PORTFOLIO · 2026

Aditya Tri Kurniawan

Director & CTO — PT Machvory Digital Engineering

Industrial IoT, energy monitoring, and predictive maintenance systems built for Indonesian factories. Sensor to firmware to protocol to backend to the screen someone opens at 7am.

BASED IN
Yogyakarta, Indonesia

CONTACT
aditya.tri.kurniawan01@gmail.com

COMPANY
machvory.co.id

CONTENTS

2 platforms in production

13 capability areas

1 iOS & Android app

5+ years in industrial systems

Prepared for the Apple Developer Academy application.

I make factory data legible

A machine on a production floor is usually silent about itself. It runs, it stops, it draws power, and nobody can tell you how much of any of that happened last Tuesday. My work is closing that gap: putting a sensor where there was none, getting the signal out over a protocol the plant already speaks, storing it properly, and then showing it to a person in a way they can act on before the cost is already spent.

I run PT Machvory Digital Engineering in Yogyakarta as Director and CTO. Two platforms of ours are in production. Before that I spent three years as a senior researcher in embedded systems and electrical engineering, which is the reason I still trust hardware more than I trust a smoothing function.

THE LAYERS I WORK ACROSS

Sensing & firmware

STM32 and ESP32 acquisition boards, accelerometers, current transformers. Schematic capture and PCB layout in KiCad, BOM sourcing, and commissioning on live machines.

Industrial connectivity

Modbus RTU and TCP, OPC UA, MQTT. Reading from PLCs, power meters and SCADA already installed in the plant, rather than asking anyone to replace them.

Data & backend

Ingestion pipelines, time-series storage, and aggregation for machine data arriving continuously from many points at once.

Interface

Operational dashboards, 3D digital twin views, and mobile. Built for someone standing on a factory floor, not for a demo.

Analytics & AI

Anomaly detection, condition trending, and asset risk scoring — each of which has to explain the number it produced.

Integration & delivery

Joining the OT layer on the floor to enterprise systems like ERP and SAP. Docker and nginx, deployed on-premise inside the plant network or in the cloud.

TWO RULES I HOLD THE TEAM TO

Every number shows its work

A score, a forecast, a rupiah saving — each one has to state the arithmetic and the baseline it came from. If two screens give different answers for the same asset, that is a bug, not a difference of opinion. Industrial buyers stop trusting a system the first time it produces a number nobody can defend.

No claim the product cannot prove

We do not publish percentages we have no case study behind. A finding inferred from power draw alone is labelled MEDIUM confidence on screen, with the reason written next to it. Saying less than you could is cheaper than being caught saying more than you can show.

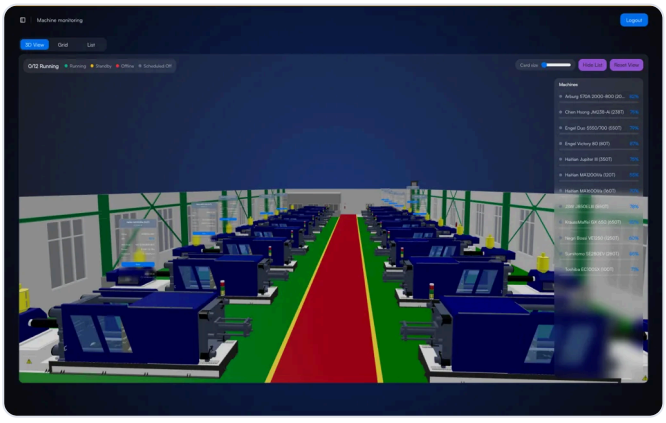
TNS — Operational Performance & Energy Intelligence

TNS answers whether the machines are actually working, and what they cost to run. OEE per machine and per shift without anyone filling in a spreadsheet. Stoppages detected and sorted by cause. Energy metered down to the individual machine, including kWh per unit produced — the number that quietly tells you a line is degrading.

Role: product architecture, connectivity layer, data model, dashboard design · **Stack:** TypeScript · React · Node.js · time-series storage · Modbus / OPC UA / MQTT

Energy monitoring — consumption, cost, CO_2 and peak load against the contracted limit.

OEE per machine and per shift, computed from machine signals.



The production floor as a 3D model, on the plant's own CAD geometry.

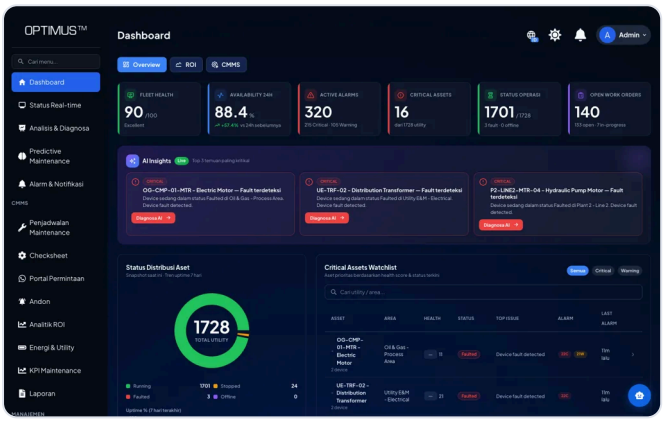
SEVEN CAPABILITIES, EACH SOLD ON ITS OWN

Energy Monitoring · Energy Efficiency · Energy Mobile · OEE Monitoring · Downtime Monitoring · Production Monitoring · Digital Twin

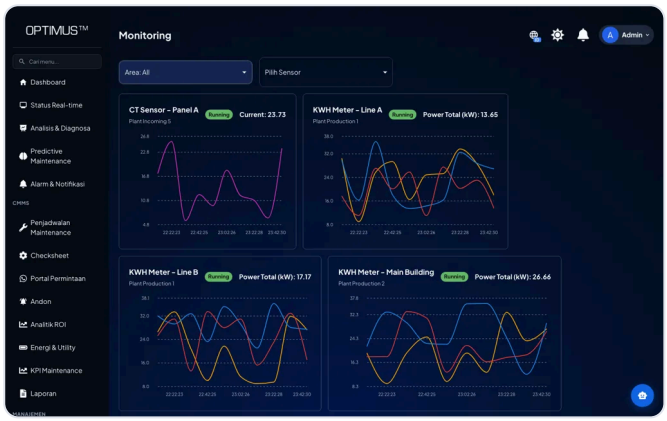
OPTIMUS — Predictive Maintenance & CMMS

Where TNS asks how well a machine is running, OPTIMUS asks how long it will keep running. It watches vibration, temperature and current on assets a plant cannot afford to lose, flags the change early, and then carries that finding through to a real job: a work order with a schedule, a checksheet and a spare part attached. Maintenance stops being something people remember to do and becomes something the system can show you the history of.

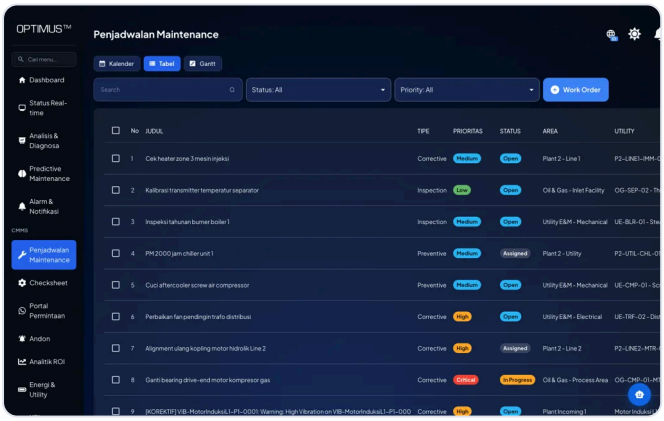
Role: platform architecture, sensor integration, analytics rules, CMMS workflow design · **Stack:** TypeScript · React · Node.js · Python · anomaly detection · 3D viewer



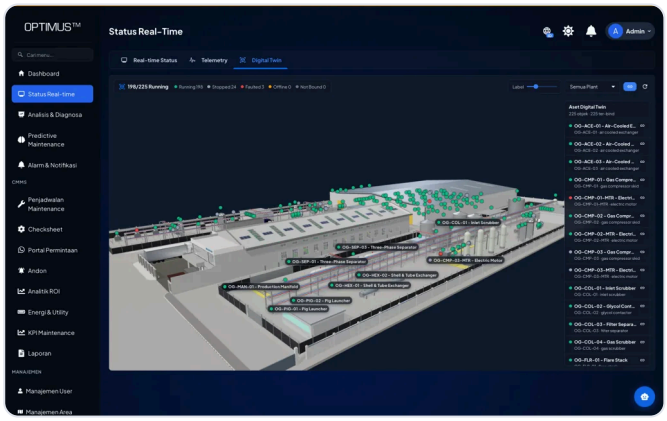
Fleet overview — health, availability, active alarms, critical assets and open work orders.



Condition monitoring — vibration, temperature and current trended per asset.



CMMS — work orders by type, priority and status, with schedule and spare parts.



Plant digital twin — live asset status pinned onto the 3D model.

SIX CAPABILITIES, SAME STANDALONE RULE

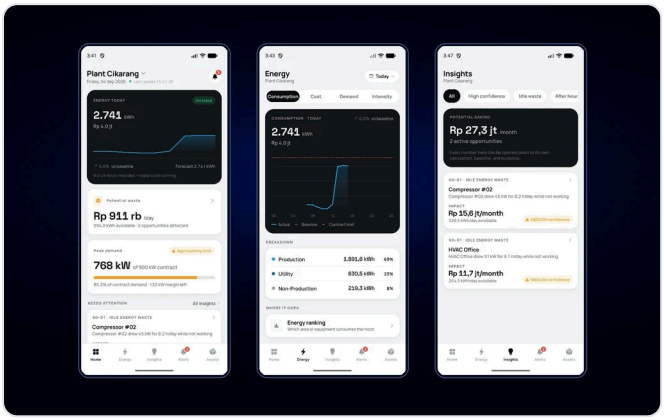
Condition Monitoring · Predictive Maintenance · Asset Health Monitoring · CMMS · Maintenance Analytics · Digital Andon · Digital Twin

Digital Andon

An operator who spots a problem should not have to find a supervisor to report it. Andon gives the floor a categorised, one-tap channel straight to the people who can act, and every raise is timestamped — so response time becomes something you can measure instead of argue about.

TNS Energy Mobile — Android & iOS

The energy dashboard lives on a control-room PC. The person who can approve stopping the waste is out on the floor. That mismatch is the whole reason this app exists.



Daily summary, consumption by area, and the open waste findings list.

Framework	Flutter (Dart)
Platforms	iOS 12 and above, Android 8.0 and above
Permissions	INTERNET only. No camera, location, storage or contacts.
Data source	The same meters and gateways as the web platform
My role	Product definition, information design, release

The design decision I am most attached to

Every rupiah figure in the app opens. Tap it and you get the arithmetic, the baseline it was compared against, and the curve the claim came from. A finding we inferred from power draw alone is stamped MEDIUM confidence with the reason printed underneath it.

It would have been easier to show a big confident number. But this app tells a manager to go spend money and interrupt a production line. If it cannot show why, it has not earned that.

WHAT IT DOES

Today in one screen

Consumption so far, its cost, potential waste, and peak load against contracted power — readable before the morning meeting starts.

Findings you can assign

A finding is not a notification. It gets a named owner and a follow-up that can be tracked to closure.

Ranked by impact

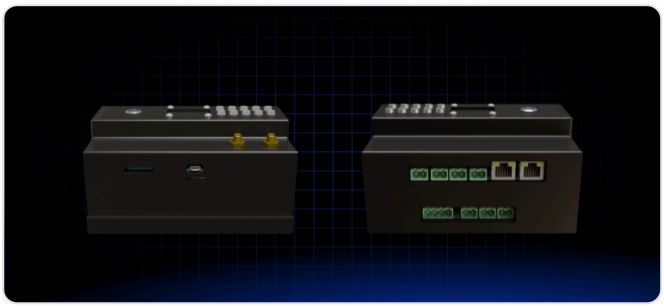
Machines and areas sorted by kWh and rupiah, so work starts where it pays, not where it is easy.

Why this matters for the Academy

Flutter got this product onto iPhones, and I am glad it did. But it also means I have shipped to iOS without ever really writing for it — no Swift, no SwiftUI, no proper feel for the Human Interface Guidelines. This app is the clearest example of both what I can already do and exactly where I stop.

Industrial IoT Node & sensors

Software people tend to assume the data is already there. On an Indonesian factory floor it frequently is not: the machine is twenty years old, it has no network port, and the only thing it will tell you is that it is on. The node is what we bolt on to change that.



The DIN-rail gateway between the machines and the platform — RS-485 and Ethernet in, MQTT out. Product render.

Where it has been installed

Vibration and temperature sensors at PT Javis Teknologi Albarokah. A sample vibration and energy monitoring deployment at PT Astra Honda Motor.

Commissioning teaches you things a datasheet will not. Cable runs pick up noise. A mounting point that looked fine in the drawing sits behind a guard nobody may open during a shift. Half of building reliable industrial data is expecting the physical world to be uncooperative.

Core	STM32 (H7 series) acquisition board
Inputs	Dual high-speed HTL encoder, analog and digital I/O
Sensing	Vibration, temperature, current transformers
Uplink	Modbus RTU/TCP and MQTT to the gateway
Tooling	KiCad schematic and PCB, LCSC/JLCPCB sourcing
My role	Circuit design, BOM, firmware, commissioning

WHY WE BUILD THE HARDWARE OURSELVES

Fix problems at the source

A noisy or badly-sampled signal cannot be rescued by analytics. Owning the board means we fix it where it starts.

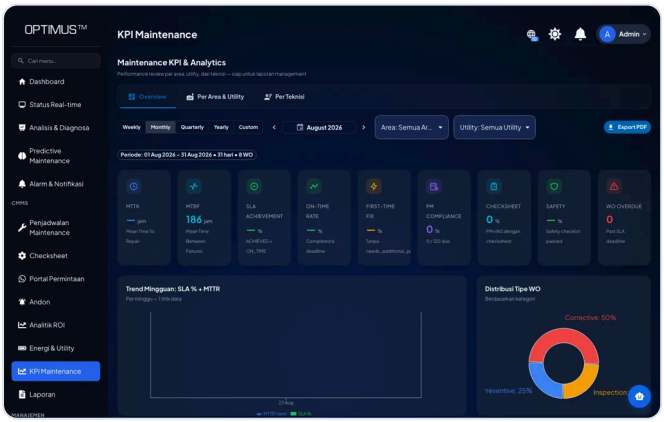
Cost that fits the market

Imported condition-monitoring kit prices most Indonesian mid-size plants out of the conversation entirely.

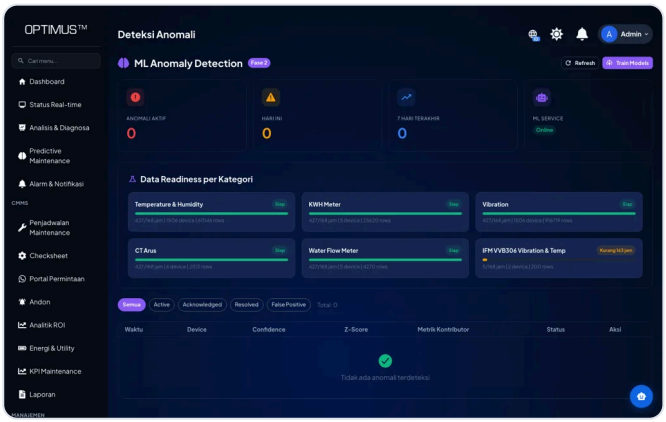
It stays a layer, not a product

We sell the outcome, not the box. The hardware is the connectivity layer underneath, and we present it that way.

WHAT THE DATA BECOMES



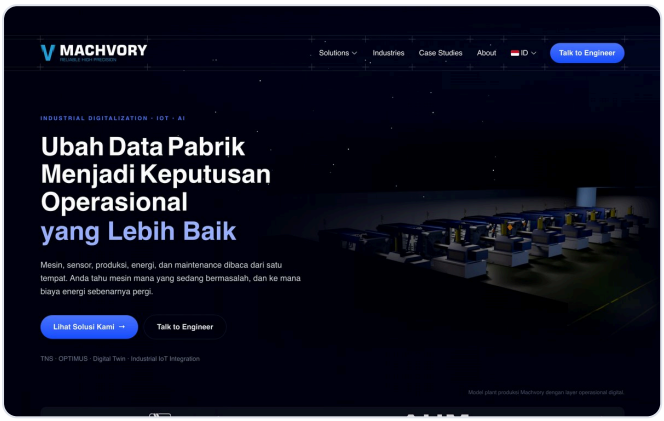
Maintenance analytics — MTTR, MBTF, SLA and work-order mix, per area and per technician.



Anomaly detection — condition trend turned into a decision about when to act.

machvory.co.id and the film behind it

I designed and built the company's public platform and the CMS behind it. Next.js 14 App Router, Prisma over MySQL, role-based admin access for four roles, first-party visitor analytics, and a lead pipeline that keeps attribution intact across a page reload. Deployed on Docker behind nginx.



The homepage above the fold.

Frame 320 of the loop — the condition-monitoring beat, with the real Digital Twin tooltip. It doubles as the video poster.

DECISIONS WORTH EXPLAINING

Thirteen pages, one source of truth

The whole site's information architecture lives in a single typed file. Navigation, footer, homepage selector, sitemap and every solution page read from it. Adding a capability page means adding one entry and its screenshots — no new route, no drift between the menu and the pages it points at.

Real screenshots or no page

Every solution page ships an image captured from the running product. One capability we genuinely have does not get a page at all, because its screen has no publishable data yet. No stock imagery and no mockups anywhere on the site.

Tag IDs in the database, not the build

Analytics and ads tag IDs are edited from the admin panel and read per request, so marketing can rotate them without a redeploy.

Hardened where it counts

The lead endpoint carries rate limiting, a honeypot, strict allowlists, phone normalisation and salted IP hashing. After a scan found a missing auth check on an upload route, I patched it and added an extension allowlist as a second layer.

THE HERO FILM

The homepage opens on a 24-second loop I built in Blender over Machvory's own production-hall model — the same geometry the TNS 3D view renders. The camera wakes a dark factory, travels the machine row through five beats (energy, OEE, condition monitoring, CMMS, andon), rises over a plant covered in status pips, and lands back on the opening frame.

Real panels, not invented ones

An earlier version drew look-alike cards from text objects and they read as generic sci-fi HUD furniture. The panels in the shipped film are cropped screenshots of the running products. It is the same rule as the rest of the site.

Prerendered, on purpose

The hero used to be a live WebGL scene. It cost load time, GPU and battery, was unstable on mobile, and stretching real screenshots onto 3D panels distorted them. 576 prerendered frames encoded to WebM and MP4 solved all four at once.

What I can do, and what I want to learn

TECHNICAL

Embedded & hardware

C / C++ · STM32 · ESP32 · Firmware · KiCad · PCB layout · Sensor interfacing

Software & data

TypeScript · React · Next.js · Node.js · Python · Prisma · MySQL · PostgreSQL · Time-series

Industrial protocols

Modbus RTU/TCP · OPC UA · MQTT · PLC · SCADA · Power metering

AI, 3D & delivery

Anomaly detection · Machine learning · three.js · glTF · Blender · Docker · nginx · Git

Mobile

Flutter · Dart · iOS release · Android release

Learning next

Swift · SwiftUI · Xcode · HIG · Core Bluetooth

HOW I WORK

Pilot first

One line or a handful of critical assets. Prove it in the field, then widen. Nobody should have to bet the plant on a promise.

Work with what is installed

No ripping out PLCs, meters or ERP. We read from what is already there.

Build for the floor

The person using this is standing next to a running machine. If it needs a manual, it has failed.

WHY THE APPLE DEVELOPER ACADEMY

Five years of making industrial data readable, and nearly all of it landed on a desktop dashboard. The one mobile product I have shipped reaches iOS through Flutter — which works, but means I have never actually written for the platform. Swift, SwiftUI, the Human Interface Guidelines, and the design side of building something people choose to open: that is the gap, and I would rather close it properly than keep approximating it.

What I would bring is a domain most applicants do not have. I know what a maintenance technician does at 6am, why a plant manager distrusts a number, and what happens to an interface when someone is wearing gloves. I have also spent three years running a small engineering team, which mostly teaches you how to be wrong in front of people quickly enough to fix it.

I am not applying to change field. I am applying because the systems I build deserve a better front door than the one I currently know how to make.