Artificial intelligence and smart technologies: practical applications to empower your digital water network

Lucio Machetti

R&D Manager

TERRANOVA

Board Member

HPA
MATH TO INNOVATE

Agenda

- A future-proof approach to enable the digital transformation of Utilities
- How can AI improve and innovate your business processes in the water sector?
- Leveraging AI and smart technologies to empower your activities

A future-proof approach to enable the digital transformation of Utilities

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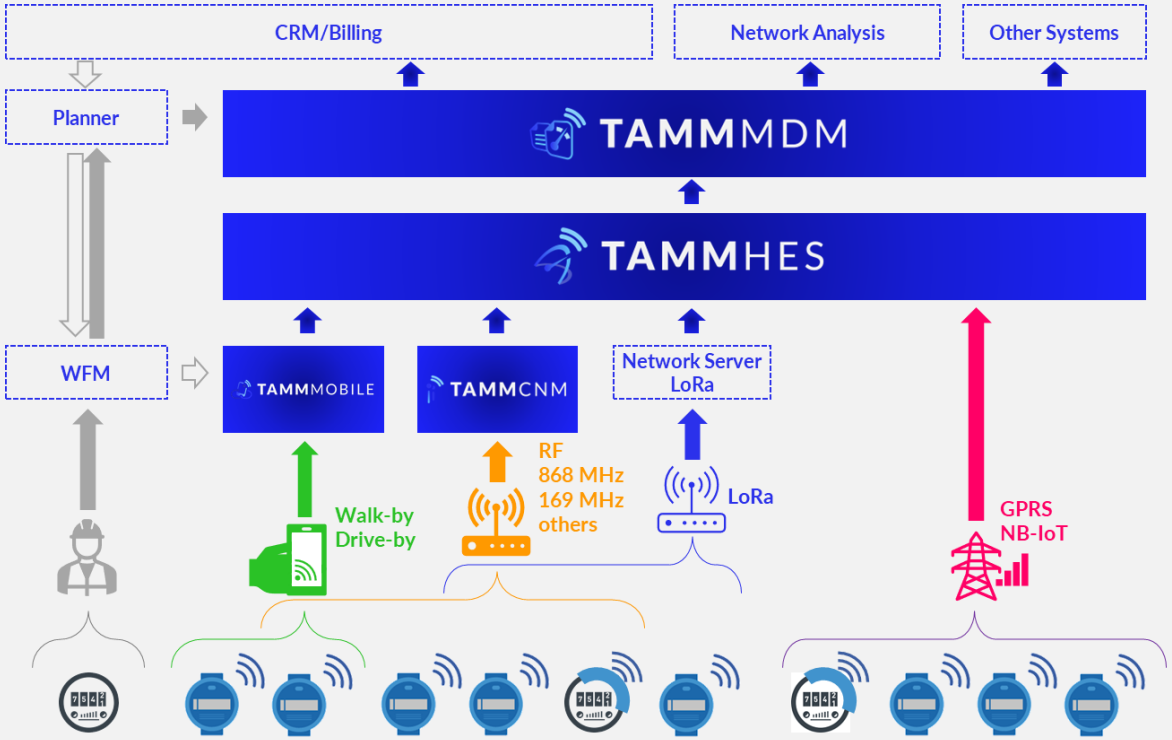
Water Architecture



MDM – metering data management
- Management of metering related processes
- Data processing
- Diagnostics and alarms
- Standard interfaces and tools to integrate legacy systems
- Software based prepayment

AMR (HES – head end system)
- Remote reading and control (bidirectional system)
- Readings, traces, events and diagnostics management
- Device and communication tech – agnostic (NBIoT, GSM, RF, LoRa...)
- Optimised collection strategy to reduce battery consumption

CNM – communication network manager
- Gateways and Concentrators managements
- Acquisition of meter data and network statistics through communication with concentrators
- Forwarding commands through the network (routing)
- Communication network management and balancing

Mobile – on site device management app
- Local setting of working and communication parameters
- Visualisation of metering and diagnostic registers
- Local firmware update
- Local retrieval of stored metering data
- Communication bridging as back up for remote connectivity
- Walk-by/drive-by data collection

To be a Digital Enablement Platform, a Smart metering Platform, must be communication technology agnostic, meter vendor agnostic and proactively evolving in features

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- Sharing data, infrastructure and analytics “helps the business case” and empowers the effectiveness of both smart network and smart metering
- Smart Metering, adding a sensor “at the end of every pipe” with daily data, is a booster for the smart ecosystem
- Smart Metering often is the best first step of the Digital Journey for Utilities
- Digital Transformation is a continuous process
- Technology underlying the Digital Transformation must be flexible and future proof

Ascopiave

Customer

Ascopiave (listed Company)

- Location: Italy
- Size:
  - 6 700 km gas network
  - 800 000 gas supply points
- Business: Gas and Water Distribution Company
- Shareholder and technology partner of Cogeide (Water Company)
  - 15 municipalities in Bergamo area
- Partnership with ATS (Water)
  - 52 Municipalities in Treviso area
- Supply start: 2014

Solution

TAMM

TAMMMOBILE

Softwares and Devices

- Software:
  - TAMM (smart metering): HES, NM, MDM
  - TAMM mobile (on-site device config. app)
- Installation: on prem
- Device models: 47
- Device types:
  - domestic, commercial, industrial gas and water meters
  - NBIoT, RF 169MHz, GPRS
- Device manufacturers: 22

Outcomes

Features and Benefits

- Complete management of all smart metering processes: remote data collection, data processing, devices management, on site activities
- Full integration between TAMM and ERP
- Varied mix of devices and communication technologies
- Unlocking of new businesses (metering services)
- Leveraging of existing assets (radiofrequency communication network)
- Leveraging of know-how acquired on gas smart metering to serve water companies

Telefonica

Customer

Telefonica

- Location: Europe and South America
- Size:
  - 48.4 billions € revenues
  - 14 Countries
- Business:
  - Telecommunication provider
  - Smart metering service provider for water and gas utilities
- Supply start: 2019

Solution

TAMM

Softwares and Devices

- Software:
  - TAMM (smart metering): HES, MDM
- Installation: on Azure cloud
- Device models: 5
- Device types:
  - Domestic water meters (NB-IoT)
  - Domestic, commercial, industrial gas meters (NB-IoT)
- Device manufacturers: 3

Outcomes

Features and Benefits

- Management of water and gas smart metering as a service for several utilities in different countries
- Complete management of all smart metering processes: remote data collection, data processing, devices management
- Integrations between TAMM and Utilities' legacy systems
- Meters with daily readings or hourly data
- Adoption of NB-IoT innovative technology
- Saas model with cloud infrastructure and multitenant approach

Como Acqua

Customer

Como Acqua

- Location: Italy
- Size:
  - 222 200 water supply points
- Business: Water Distribution Company
- Supply start: 2021

Solution

TAMM

Software and Devices

- Software:
  - TAMM (smart metering): HES, MDM
- Area: domestic, commercial and industrial meters, waste water meters
- Installation: on premise
- Communication technologies: GPRS, NBIoT, LoRaWAN
- Device manufacturers: 4
- Device models: 6

Outcomes

Features and Benefits

- Early trials with different communication technologies and models and then consolidation of the effective meter selection
- Integration of different Network Managers from different suppliers, depending on the municipality served (for LoRaWAN connectivity)
- Management of whole processes - from meter to billing - thanks to the integration with legacy systems
- Enablement of water physical balance

How can AI improve and innovate your business processes in the water sector?

- Battery life remaining estimation
- VEE

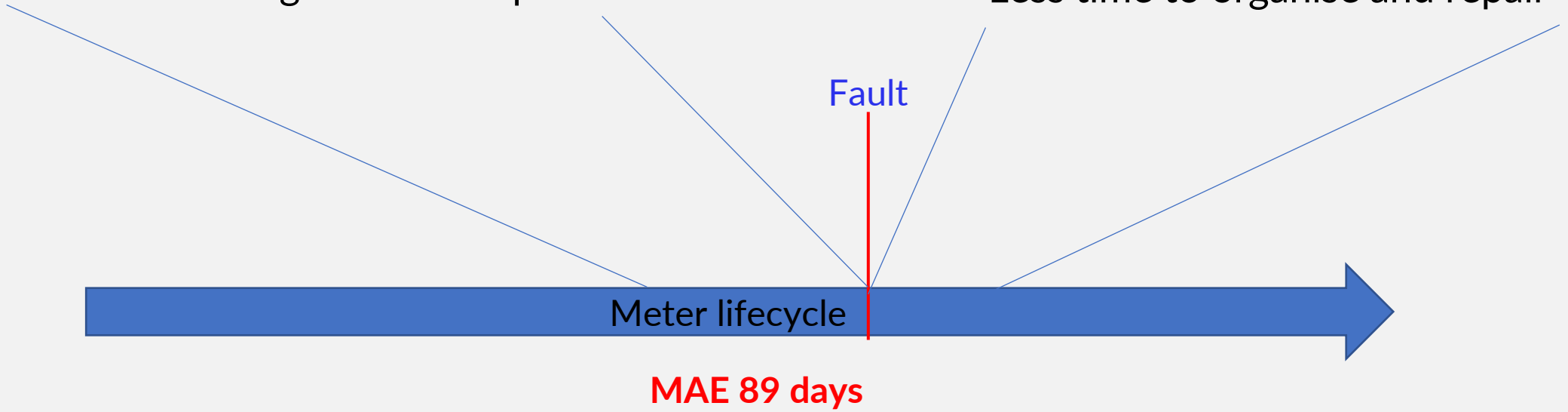
Battery life remaining estimation

Predictive maintenance

- Acts before the failure
- Requires historical data
- Proactive method
- More time to organise and repair

Condition monitoring

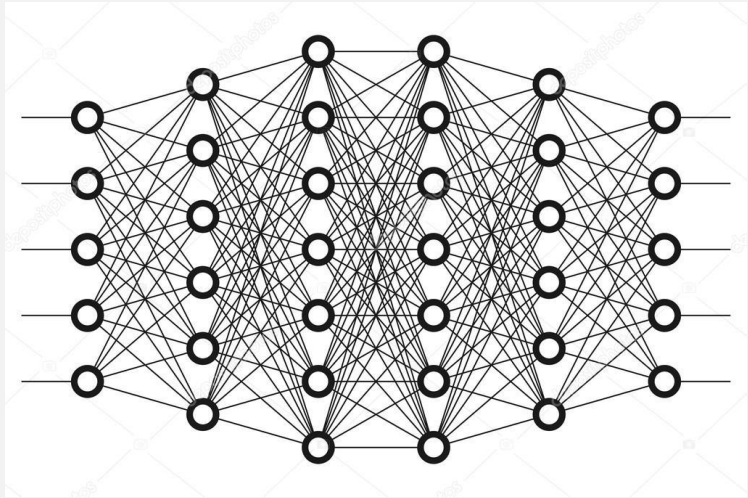
- Detects the failure
- Requires sensors
- Reactive method
- Less time to organise and repair

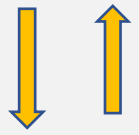


VEE - Forecasting

Input

1 2 1 2 . 2 1 . 1 2 ...



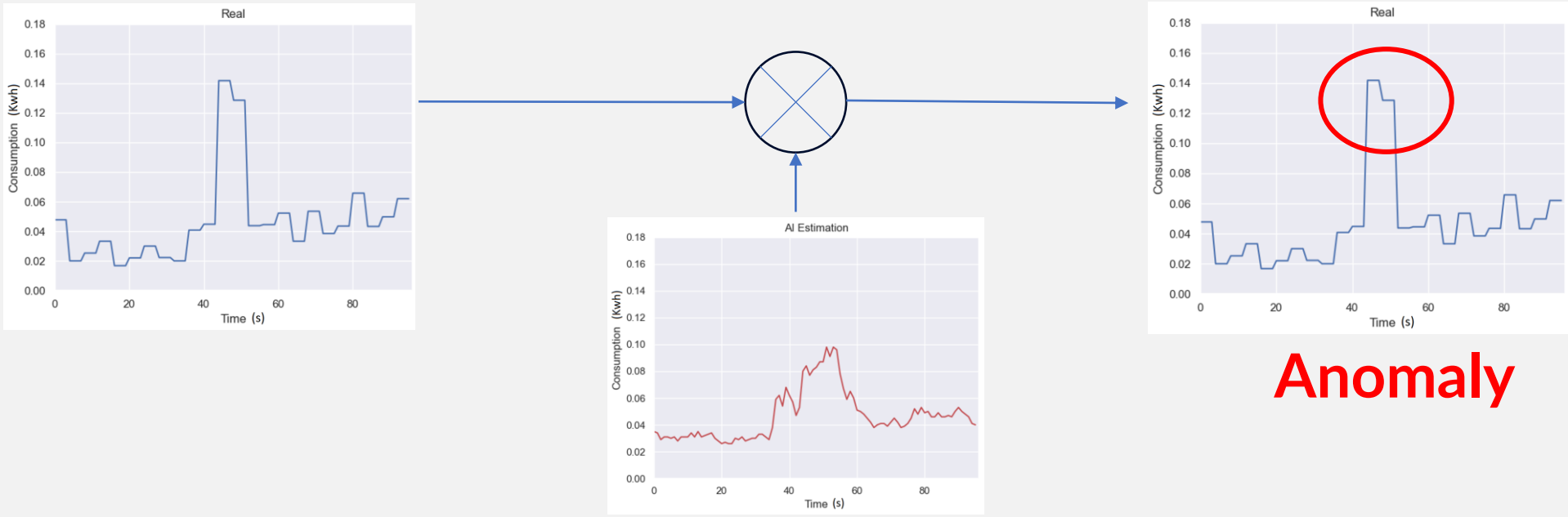


Output

1 2 1 2 1 2 1 2 1 2 ...

OK

VEE – Anomaly detection



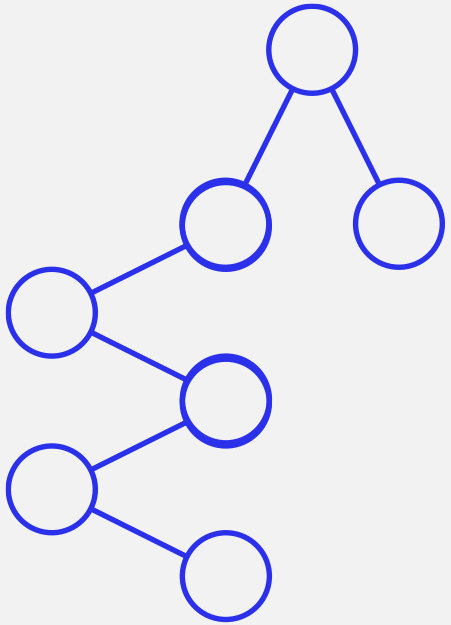
Anomaly

Leveraging AI and smart technologies to empower your activities

- Route optimiser
- Meter Image Recognition

Route optimiser

- Reduction of km travelled by vehicles and relative decrease in fuel consumption
- Improved execution times
- Optimal distribution of activities
- Seasonality management
- Creation and comparison of scenarios
- Reorganisation following unforeseen events



Meter image recognition

92%

Precision Accomplished

2 commodities

Gas and Water

200 000 Photos

10GB of images, 1GB of which discarded for poor quality

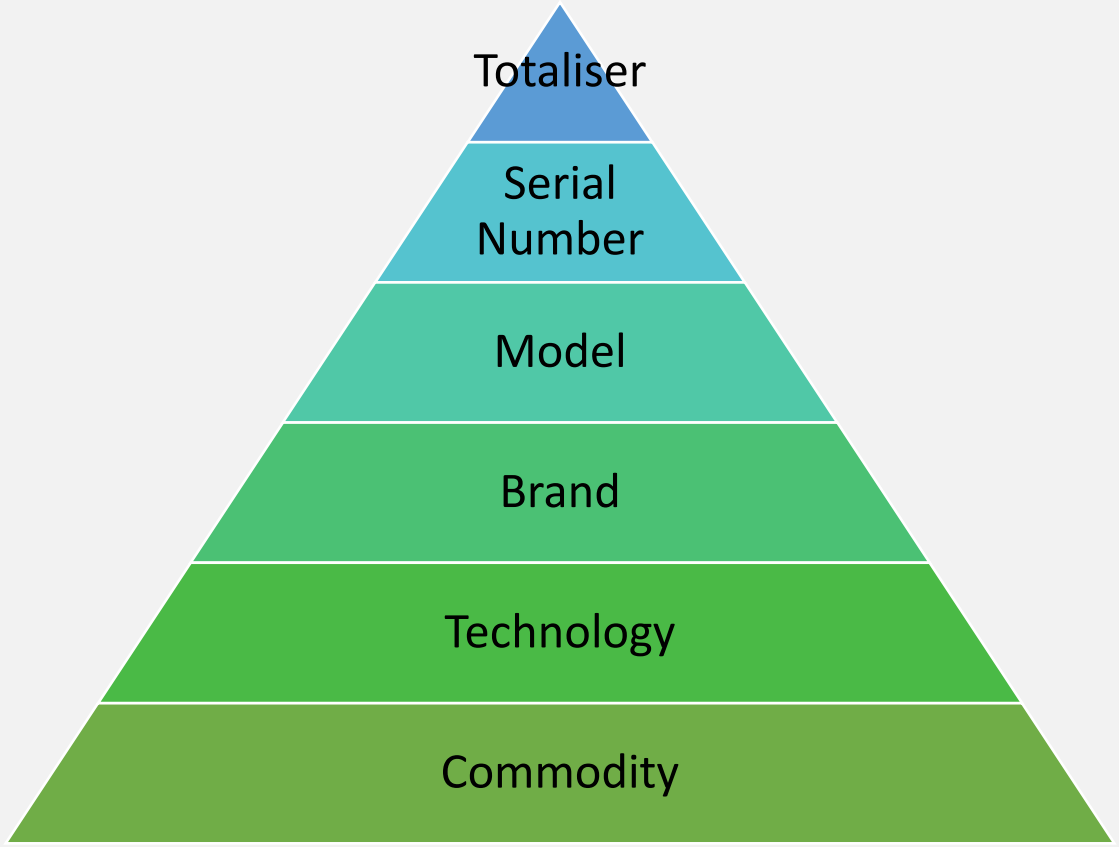
3 months

Project duration

30 models

Several layouts, both mechanical and smart

Information available in a meter photo



- Machine Learning
- Deep Learning
- Qr Code
- OCR

Functional applications

- Control Dashboard:
  - Meter or non-meter?
  - Brand and model
  - Protocol
  - Serial number
  - Totaliser
- Automatic photo detection
- Correct meter model and brand
- Check on supplier performances

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