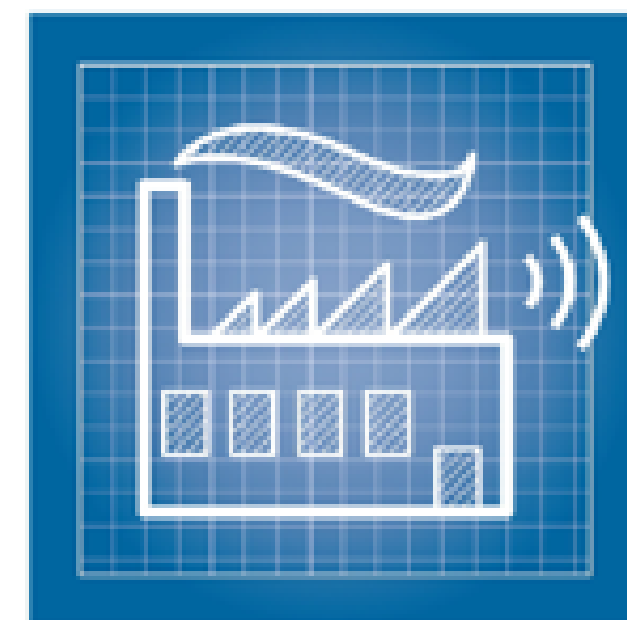# Industrial IoT Business Experience
&
tinyML Opportunities

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June 2022

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SMART SENSE
INDUSTRIAL DESIGN CO., LTD.

Asian Regional Workshop on SciTinyML: Scientific Use of Machine Learning on Low-Power Devices

ICTP

About Me

**Founder & Chief Technology Officer
SMART Sense Industrial Design**

A photo during my visit to
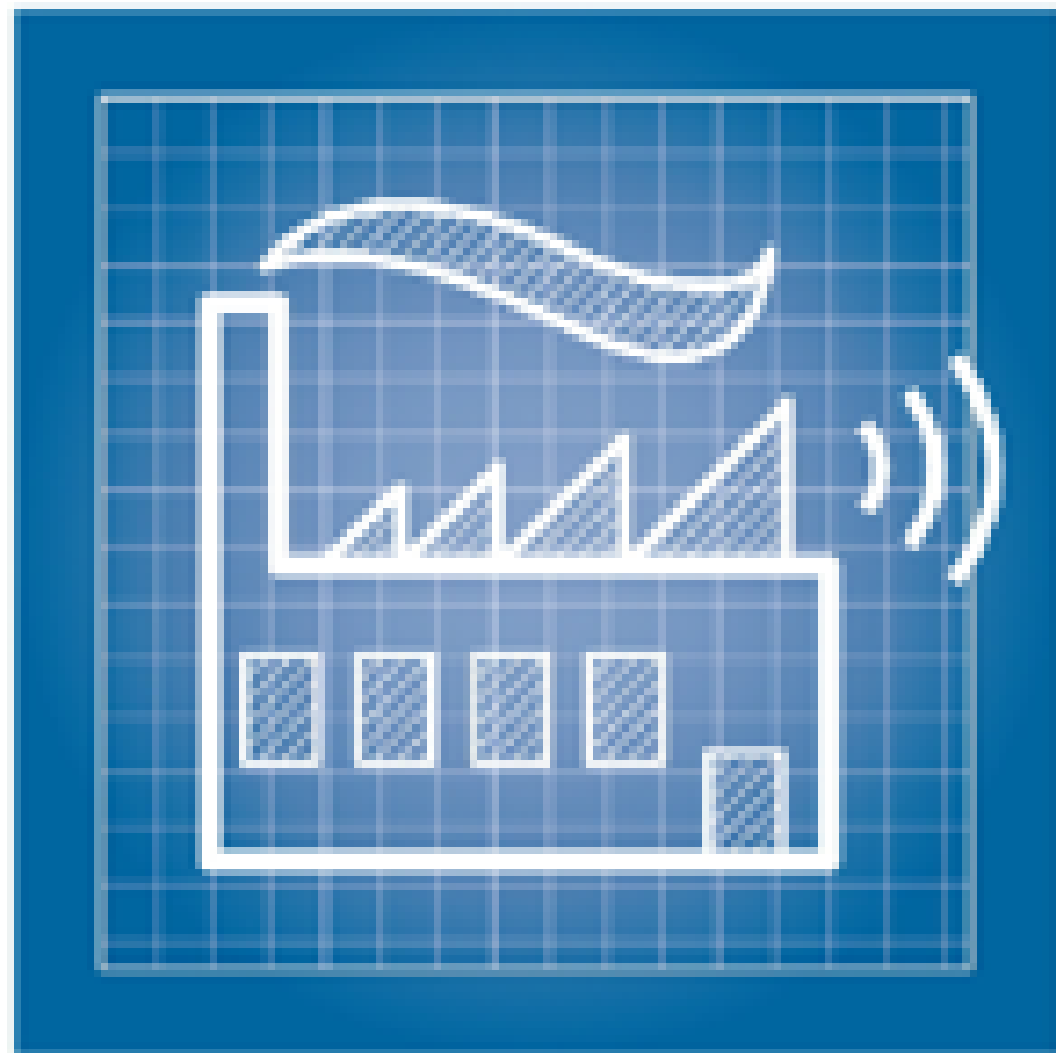ICTP in 2014

Our collaboration with ICTP & NSRC

ICTP & NSRC's Wireless Sensor Networks Workshop in 2014

Ref: https://www.ictp.it/about-ictp/media-centre/news/news-archive/2015/3/the-future-is-smart.aspx

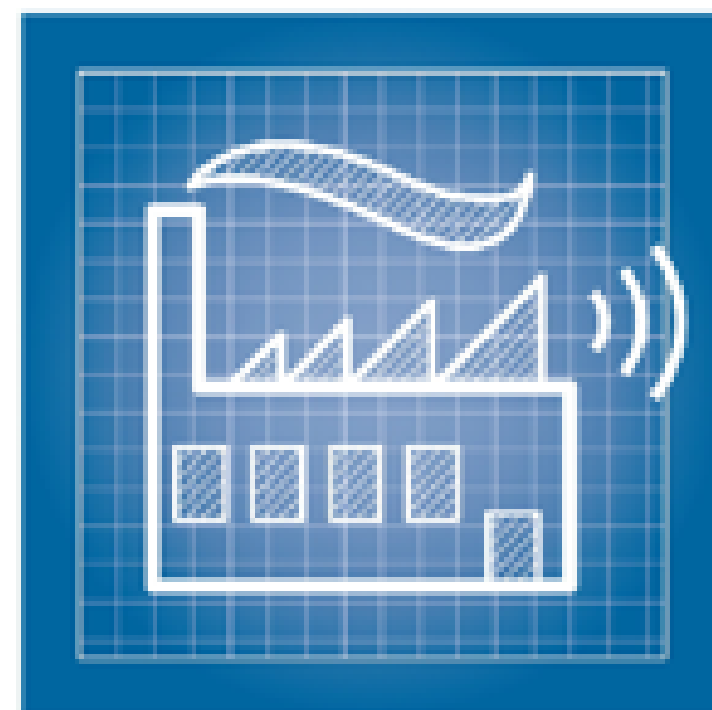# "Industrial" Digital Transformation Made Easy

SMART SENSE
INDUSTRIAL DESIGN CO., LTD.

Why do we mainly focus on IIoT ?

– Market size

– Economic and Societal Impacts

– The amount of 'money' that potential buyers can pay.

Digital Transformation (DX) Made Easy

เราปรับปรุงเปลี่ยนแปลงกระบวนการผลิต
โดยอาศัยเทคโนโลยีดิจิทัลได้ อย่างไร ?

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Common Pain Points ปัญหาที่พบบ่อย ๆ

อุบัติเหตุ การบาดเจ็บ
Accidents & Injuries

เครื่องเสีย
Machine Breakdowns

เวลา / คุณภาพ / ต้นทุน
Time, Quality and Costs

Common Gain Points   สิ่งที่ช่วยเพิ่มผลงานให้เราได้

การวางแผนการผลิต
Planning & Scheduling

การติดตามเฝ้าระวัง
Monitoring & Tracking

การตรวจสอบควบคุมคุณภาพ
Quality Inspection

Digitalization : การใช้เทคโนโลยี Digital ในกระบวนการผลิต

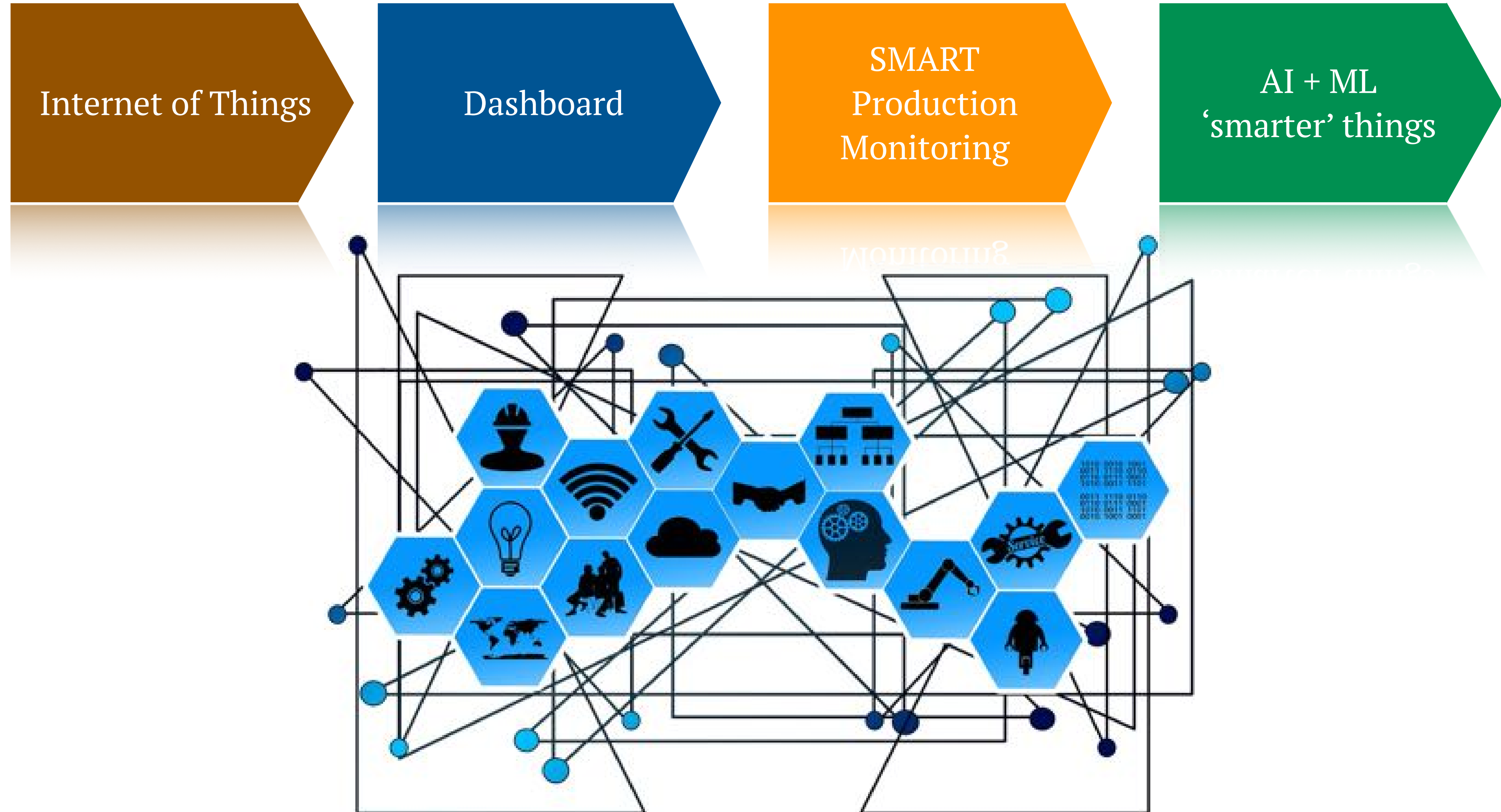**Information Technology (IT)**

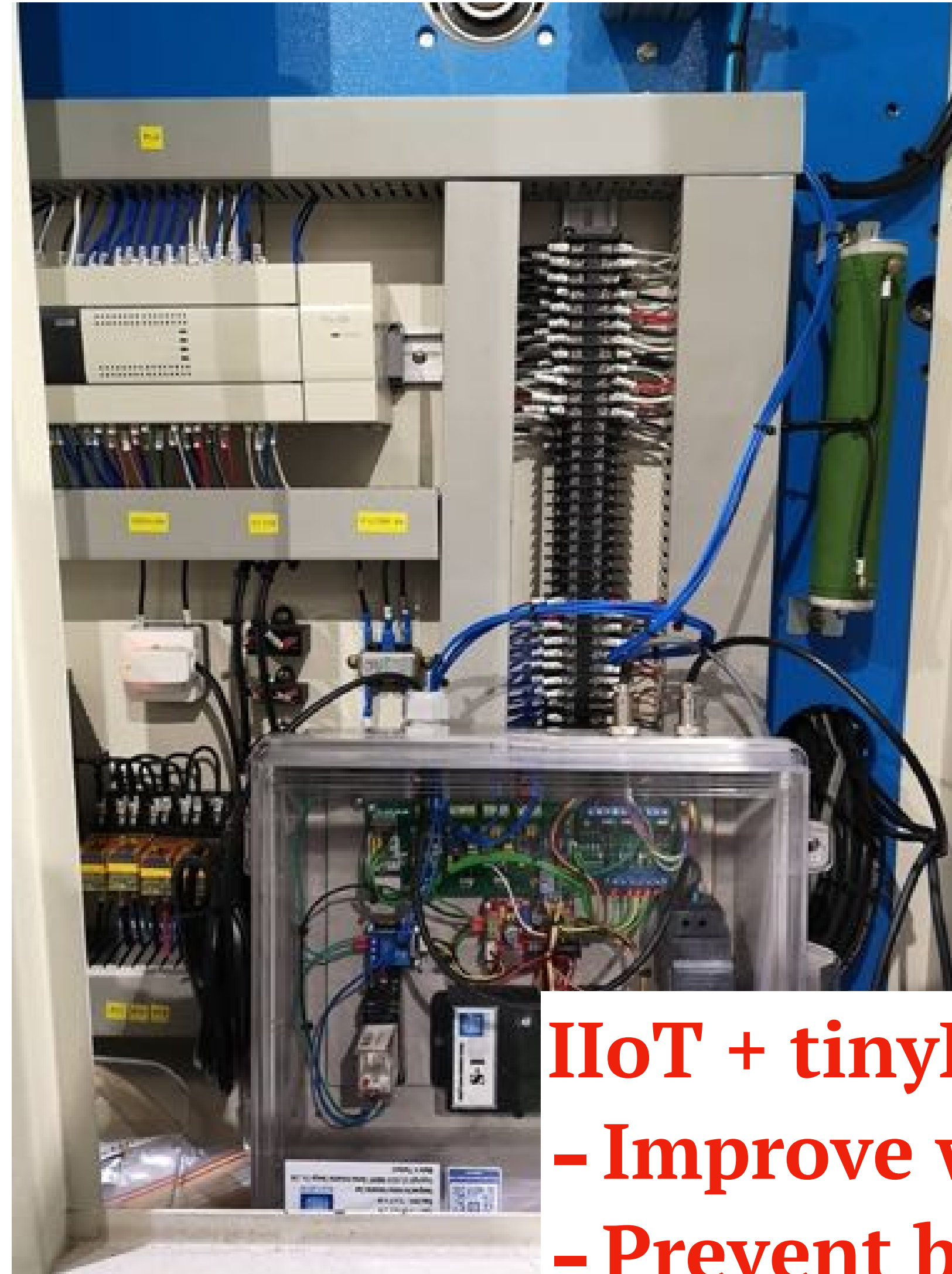**Operational Technology (OT)**

Some of the most important things in Industry 4.0 are **Data Making** and **Acting upon that Data**

สิ่งที่สำคัญอันดับต้น ๆ ใน Industry 4.0 คือ การสร้างข้อมูล และการนำข้อมูลไปใช้

Typical IIoT Value Creation for our Industrial Customers

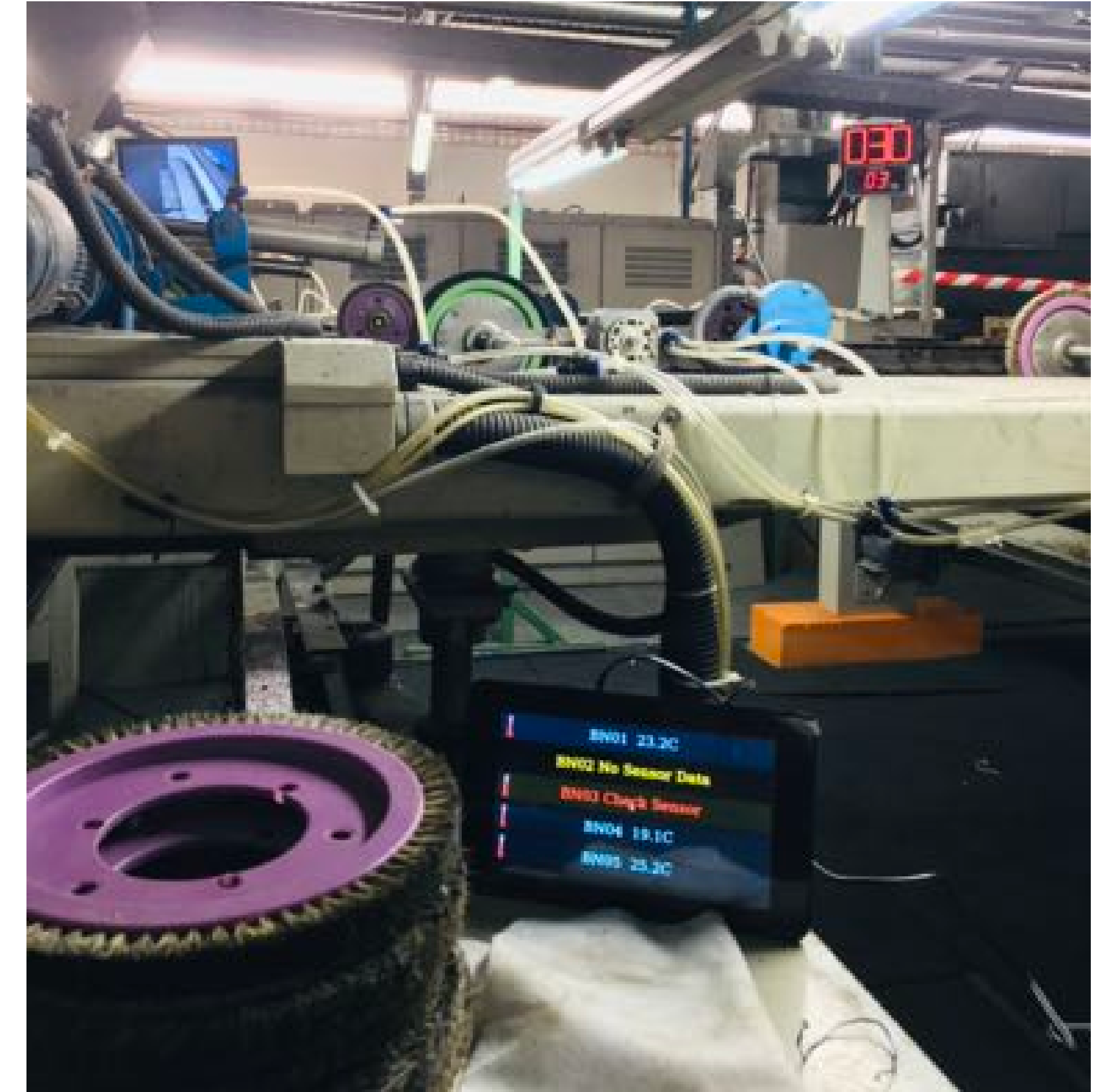| Internet of Things | Dashboard | SMART Production Monitoring | AI + ML 'smarter' things |

Worker Safety Monitoring

IIoT + tinyML's opportunities
–Improve worker's safety.
–Prevent bodily injuries.

Burner Monitoring

IIoT + tinyML's opportunities
- Better Temperature Anomaly Monitoring
- Fewer production defects and wastes

Block Heating Element Monitoring

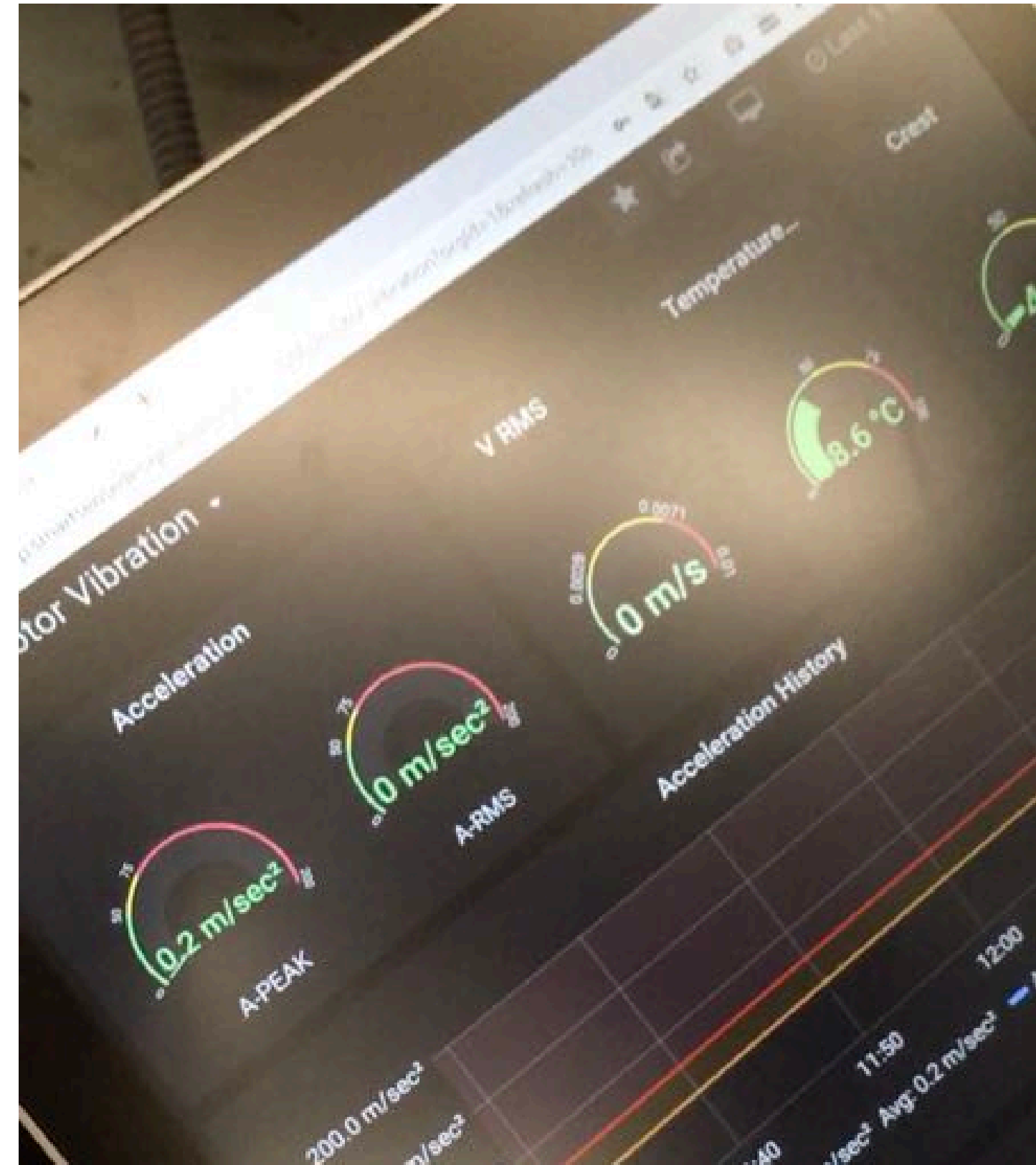**IIoT + tinyML's opportunities**
– Better Temperature Control
– Better quality & lower productivity losses

Motor Vibration Monitoring

IIoT and tinyML's opportunities

- Motor's health

- Alarms on abnormal vibration or temperature

Cycle Time & Productivity Monitoring

IIoT and tinyML's opportunities:

– Item counting & cycle time monitoring

– Machine breakdown status

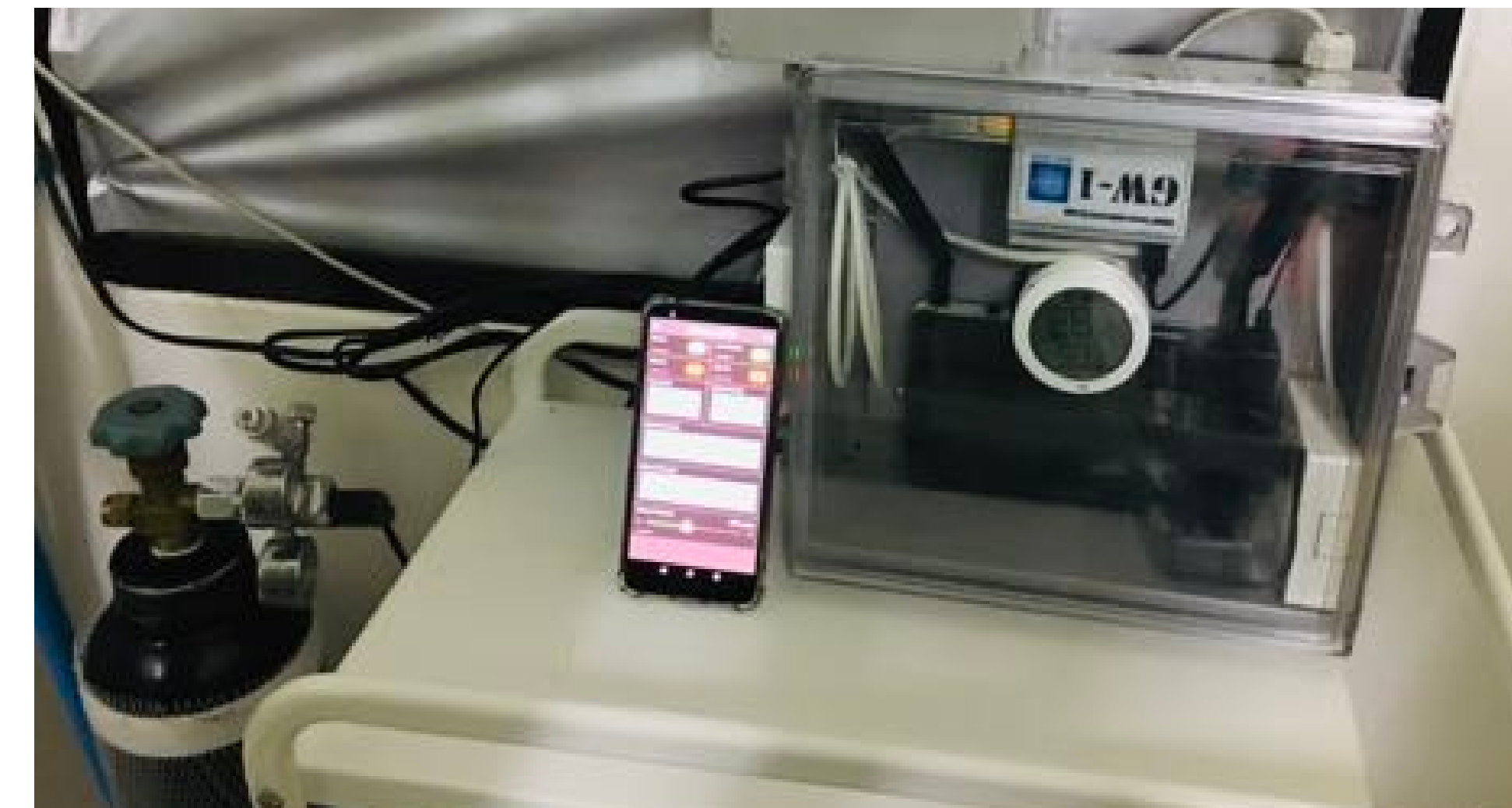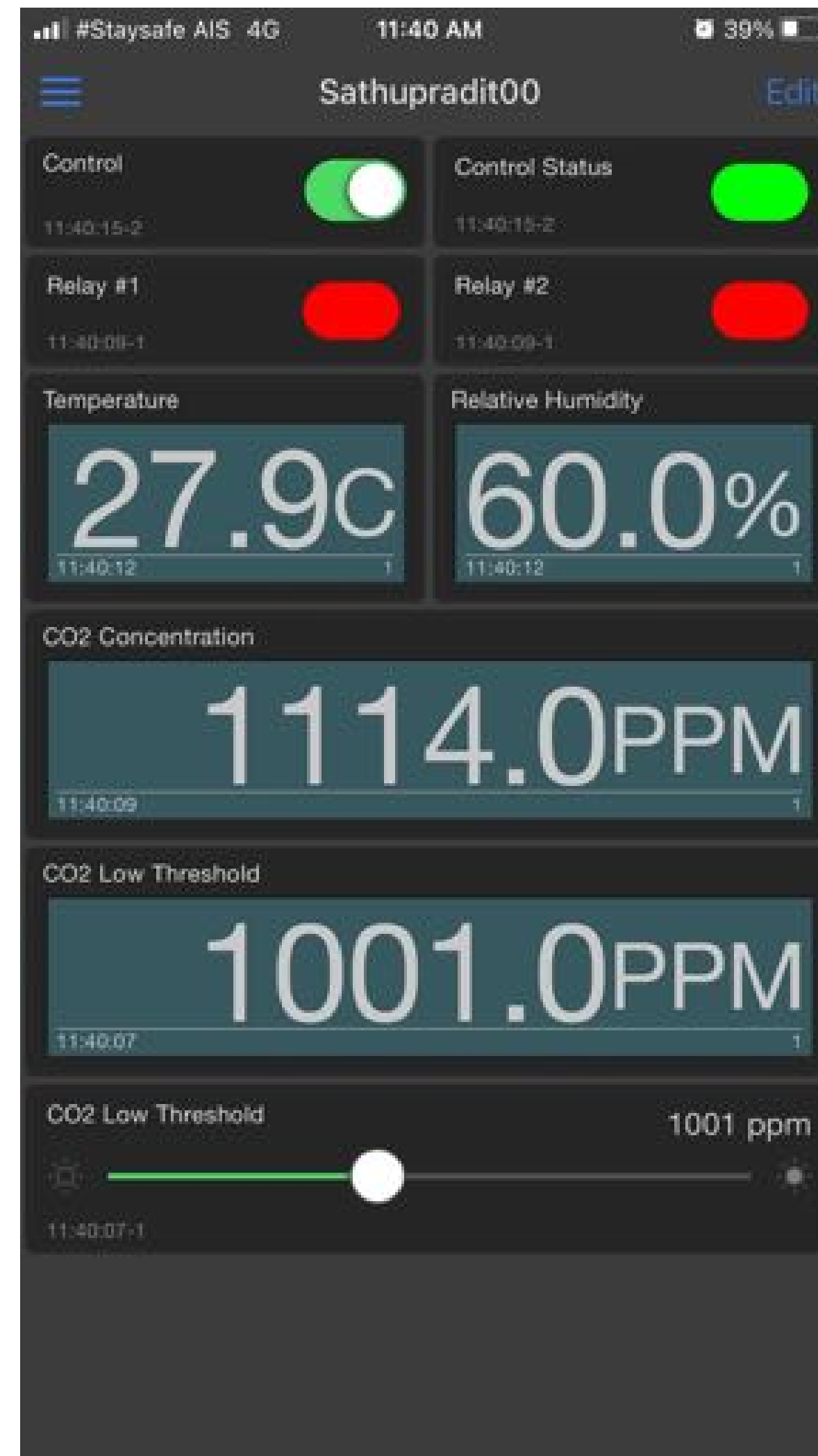# Leather Soaking & Tanning Process (Industrial Agri Tech)

IIoT and tinyML's opportunities:
- **Machine status monitoring**
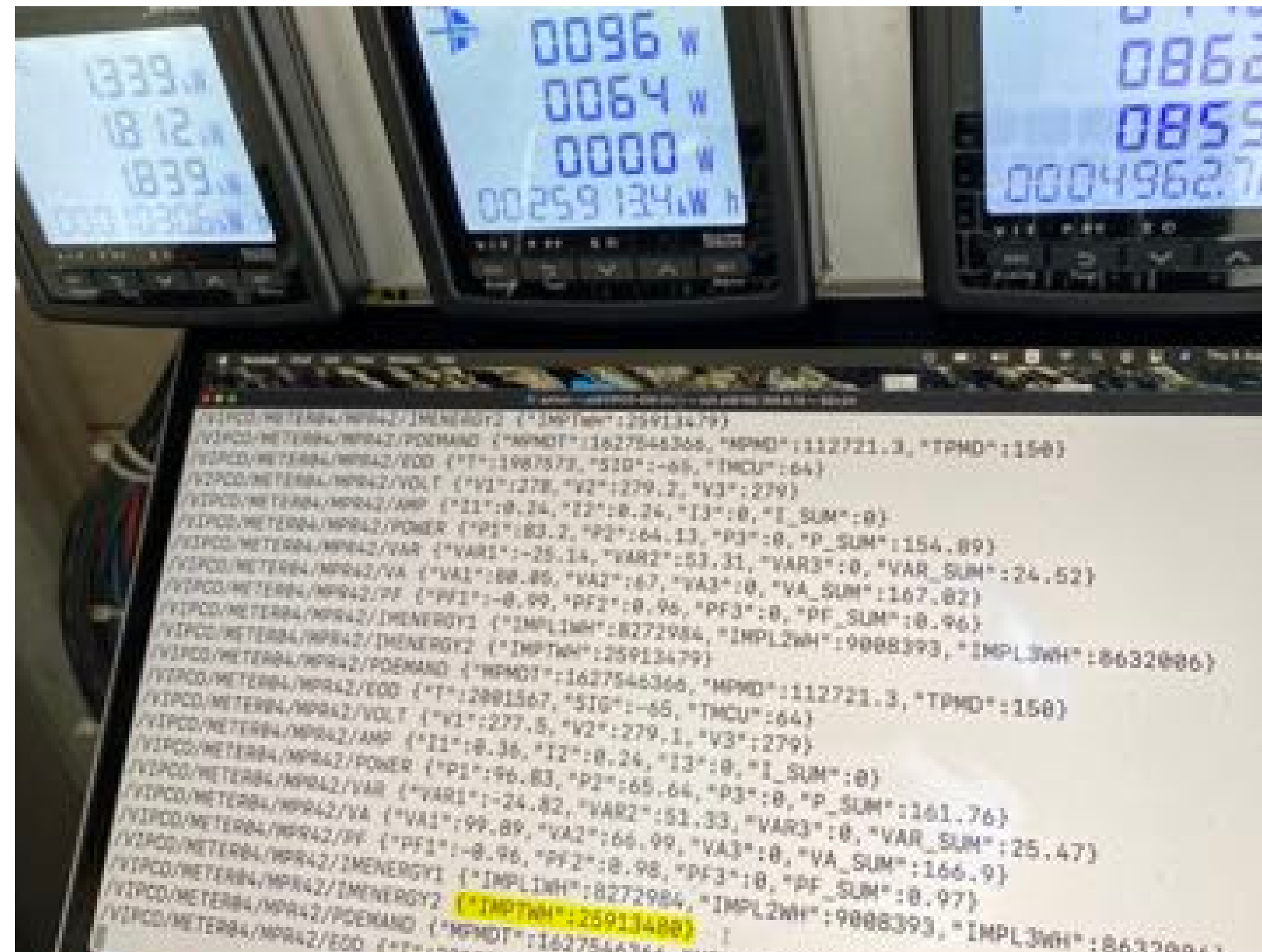- **Better scheduling & automatic control**

SMART Vertical Farming

IoT + tinyML's opportunities:
- Better monitoring and control of indoor environment
- Better monitoring monitoring and control of water pH, EC
- Better monitoring and control of CO2 gas concentration.

Energy Consumption Monitoring

IIoT and tinyML's opportunities
- **Better monitoring & classification of Power & Energy Consumption characteristics (KW, KVAR, KVA, PF, KWH)**
- **Detection of abnormal or irregular power/energy behaviors**

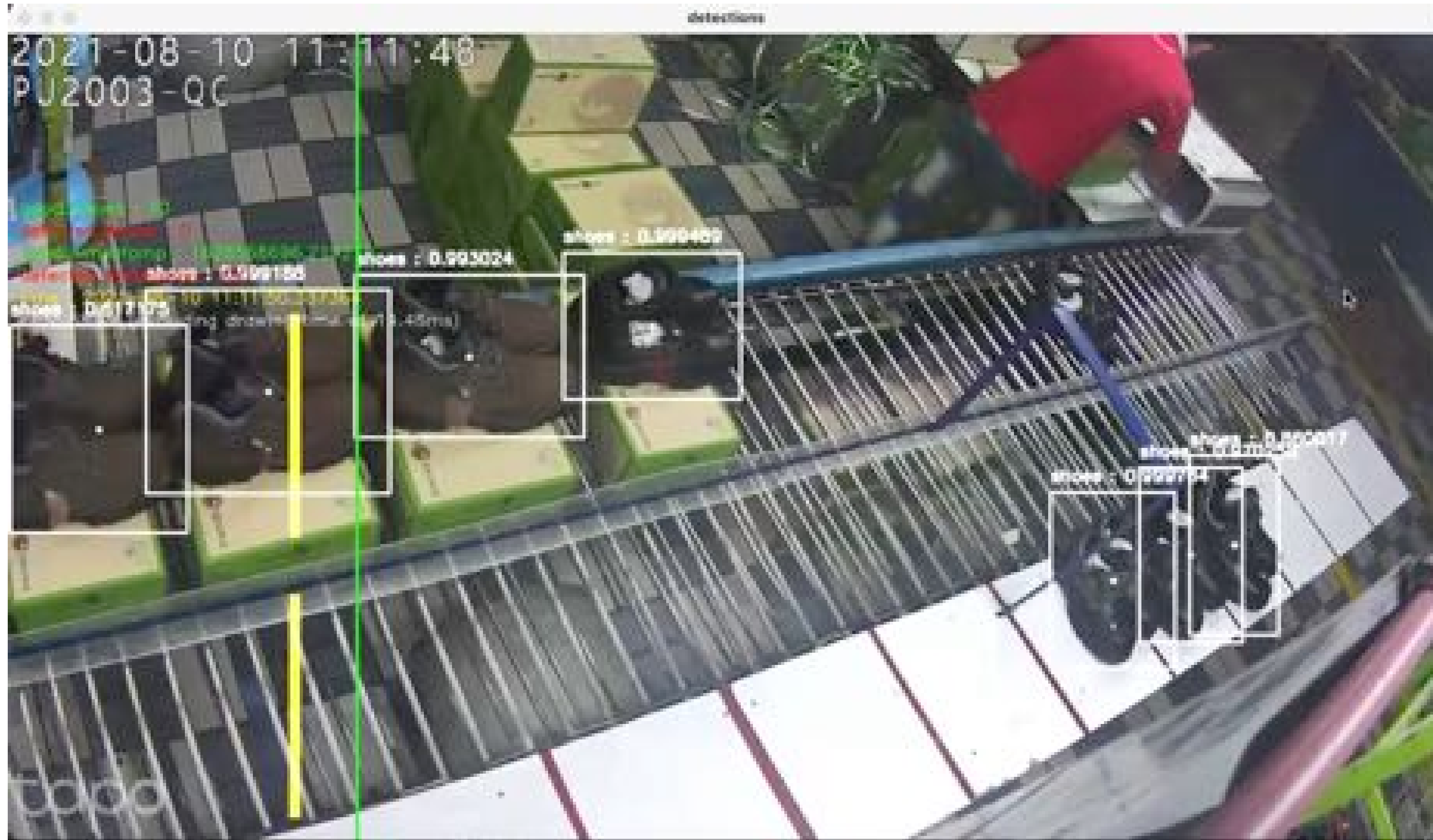# Camera as a Sensor Testbed

tinyML's opportunities:
- Better 'micro' monitoring of 'Parts', 'Processes', and 'Cycle Times'

Industrial Video Analytics Research Credits:
- Mr. Nisit Sirimarnkit,   SMART Sense Industrial Design
- Dr. Chawalit Jeenanunta, Sirindhorn International Institute of Technology (SIIT)

Example: Counting of OK vs. NG

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- Dr. Chawalit Jeenanunta, Sirindhorn International Institute of Technology (SIIT)

Visual Identification of Truck's Markers

IIoT + tinyML's opportunities:
– Reduce Waiting time
– Improve Truck Routing/Scheduling
– Reduce CO2 emission !

Industrial Video Analytics Research Credits: Mr. Nisit Sirimarnkit, SMART Sense Industrial Design

Thank you !
Q&A