Haute école d'ingénierie et d'architecture Fribourg
Hochschule für Technik und Architektur Freiburg

iCoSys
Institute of Complex Systems

LYSR

AI-based Anomaly Detection Platform in the Cloud for Industrial Processes Monitoring

INDUSTRIE 2025 INDUSTRIA INDUSTRY

From 2017 - creation of a new group in our institute: **ICT for Industry 4.0**

Various projects in different fields: manufacture industries, industrial chemical reactors, train systems, supply chain management, food production, district heating systems, smart building, precision farming, etc.

Team: 2 profs, 2 senior researchers, 3 CS engineers, 2 PhD students

Direct Research Mandates

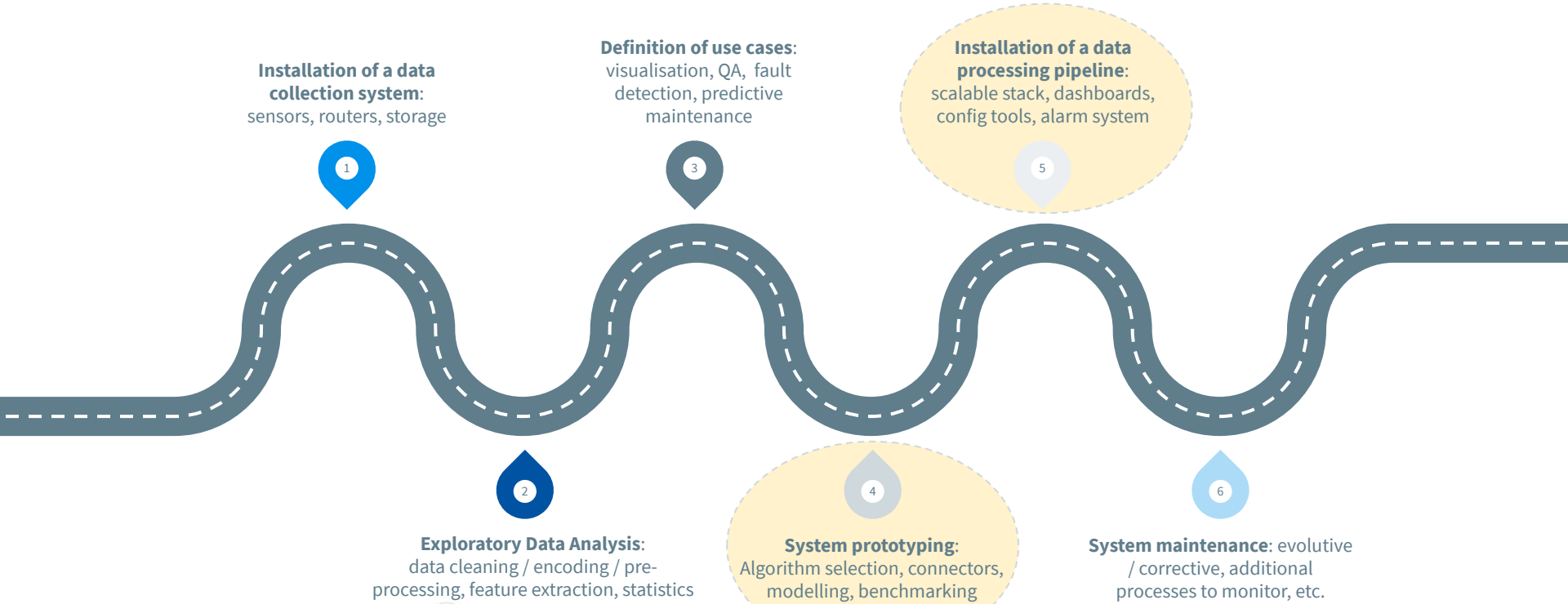
FNSNF
FONDS NATIONAL SUISSE DE LA RECHERCHE SCIENTIFIQUE

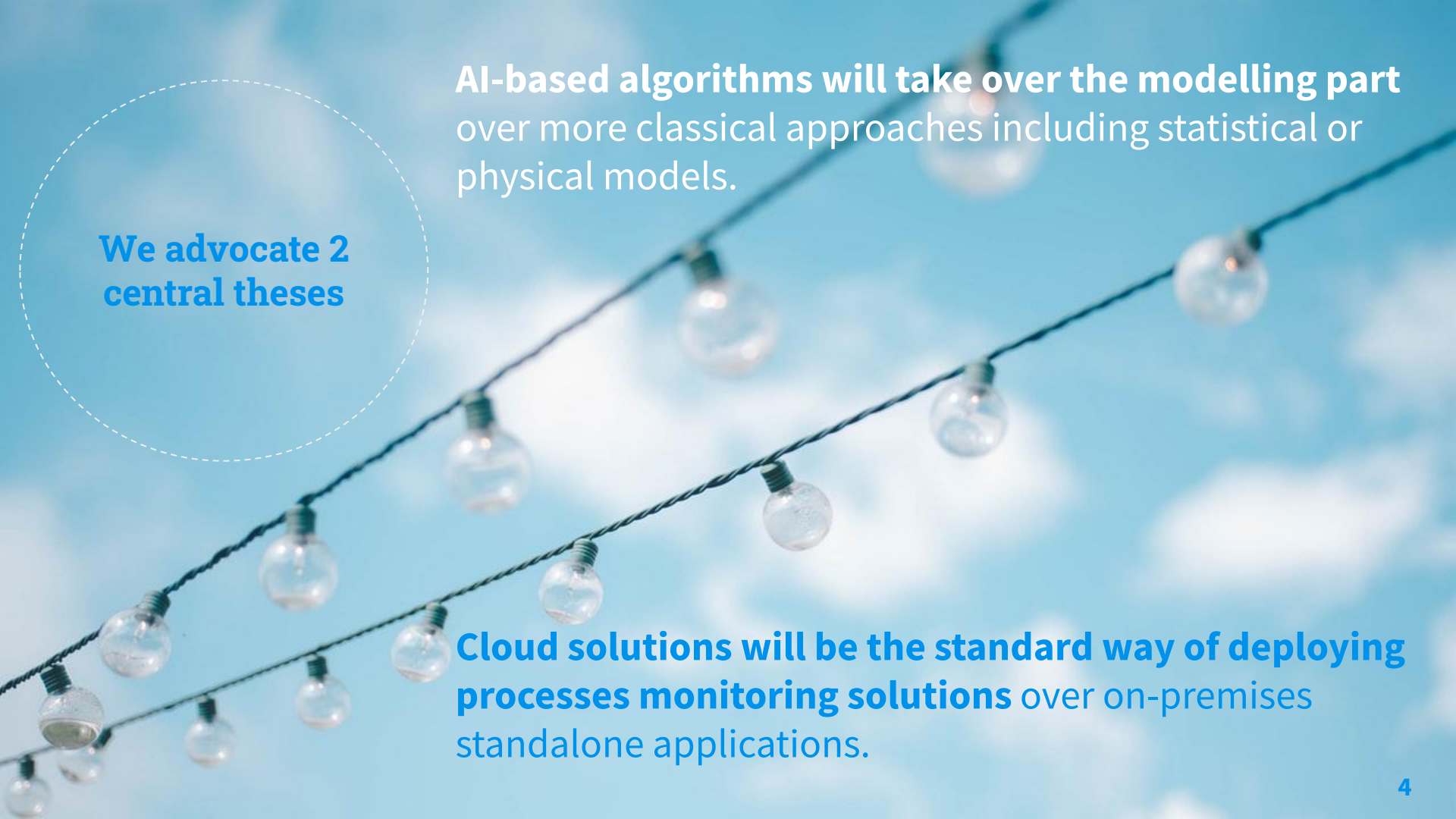
Innosuisse - Swiss Innovation Agency
Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

ETAT DE FRIBOURG
STAAT FREIBURG
STATE OF FRIBOURG

Promotion économique PromFR
Wirtschaftsförderung WIF
Development Agency FDA

Roadmap towards data-driven supervision of processes





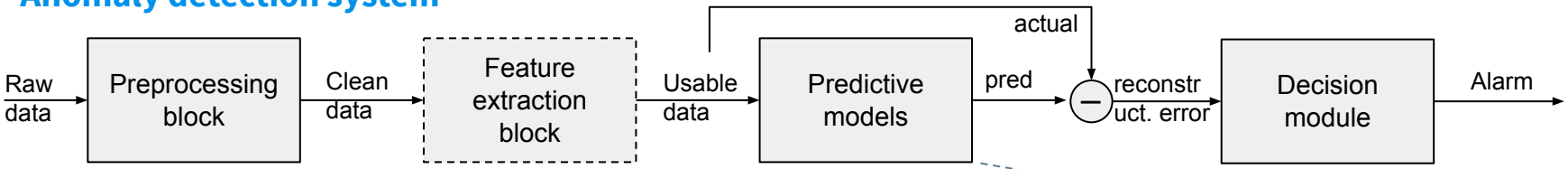
We advocate 2 central theses

AI-based algorithms will take over the modelling part over more classical approaches including statistical or physical models.

Cloud solutions will be the standard way of deploying processes monitoring solutions over on-premises standalone applications.

Thesis 1 - AI-based algorithms will take over the modelling part

Anomaly detection system

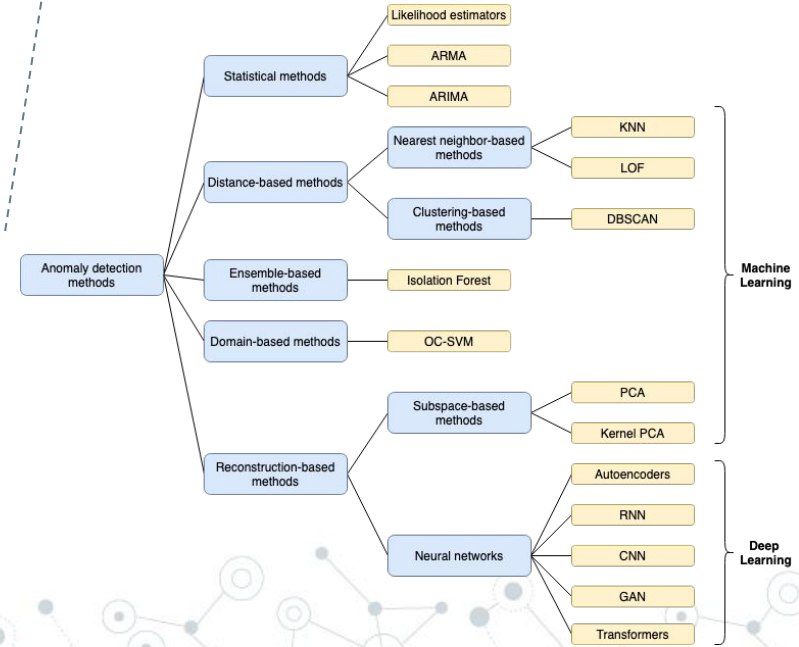


Advantages of AI:

- Adapt to many contexts
- Less hypothesis
- Good performances
- Incremental learning

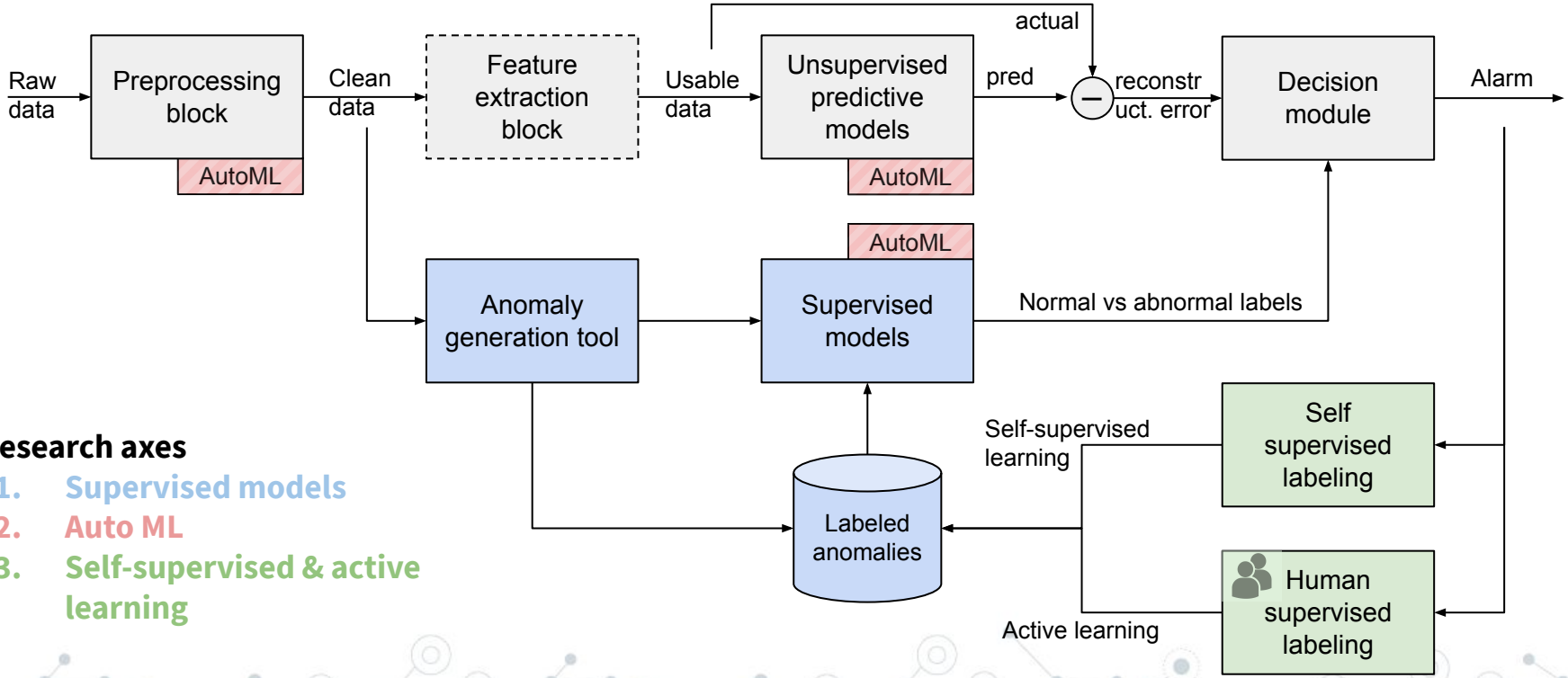
Disadvantages of AI:

- Costly - data storage, CPU/GPU
- Expertise needed



Thesis 1 - AI-based algorithms will take over the modelling part

Anomaly detection system - expected research outcomes



Research axes

1. Supervised models
2. Auto ML
3. Self-supervised & active learning

Thesis 2 - Cloud will be the standard for deploying monitoring solutions

Advantages of cloud:

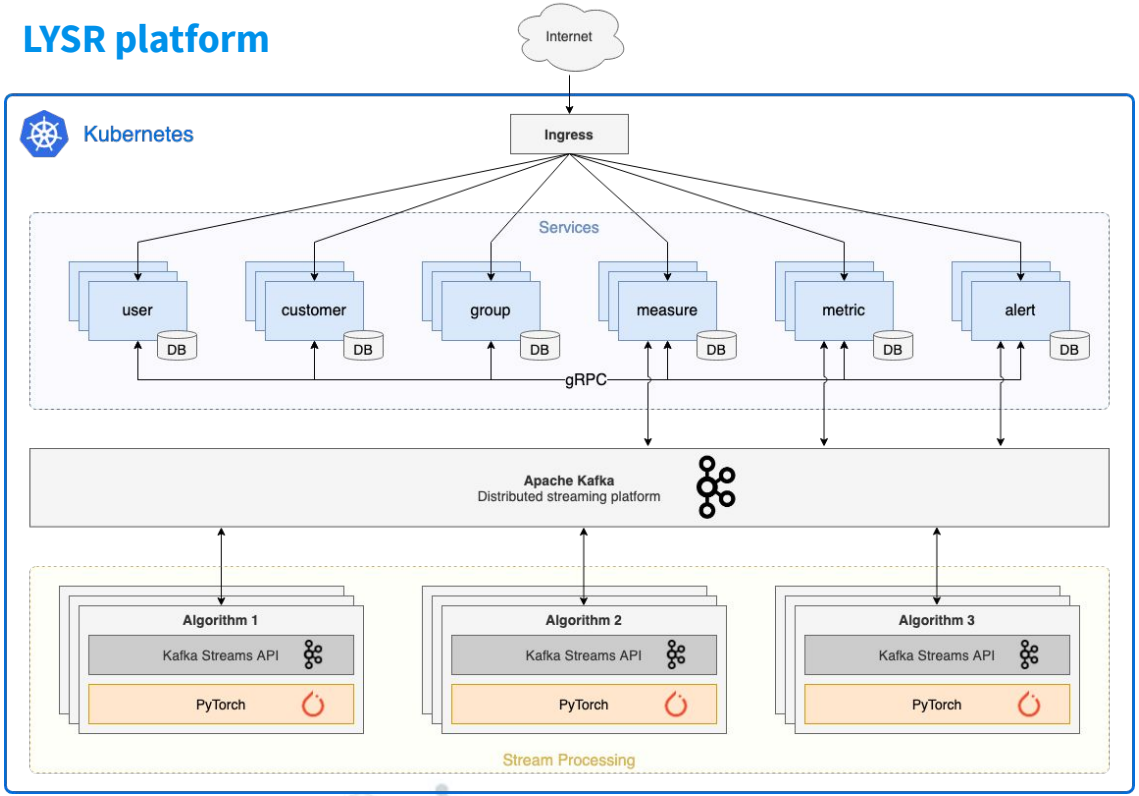
- Scalability
- Easy and fast setup
- Economy of scale
- Maintained by IT specialists

Disadvantages of cloud (*):

- Data are centralized “out of the walls”
- Dependency to network

(*) Disappear in case of “private cloud on premises”

LYSR platform



Contact us!

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