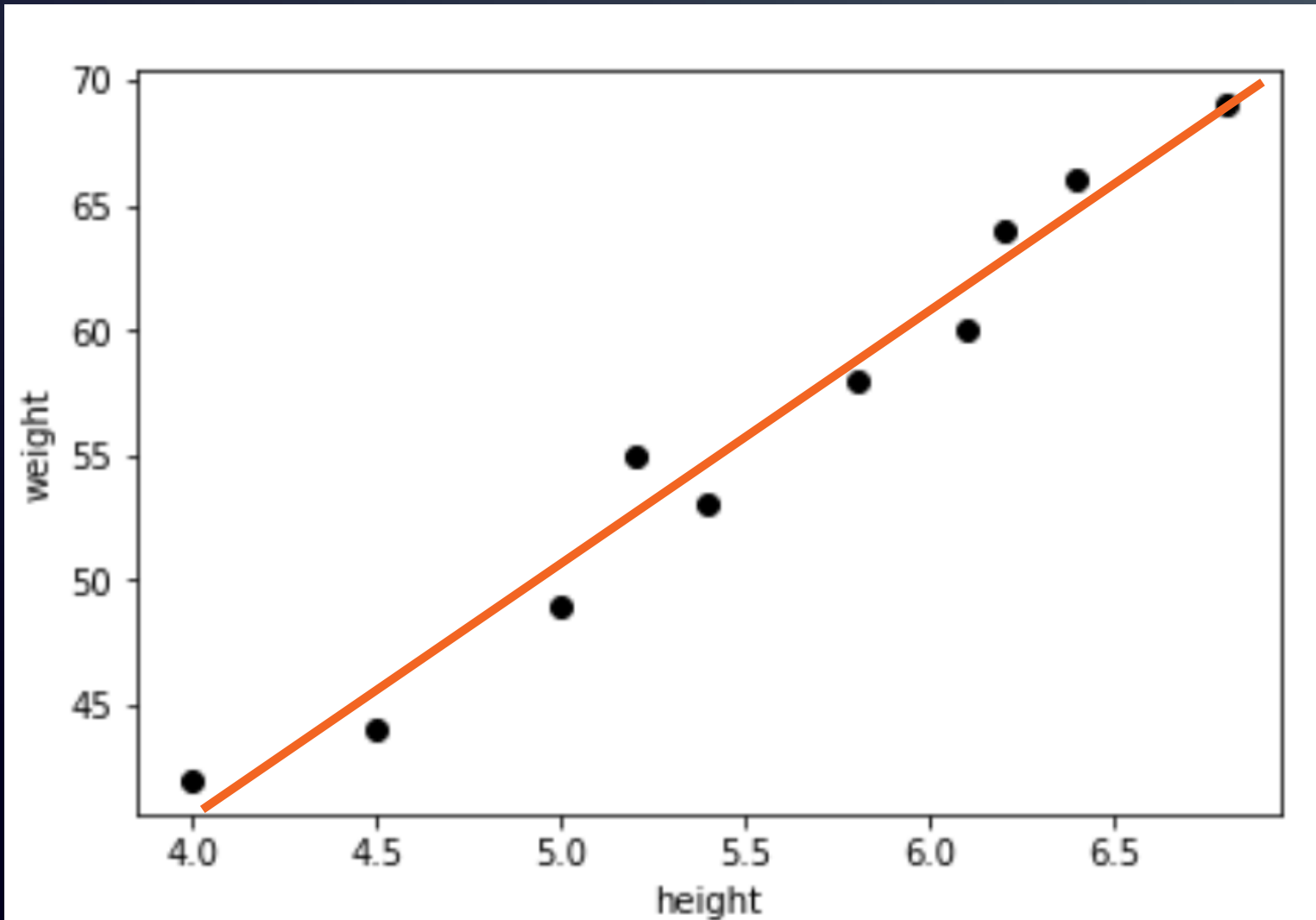


Sub-metering using Multi-circuit Meters



- Compact Size
- Wireless Data Communication
- **Edge Gateway**
 - Low Latency -> High data sampling rate
 - Local database
 - Local webserver for data visualisation
 - Edge data processing before published to cloud (A.I. enabled)

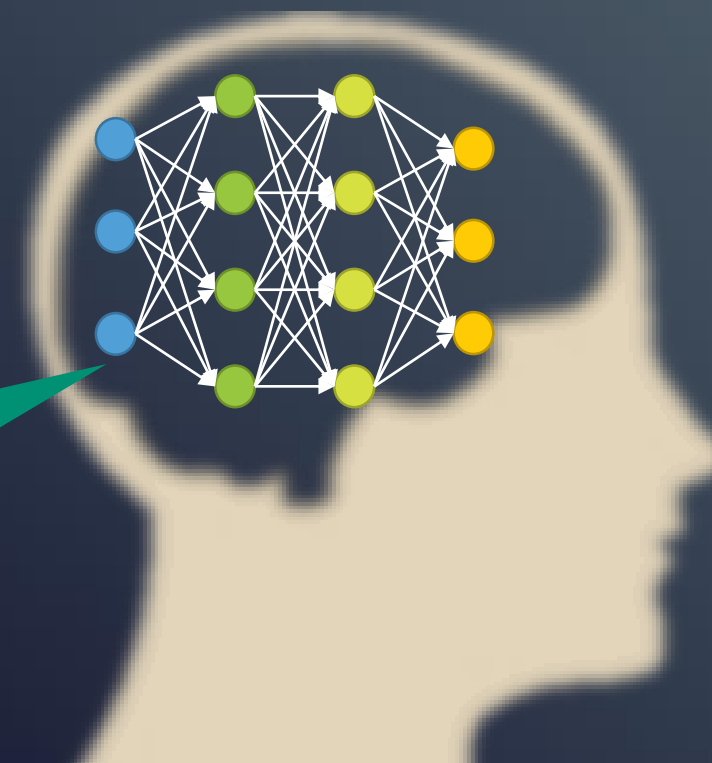
What is Machine Learning?



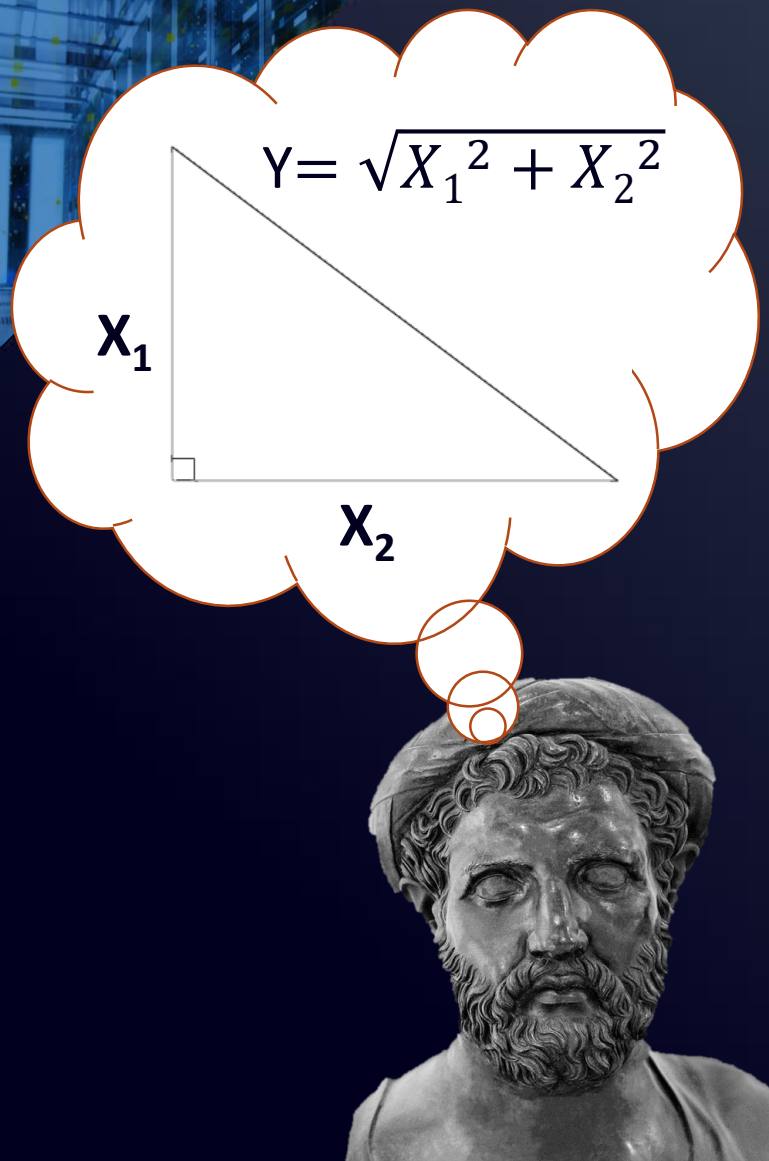
**ARTIFICIAL
INTELLIGENCE**

**MACHINE
LEARNING**

**DEEP
LEARNING**

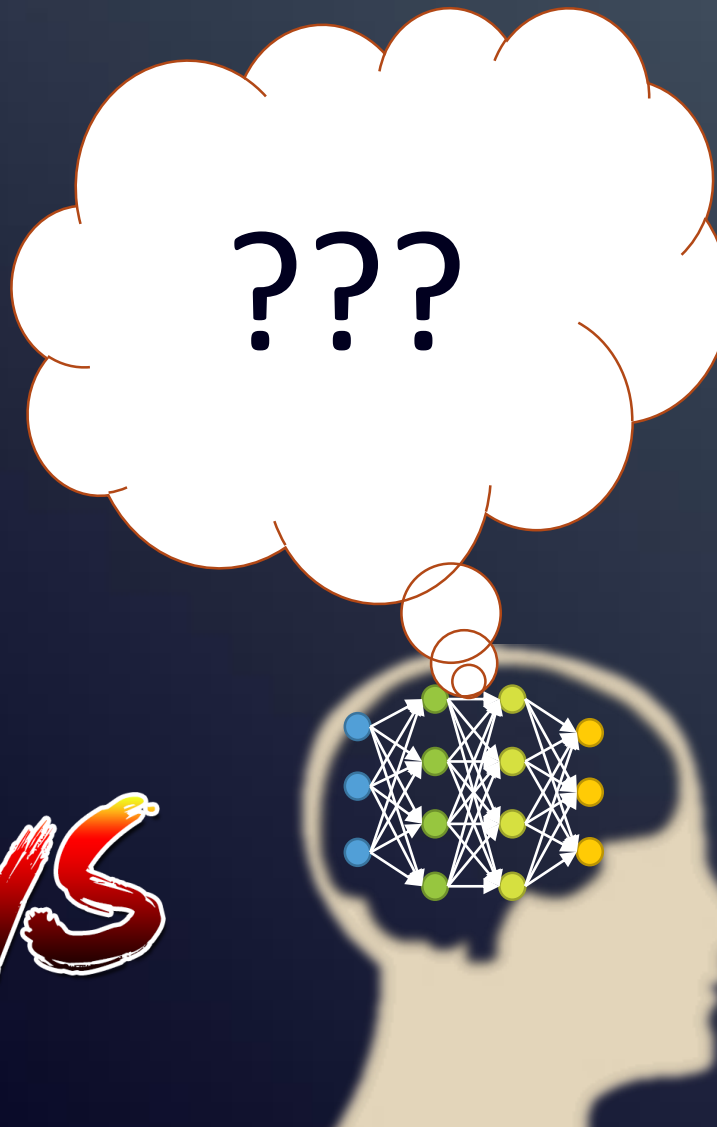


Artificial Neural Network

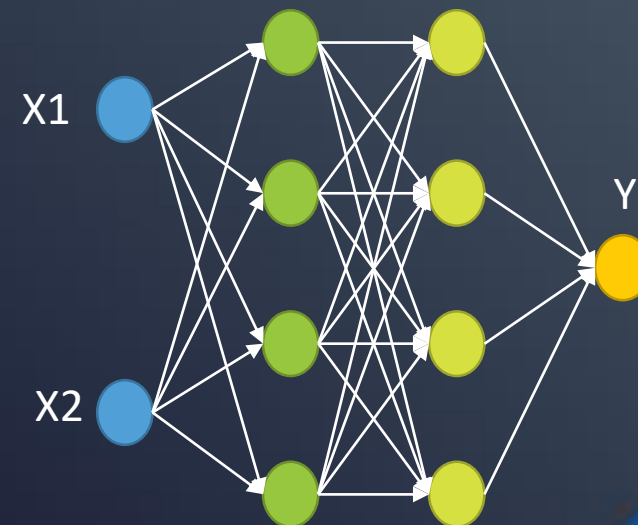


Pythagoras

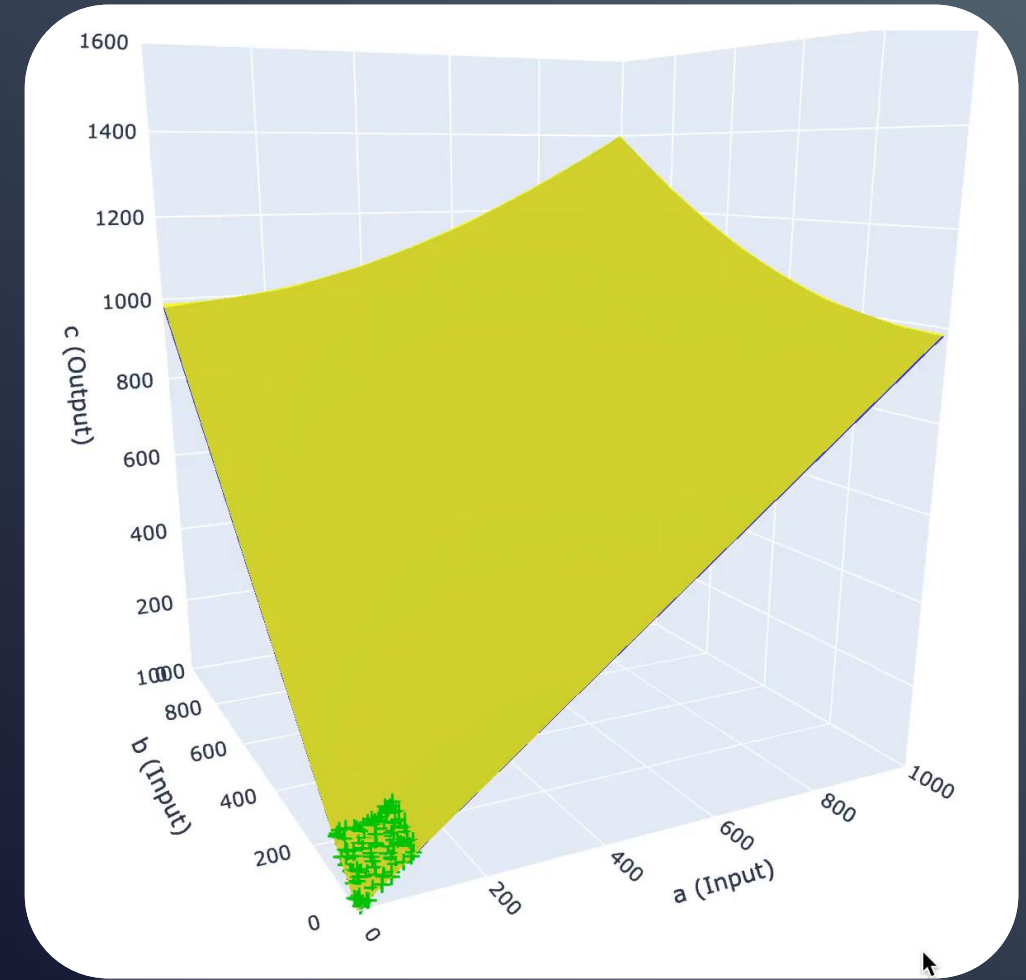
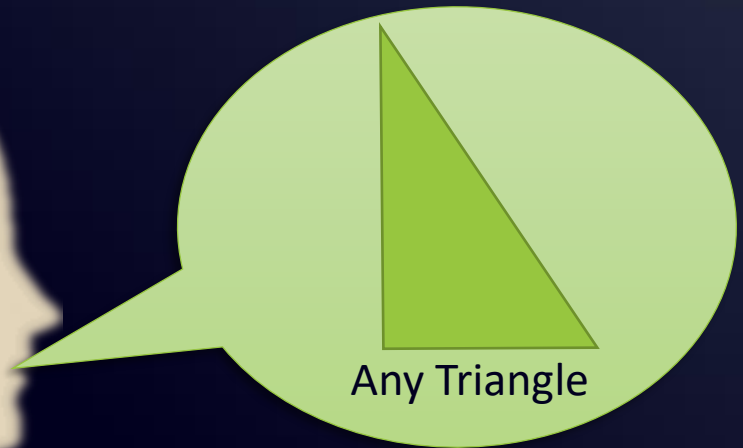
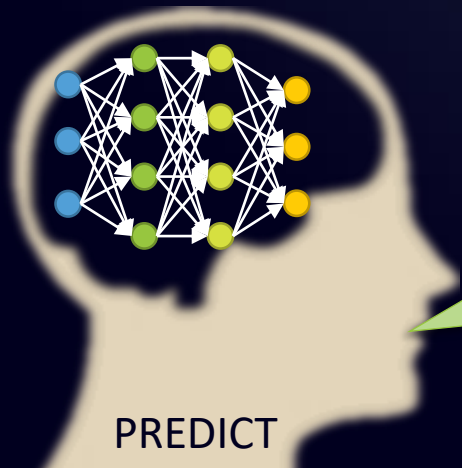
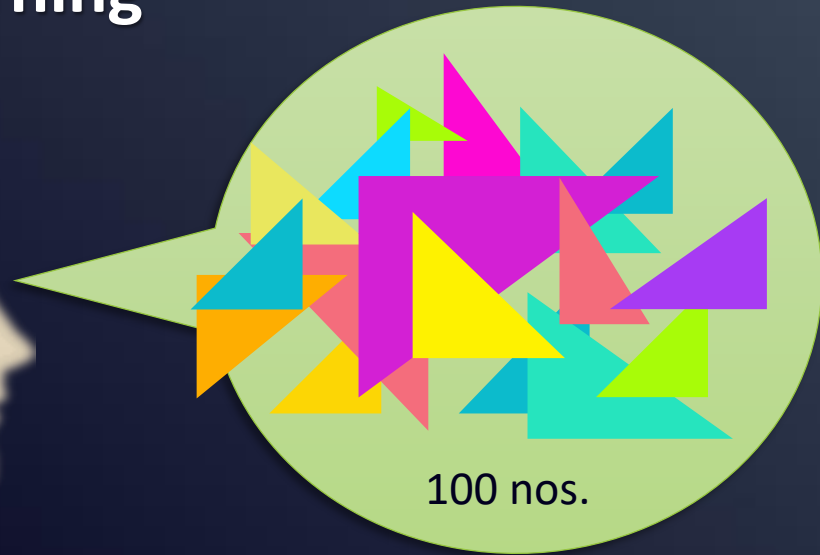
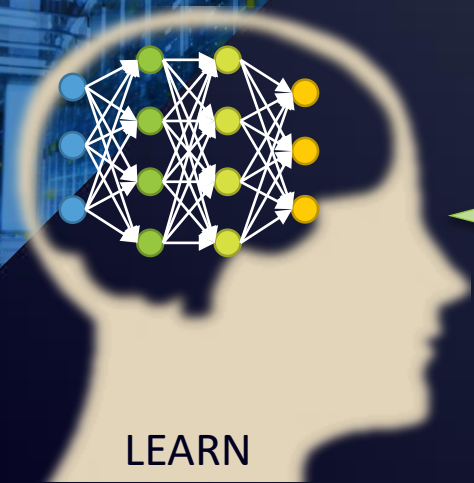
VS

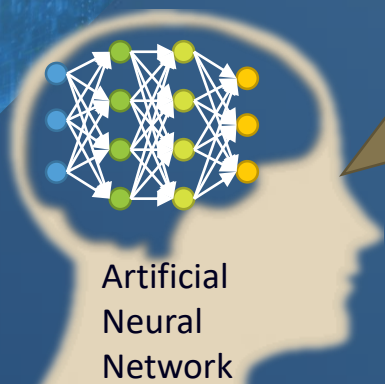


Artificial Neural Network



Deep Learning





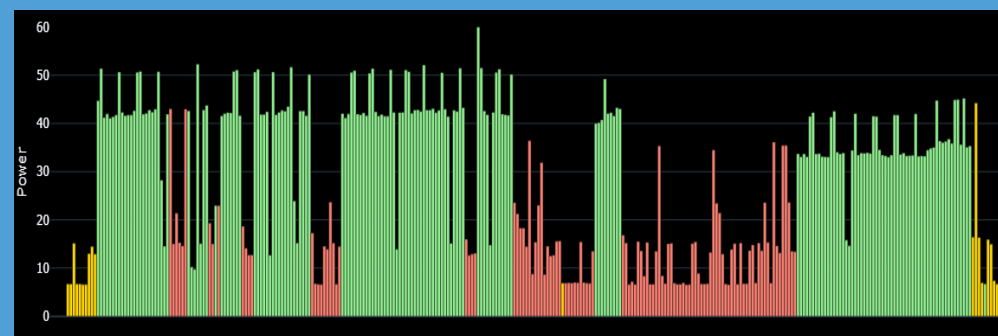
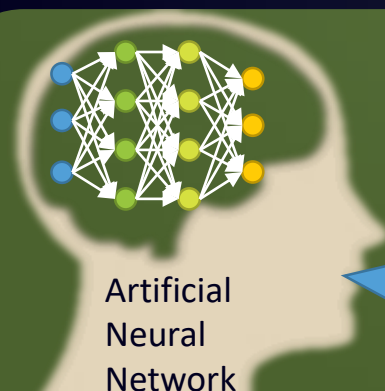
Energy Data of Printing Machine
Captured by Smart Meter



Printing Machine Operational Status
Manually Recorded by Human

Idling
Calibrating
Running

Model Training using Deep Learning Technique



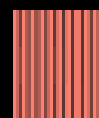
Printing Machine Operational Status
Automatically Interpreted by A.I.
Solely using Energy Data

Idling
Calibrating
Running

Model Deployment to Realize Automated Diagnosis

We Automate Data Analysis using Artificial Intelligence

Model Deployment to Realize Automated Diagnosis



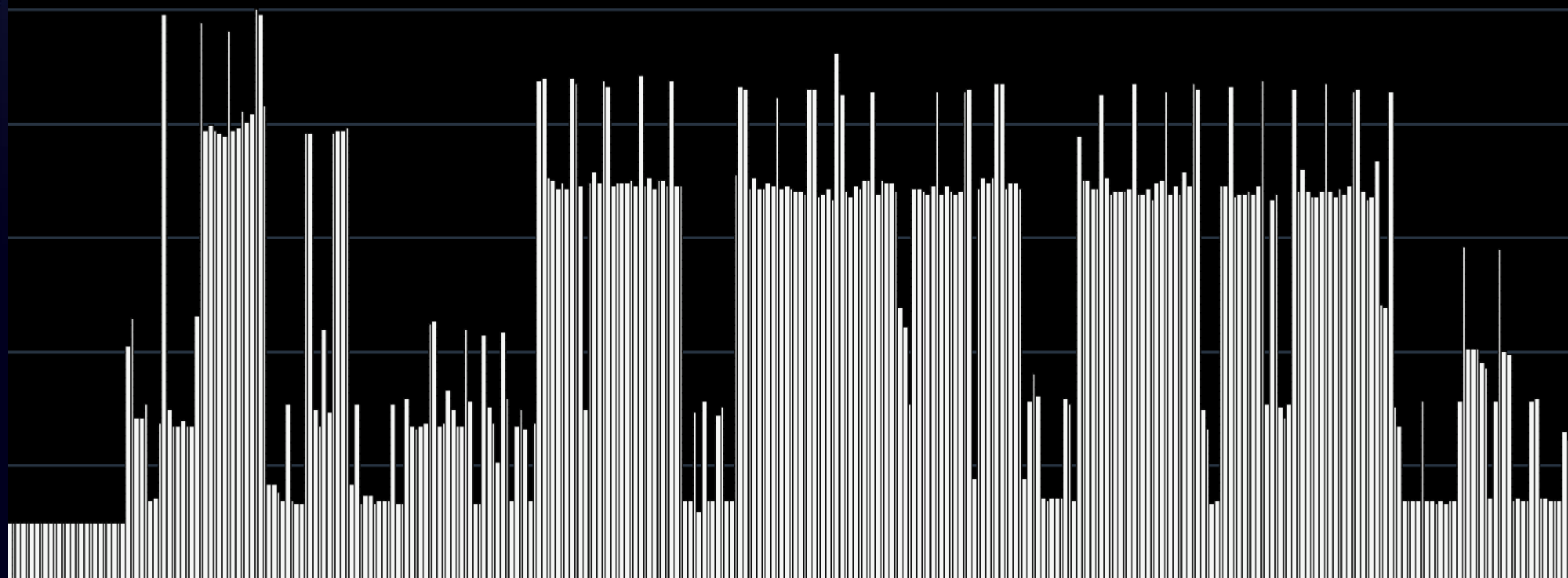
Calibrating



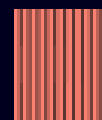
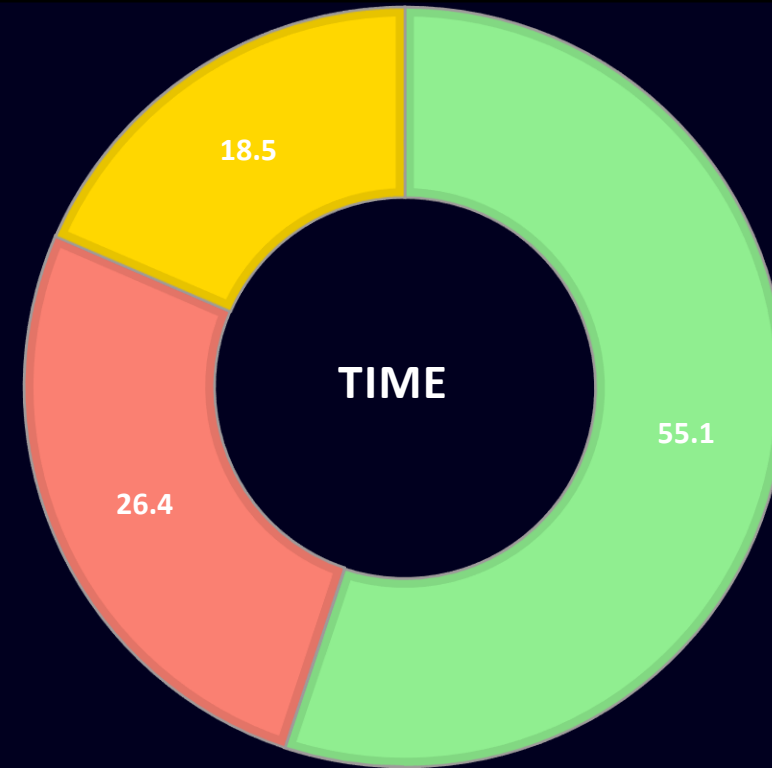
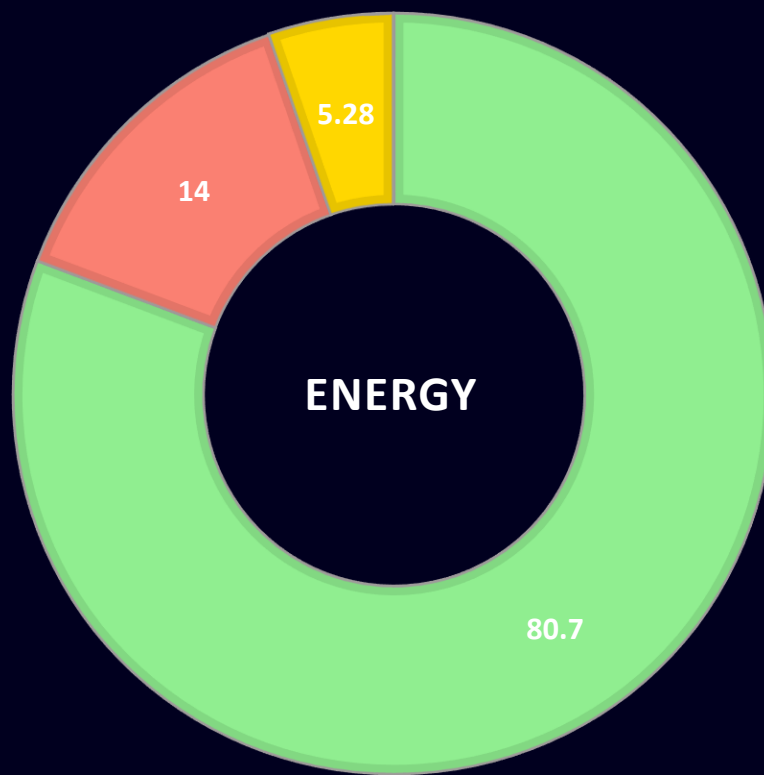
Idling



Running



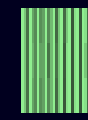
Real-time Energy Monitoring System



Calibrating



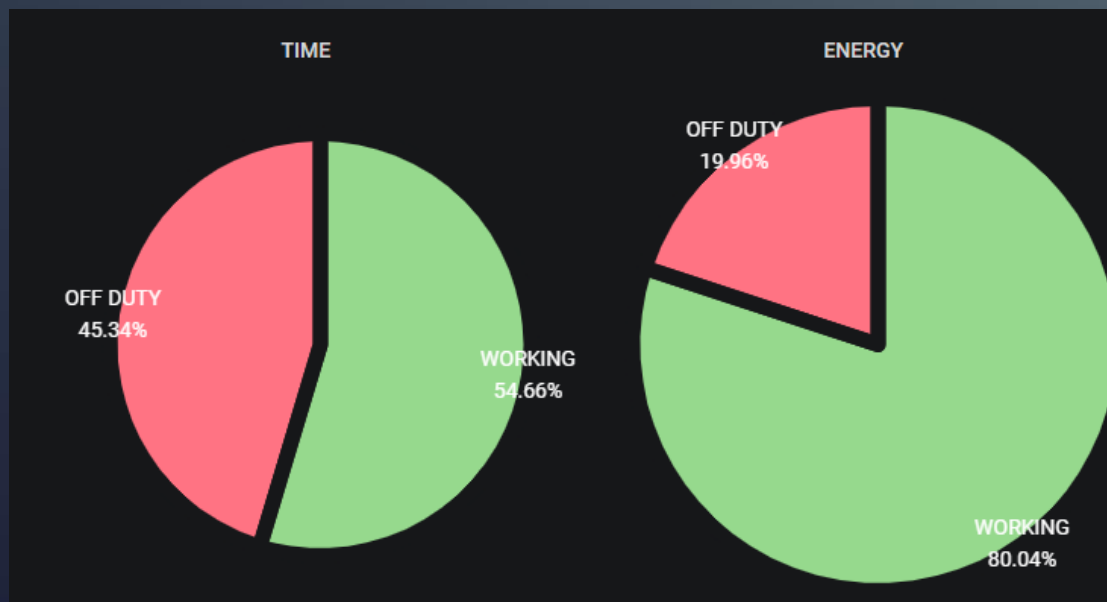
Idling



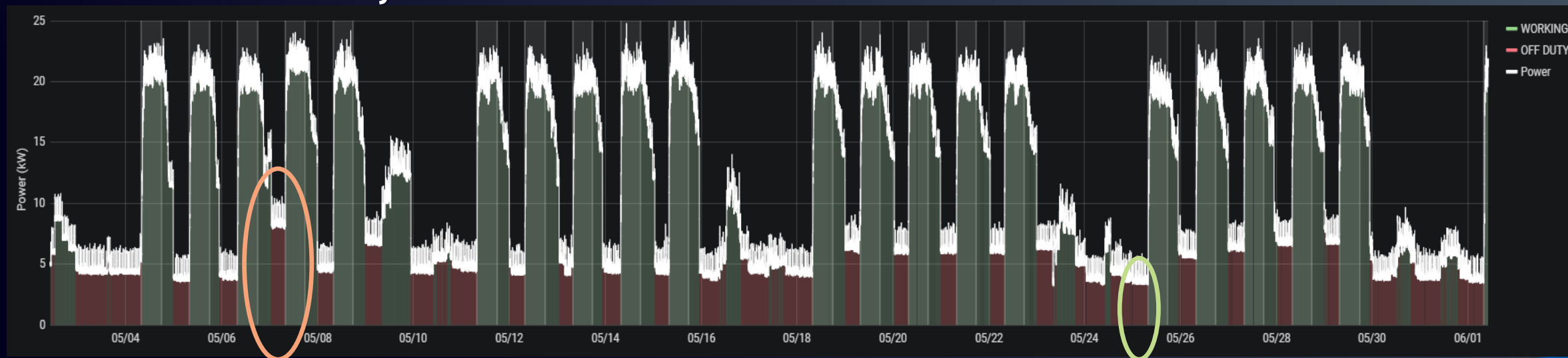
Running

Reveals INSIGHTS about Activities that Consume Energy

Real time analysis on Energy Wastage / Productivity :

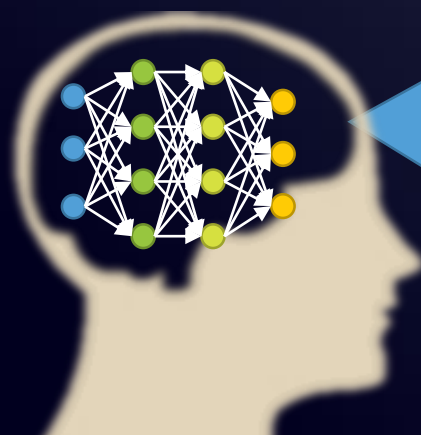


Automatic Office Activity Detection in REAL-TIME:



AI-powered Data Analytics reveal Insights on Performances

“Artificial Intelligence is the **NEW ELECTRICITY**.”



Artificial
Neural Network



Image Recognition



Self-Driving Cars



Finance



Mobile Phones



Healthcare

.....

Mature & Grooming
Applications



Pollution Control



Waste Reduction



Energy Saving

Underserved Market



Hong Kong Productivity Council
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