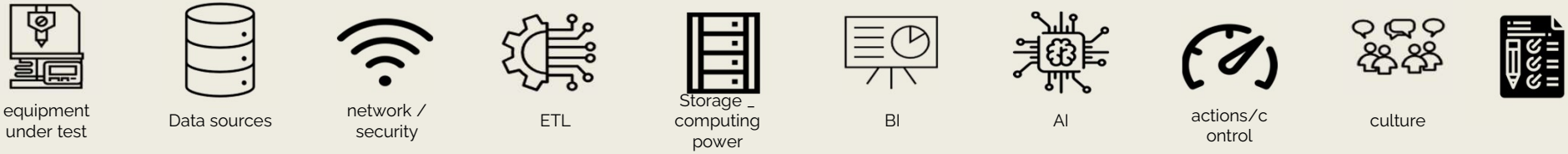
AI and Data

Jurjen Helmus

AI design is an iterative process from experimenting to exploitation,

from demonstrating via doing together in EDIH to doing it yourself



Minor Data Science – Proof of concepts

Minor Data Engineering (DMCI)

Workshops

Internships and graduating students

SIA Innovation Traineeship

Practice-oriented Research (SIA KIEM / RAAK MKB)

Associate degree Smart Asset Management / Master Applied AI

Demonstrate

Work together

Do it yourself

As Context : we see the following trends in the field

Digital production

Expectation
More digital production resources become commodity, data and AI driven and accessible for SMEs

Effect
Human activities will be taken over by expert systems.

IoT & Edge

Expectation
Production edge & IOT devices become commodity regarding price and operation.

Effect
Sertivitization and improvement data - based service become feasible for smaller SMEs

EDGE IMPULSE

Commodity & operational

Expectation
Increase of platforms for production. Own code can be put into production more easily.

Effect
It is taken from notebooks into production.

UbiOps

hackster.io
AN AVNET COMMUNITY

Algorithms for everyone

Expectation
Low-code tooling continues to develop, especially in DS platforms. More libraries show standard solutions for "standard" problems

Effect
Less in-house competences needed within SMEs to get started with PM. Keep in mind AI explainability issues

AI is essentially about making better decisions

Better

- precisely reduction of (i) unnecessary activities (ii) more correct observation
- a timely manner (before anything really happens) *
- complete decision involves multiple components (cross-correlations)

*delta between the forecast horizon and the moment of taking action must be such that the project is relevant, otherwise the project is pointless

AI can only be successfully applied in maintenance cases if the entire chain from sensor to algorithm is understood


Physical world

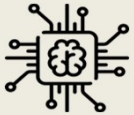

Data sources


network / security


ETL


Storage _ computing power


BI


AI


actions/control


culture


Implementation

The data chain consists of a series of technologies and challenges

Data sources
such as Salesforce, ERP systems , ...

(external) data sources

ETL to correct format
Long wide Internal and external data
Data input

Dashboarding
Email reports in PDF
RShiny Dashboards
Dash Python
Power BI integration

Steering to define
Define control measures.
Developing a feedback loop for adjust algorithms (drifting)

Implementation
Effect measurement and monitoring of algorithm use

sensors

network / security

ETL

Storage _ computing power

BI

AI

actions/ control

culture

Physical world
From customers , stocks , machines,

Sensors
Measurements of the physical world

Gateway
Speed transfer, encryption and cybersecurity

DataLake
Set up data structure and import new data with attention to speed of data refresh .

Algorithms
Design choices for bias, transparency, scalability and generalizability

Change management
Involve employees with domain knowledge and train them in the correct use of algorithms

Co-funded by the European Union

EDIH DIGITAL HUB NOORDWEST

Use Cases - TinyML on the Edge

Tiny Machine Learning (TinyML) is a new and fast growing AI technology that uses local sensors and boards to collect data.

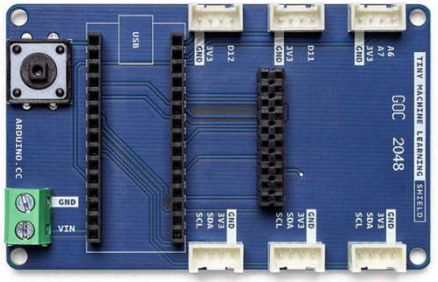
Use sensors on small chips to run algorithms and software that provide real-time information.

Measure different installations in real time. This allows you to immediately identify anomalies and assess whether maintenance is required.

TINY ML

TECHPORT

EDGE IMPULSE



Use case - Digital Twins for cooling installations

Freezerdata is a company that reads and manages cooling installations for hospitals, retail and industry, among others. Within the minor data science we have developed various algorithms that can detect that this failure will occur up to 1:40 minutes before a system fails.


Normal
5x amplified

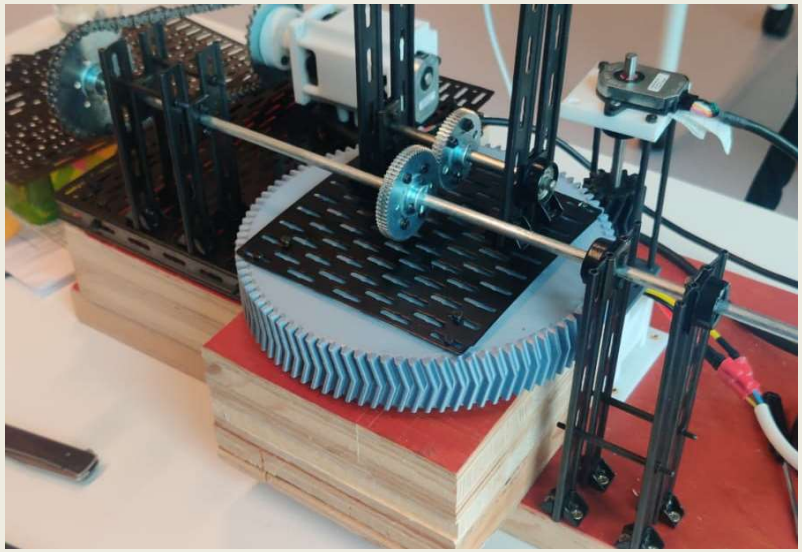
Use case - Digital Twins Gear box self re-alignment

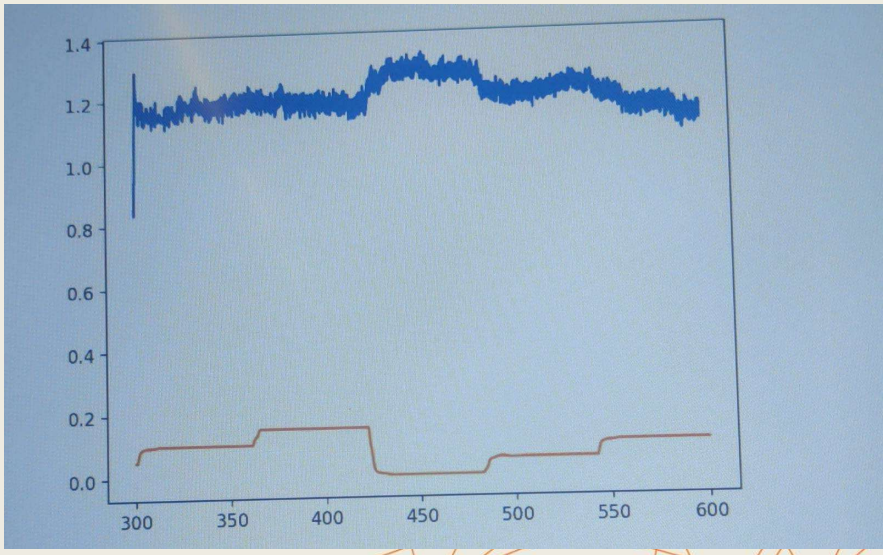
Co-funded by the European Union

EDIH DIGITAL HUB NOORDWEST

The digital Twin is the digital counterpart of a physical object. The digital part of the digital twin is a calculation model that is fed in real time by the data from the physical model. The promise of this technology is great, because the DT should be able to provide a signal for any type of deviation from the expected data.

In this test setup we develop an error in the mechanical transmission between two gears. This is a common mechanism. A random algorithm introduces a random offset of a gear, say [x] degrees of rotation.






EDIH
DIGITAL HUB
NOORDWEST
Funded by
the European Union