Precision Livestock Farming

What's that about?

Joachim Lübbo Kleen
Veterinary Big Data Stakeholder Forum
European Medicines Agency

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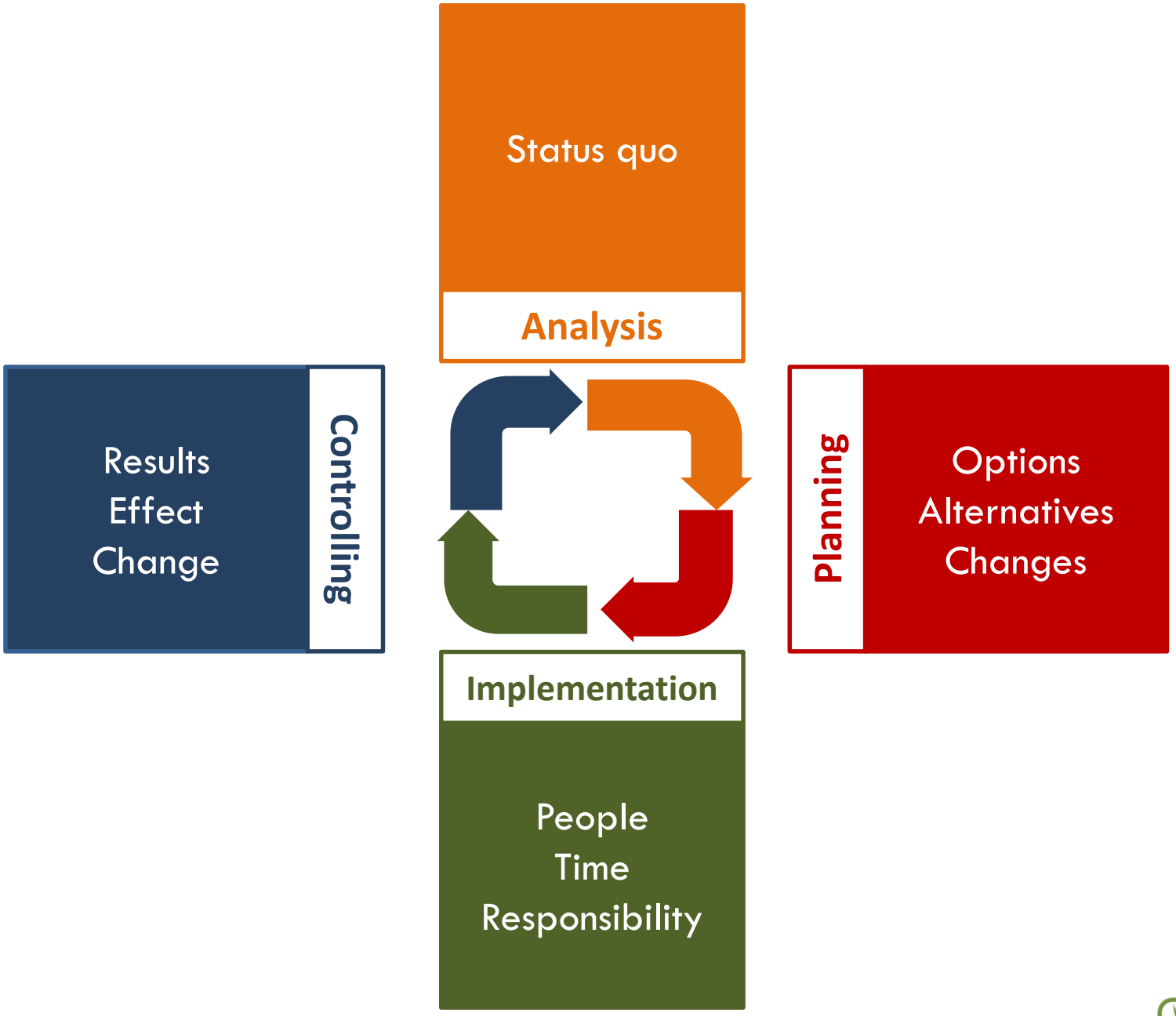

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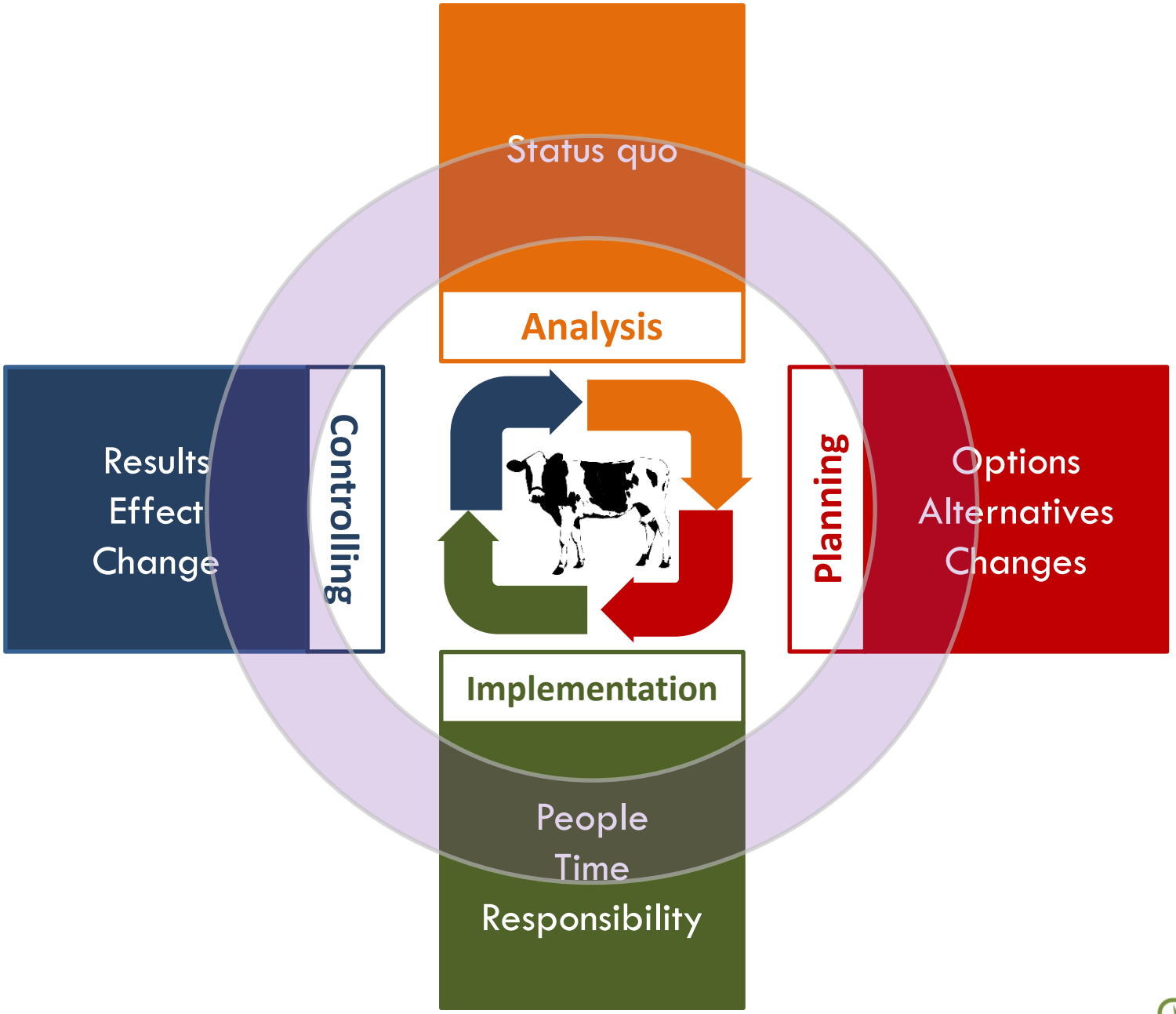

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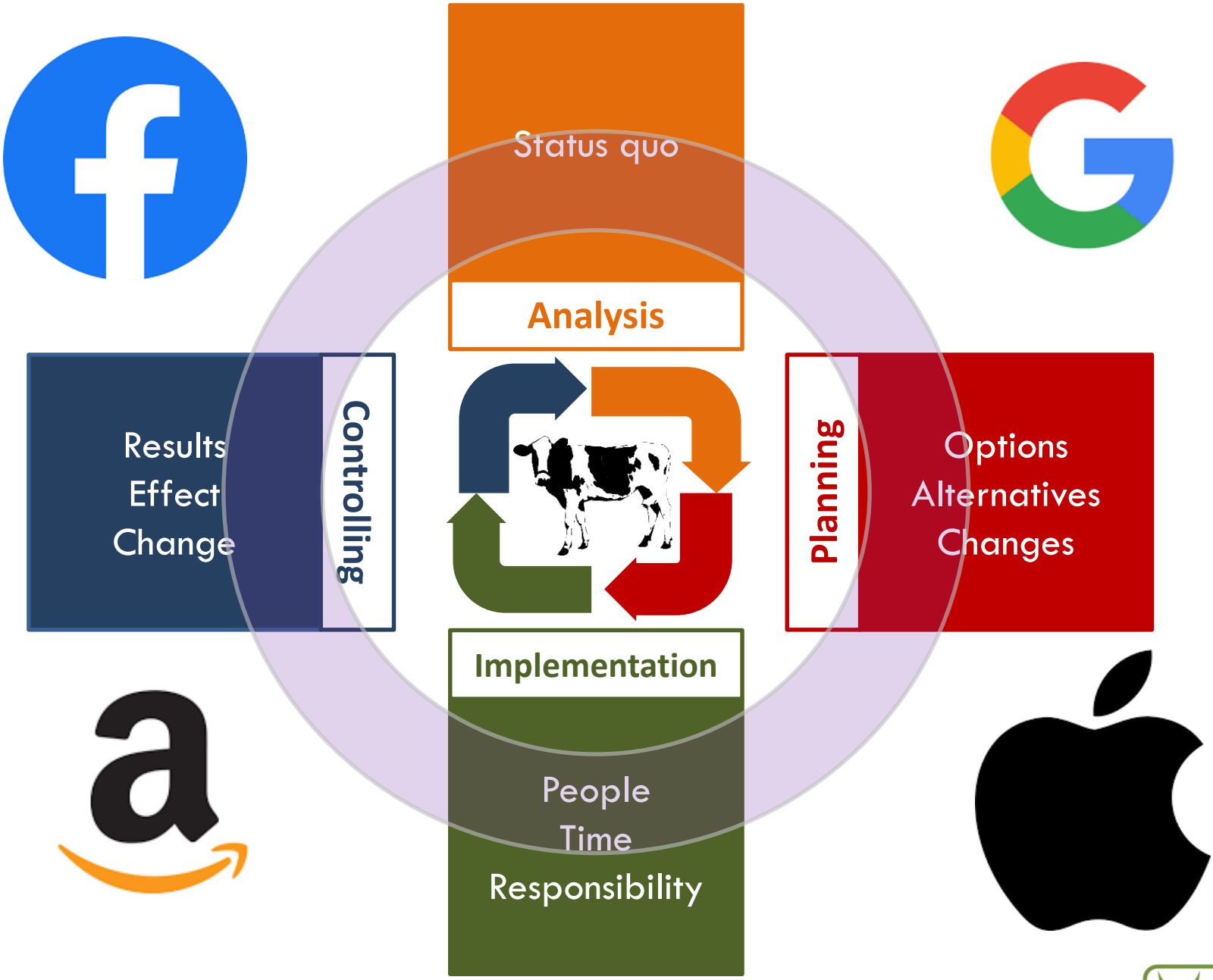

Meaningful Data:

Data are reliable and „clean“

Data are objective and unbiased

Data are standardized

Data are fresh and allow for projection

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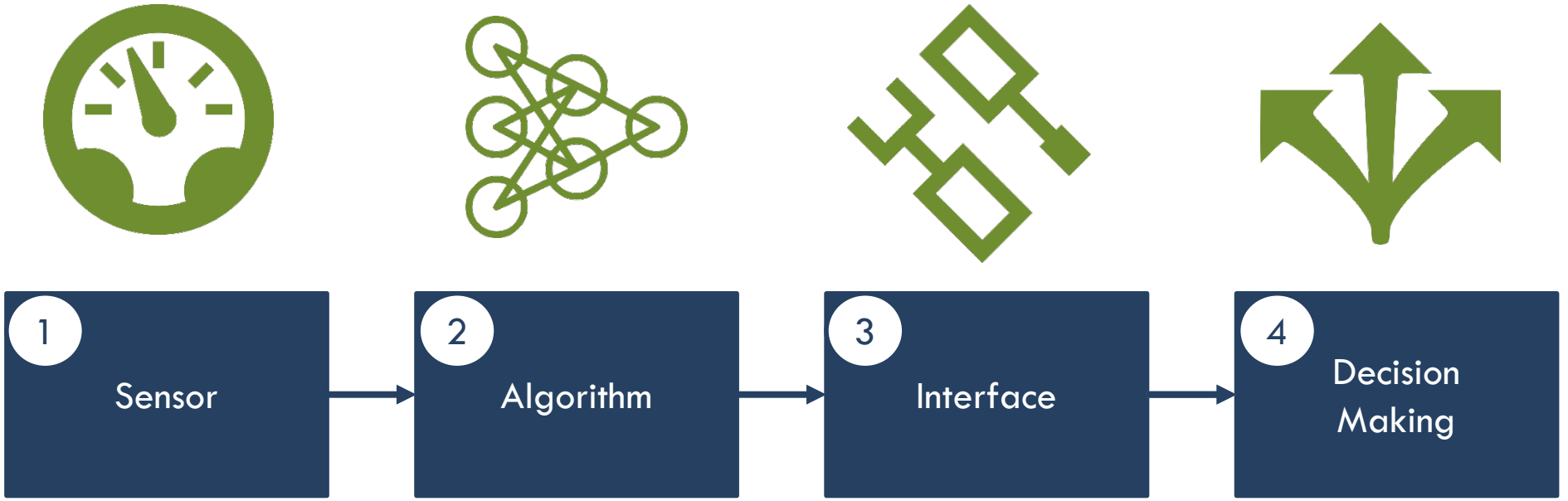
Precision Livestock Farming



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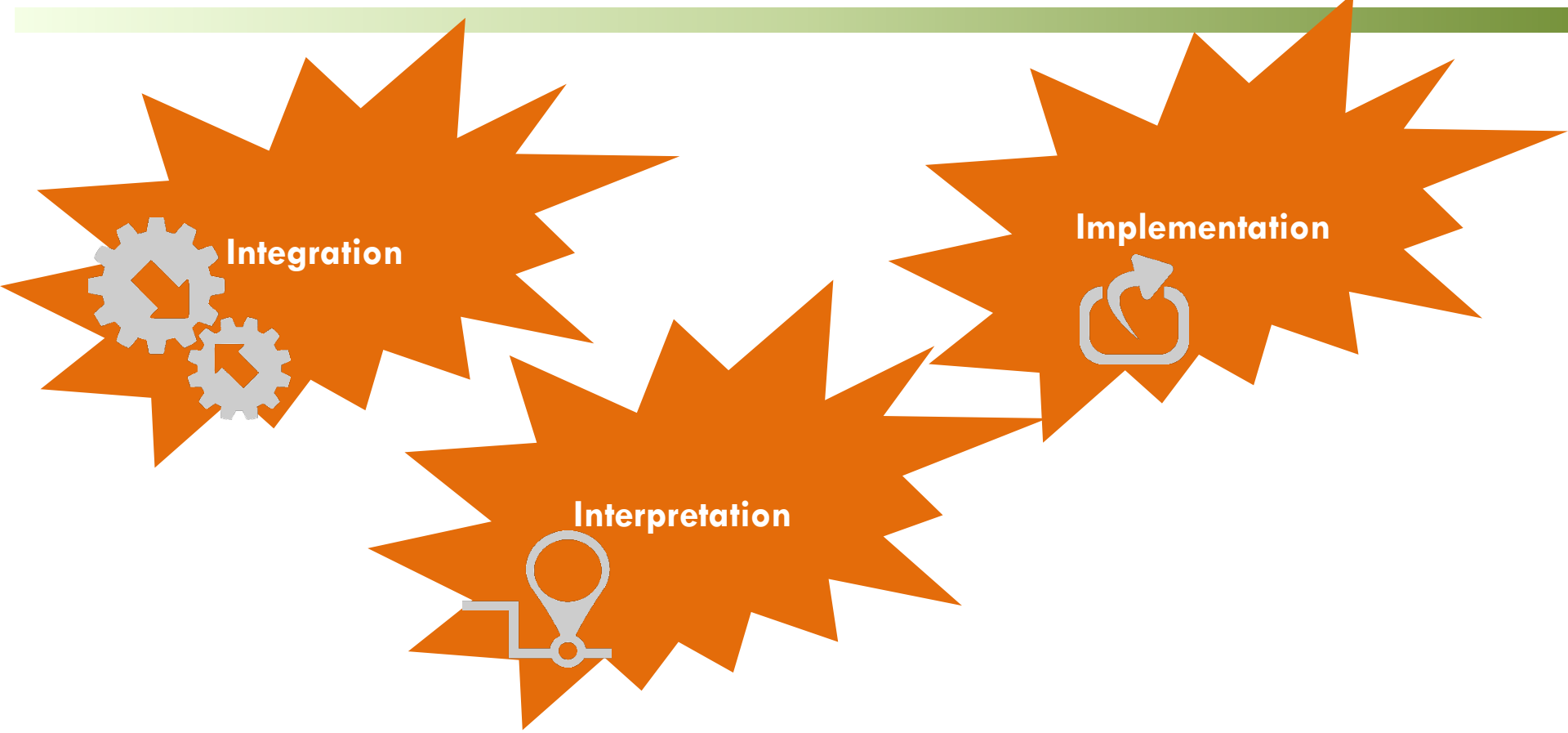

1 Sensor → 2 Algorithm → 3 Interface → 4 Decision Making

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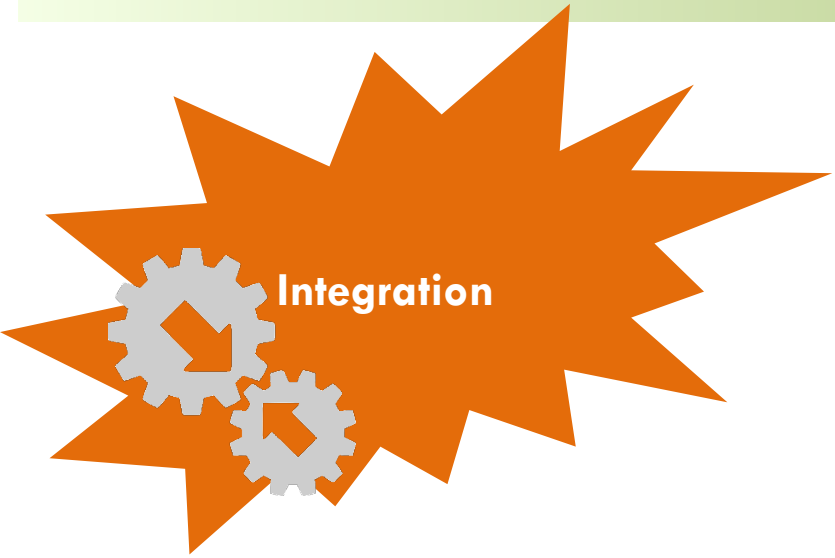

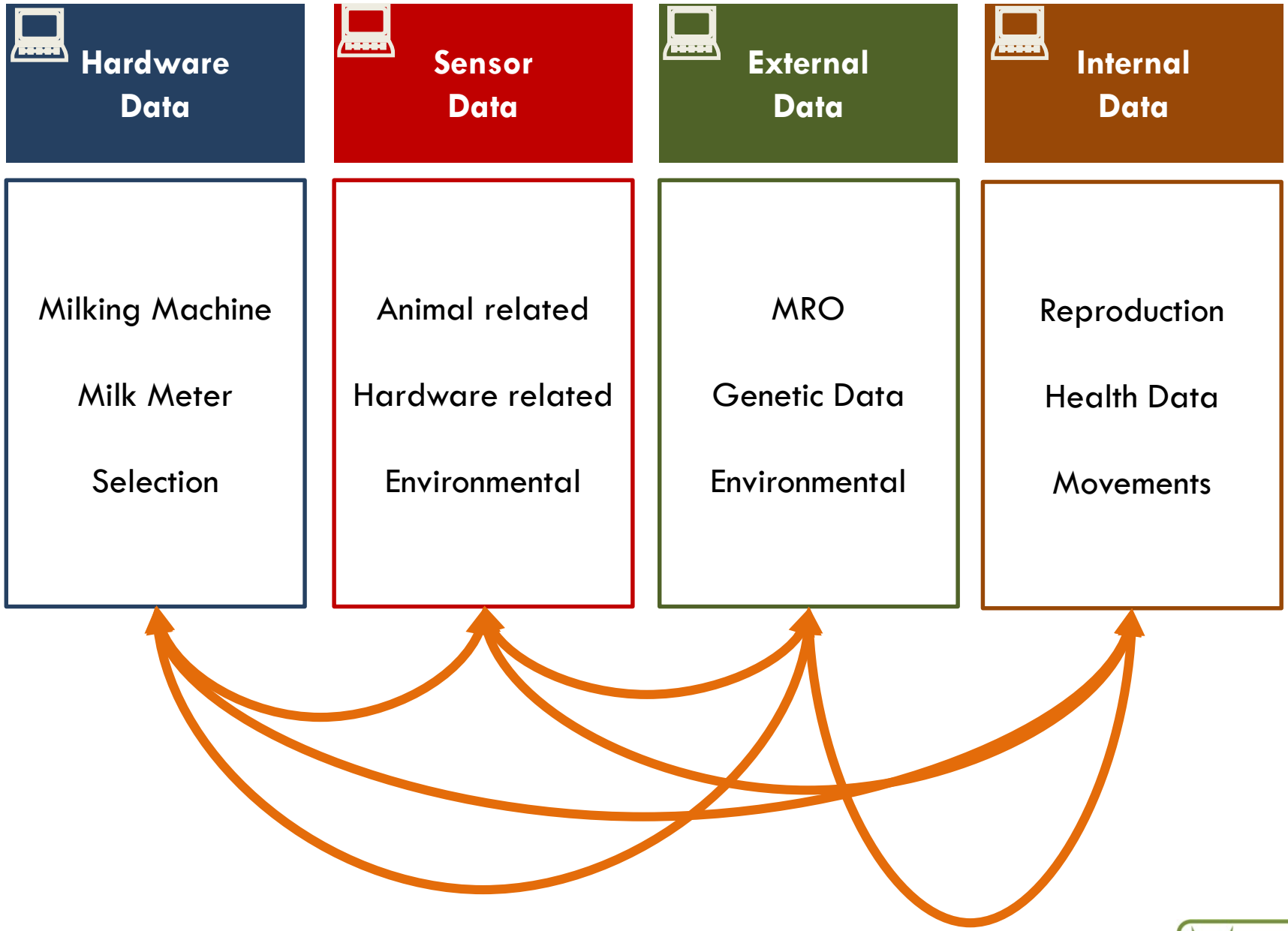

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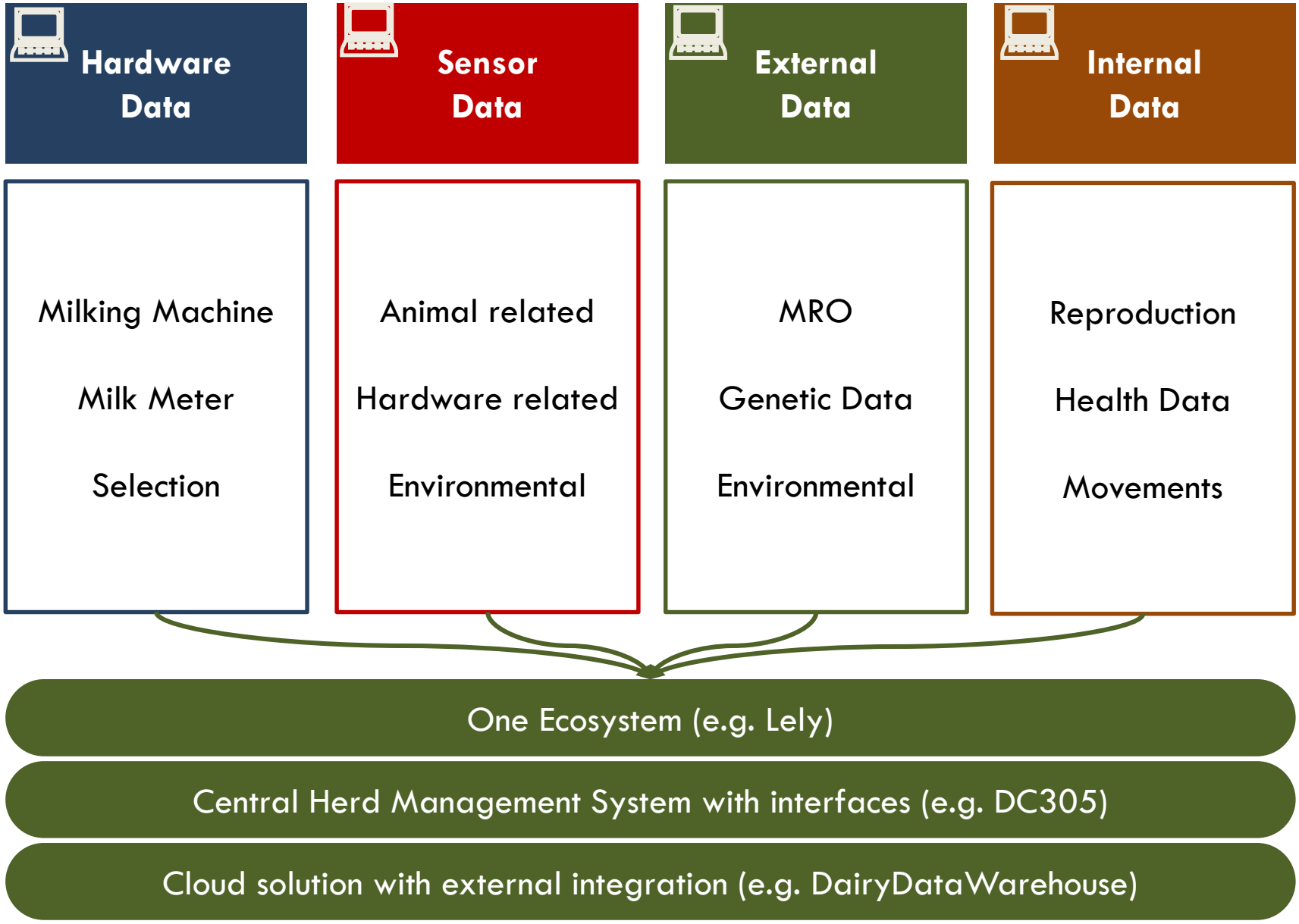
Hardware Data	Sensor Data	External Data	Internal Data
Milking Machine	Animal related	MRO	Reproduction
Milk Meter	Hardware related	Genetic Data	Health Data
Selection	Environmental	Environmental	Movements

Farm-specific systems may produce farm-specific results

System-specific business rules in data analysis produce results difficult to compare

Access to data depends on access to respective system (Ecosystems)



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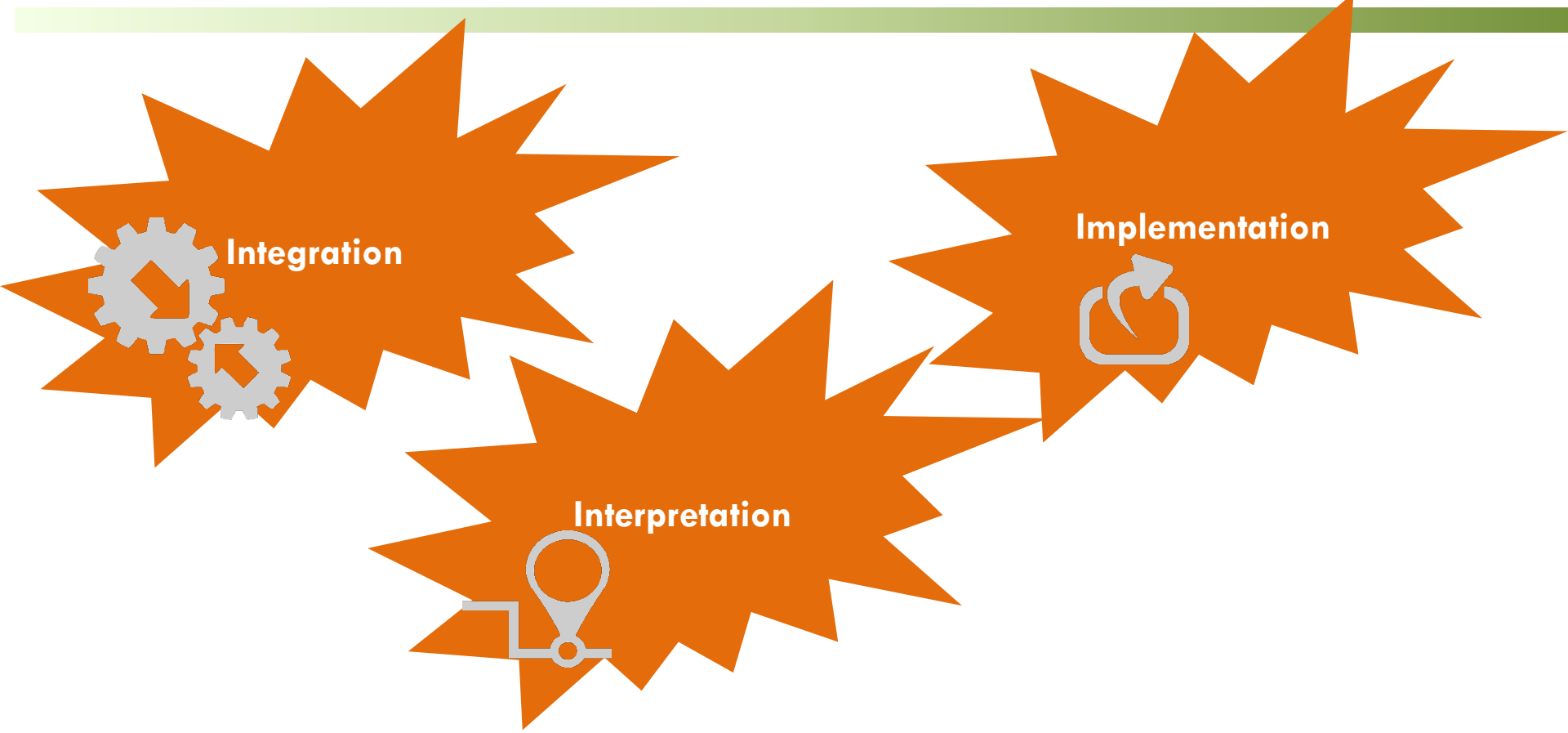

1 Sensor → 2 Algorithm → 3 Usability → 4 Decision Making

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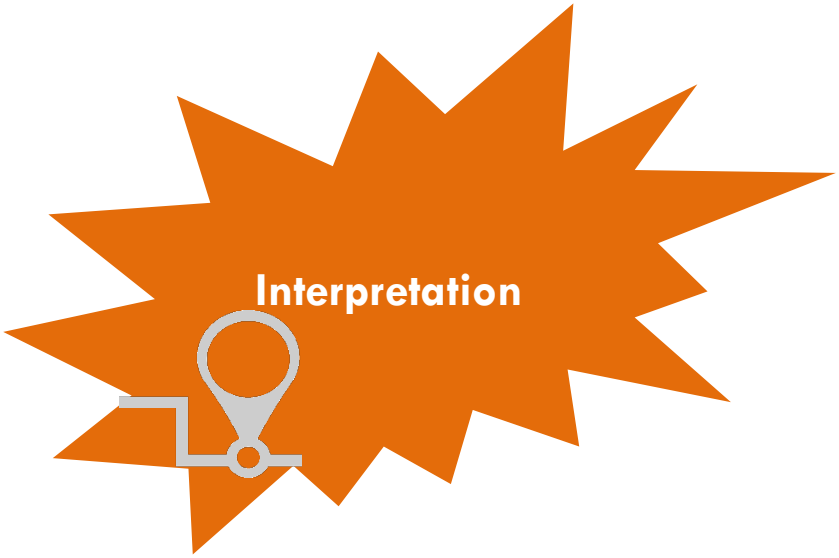
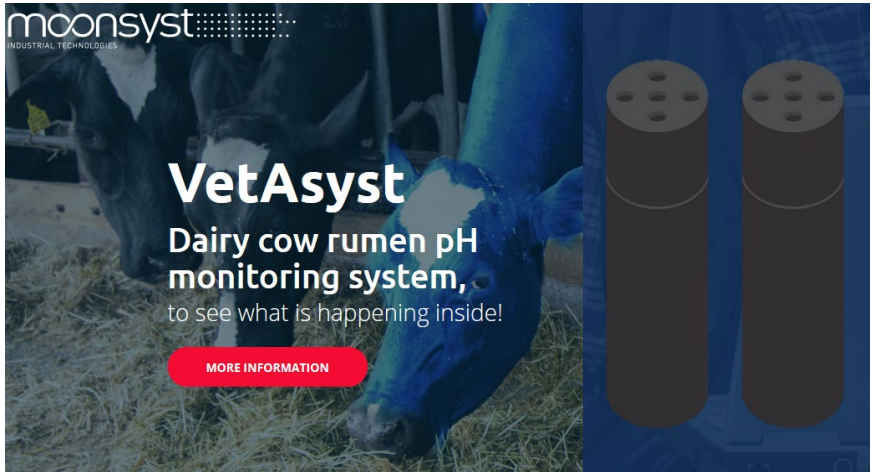
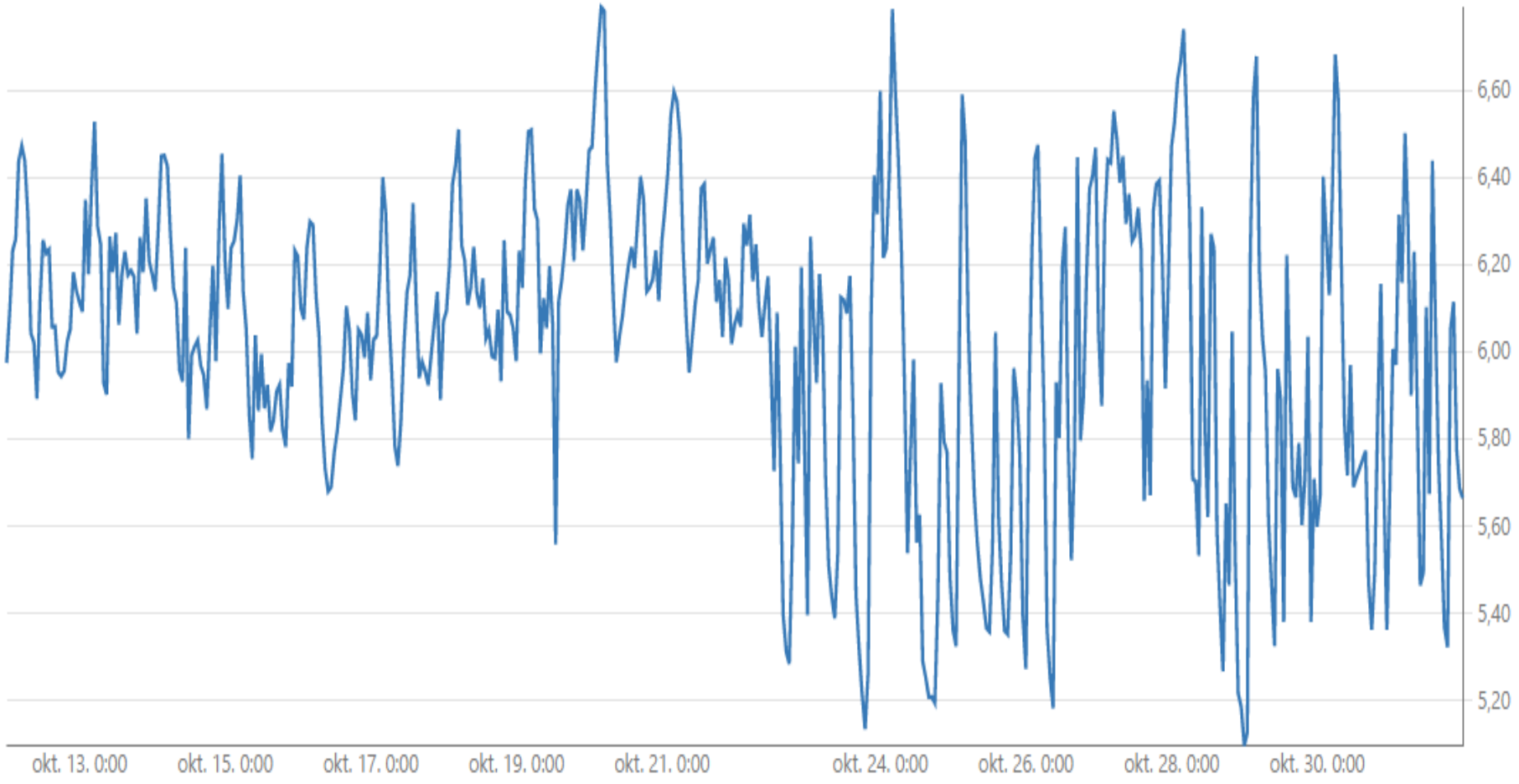




Intraruminal pH-measuring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J. Dairy Sci. 101:1–13
https://doi.org/10.3168/jds.2017-12828

Describing temporal variation in reticuloruminal pH using continuous monitoring data

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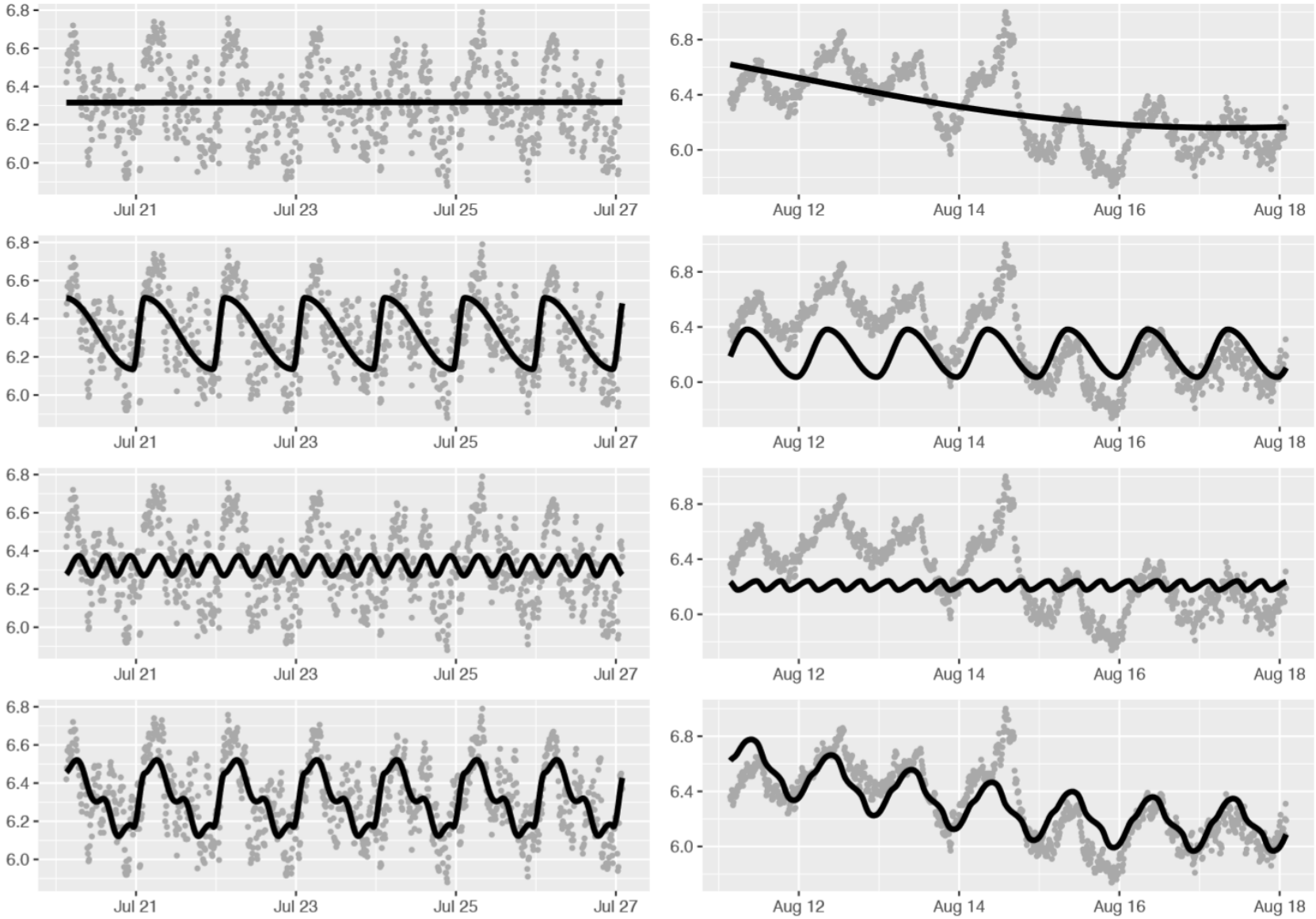
ABSTRACT

Reticuloruminal pH has been linked to subclinical disease in dairy cattle, leading to considerable interest

Key words: reticuloruminal pH, acidosis, remote sensing data, statistical model

INTRODUCTION

https://doi.org/10.3168/jds.2017-12828



Denwood et al. JDS 2017

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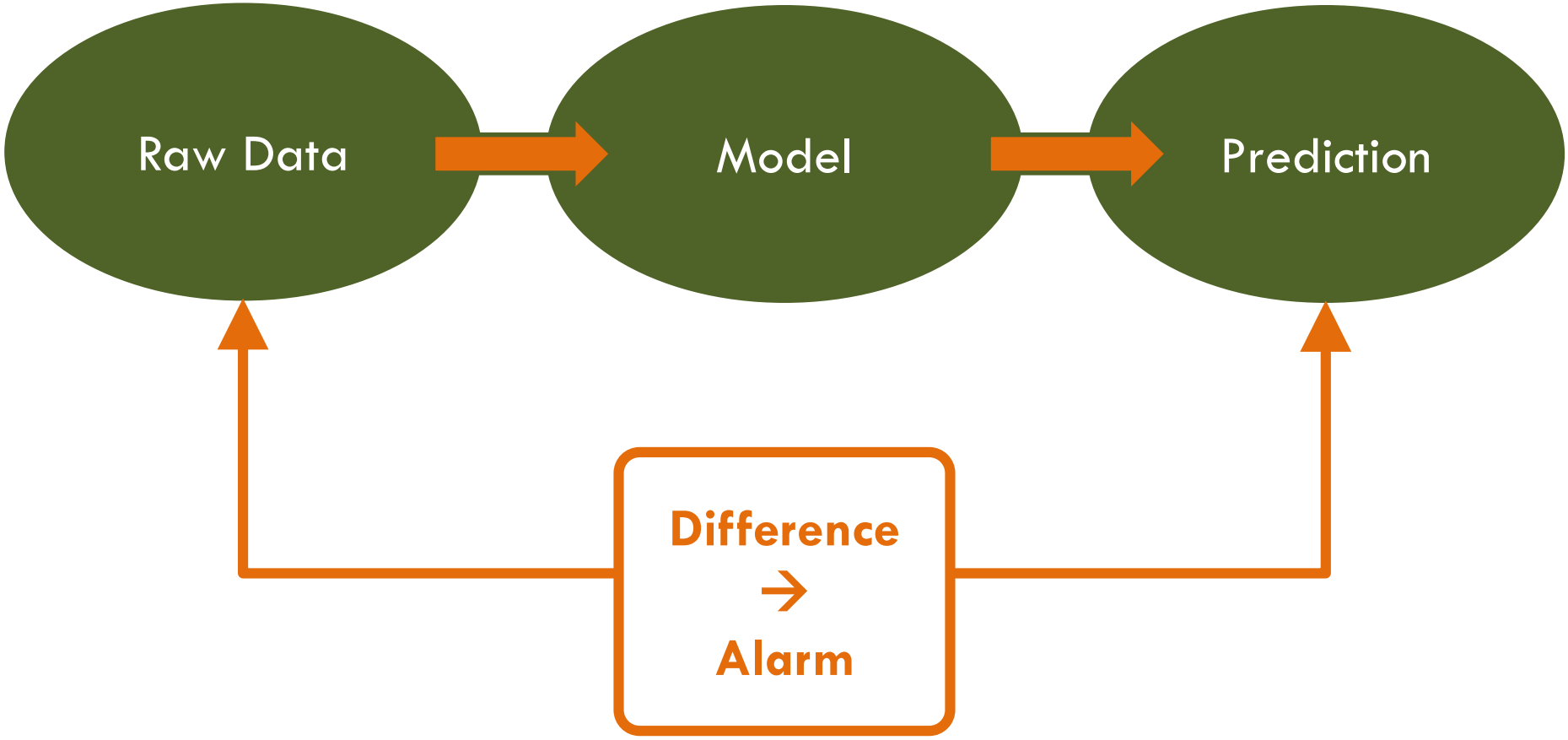


Predictions

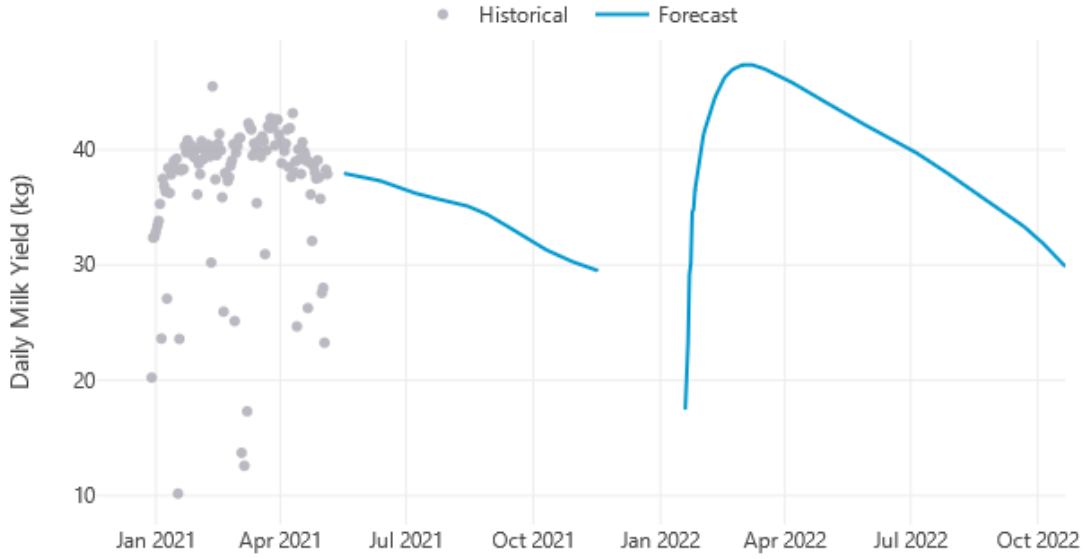
e.g. Optical Lameness Detection

e.g. Chewing Activity –> Metabolic Diseases

e.g. Vocalisation –> Stress Level

Difference
→
Alarm

Predictions



PREDICTA MILK from Dairy Data Warehouse

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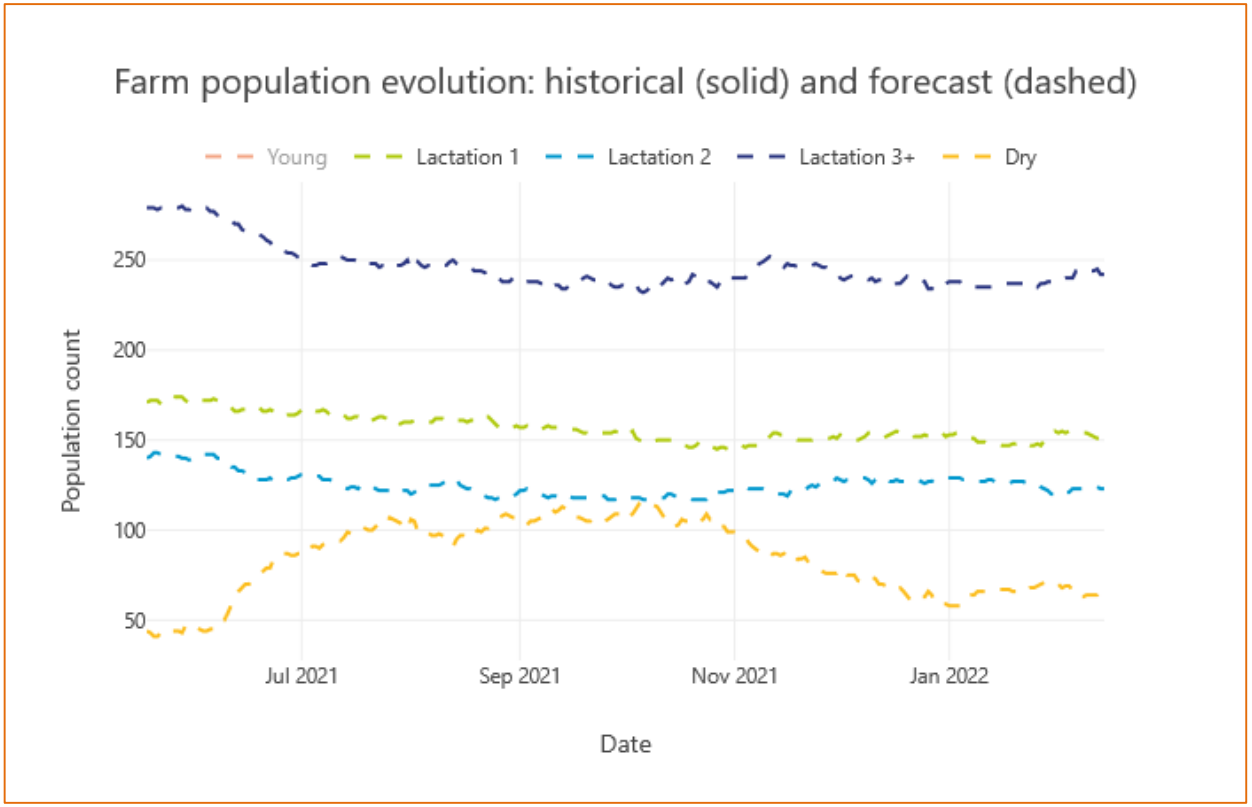
Predictions



PREDICTA INVENTORY
from Dairy Data Warehouse

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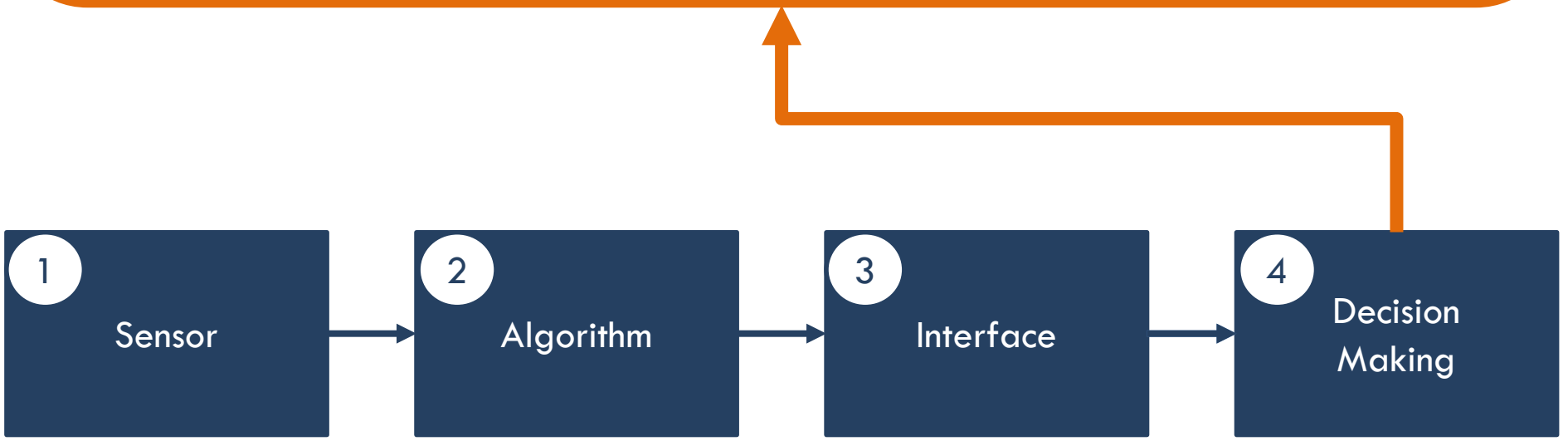
An integrated system

Combining all available information
Predicting developments for individuals, herd, farm and sector
Controlling hardware components

Helping with decisions → Making decisions → Implementing decisions



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Review

Symposium

Symposium review: Real-time continuous decision making using big data on dairy farms

Victor E. Cabrera, Jorge A. Barrientos-Blanco, Hector Delgado, Liliana Fadul-Pacheco

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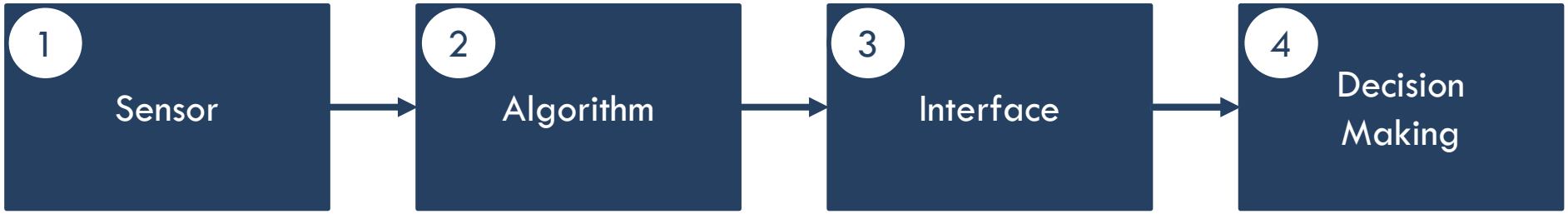
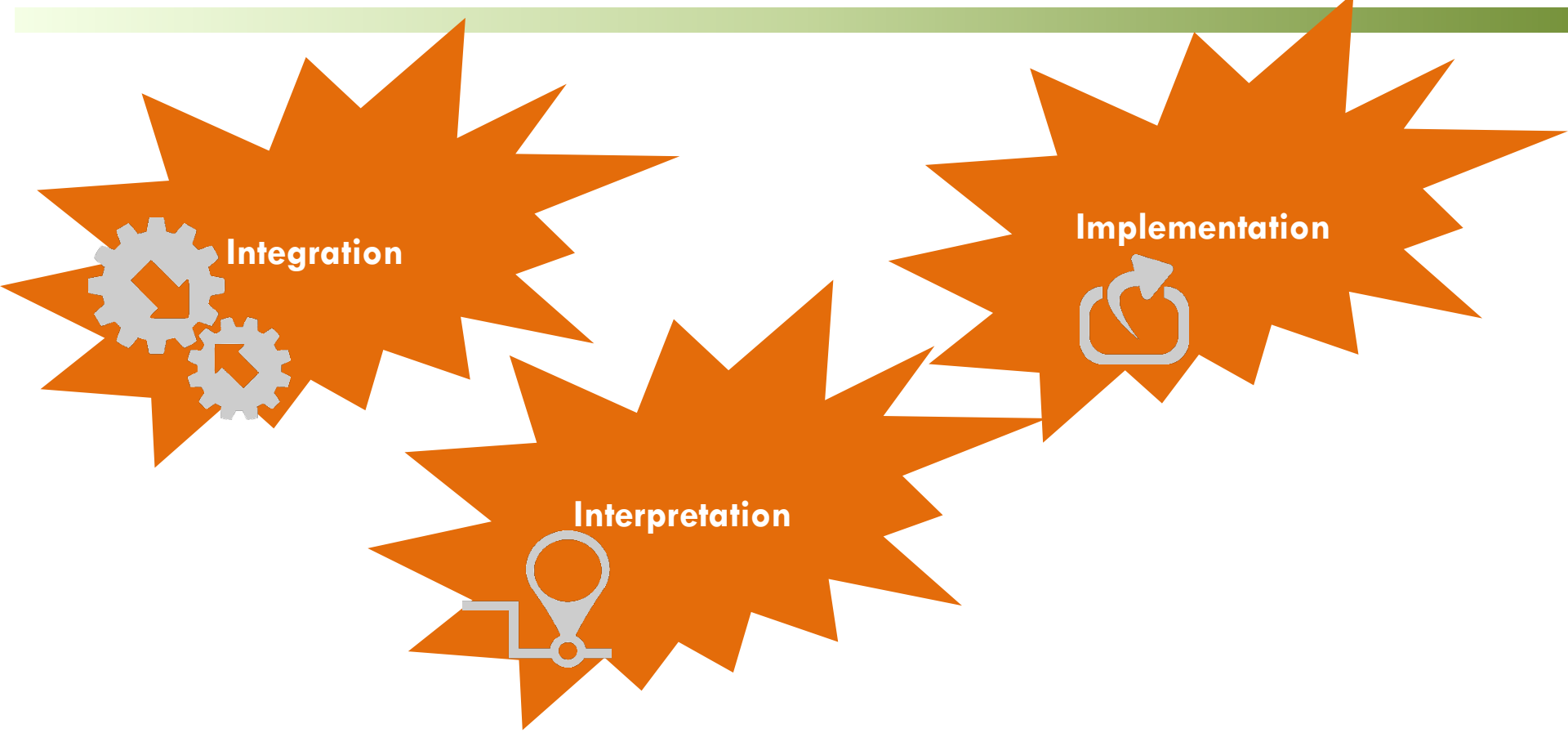
https://doi.org/10.3168/jds.2019-17145





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ELSEVIER

Journal of Dairy Science

Volume 103, Issue 2, February 2020, Pages 1566-1582

Research

On-farm use of disease alerts generated by precision dairy technology

E.A. Eckelkamp [1], J.M. Bewley [2]

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https://doi.org/10.3168/jds.2019-16888

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Implementation

Habituation effect:
Longer use,
less response

Own experience
valued higher
than alarm

Many alarms →
Less response

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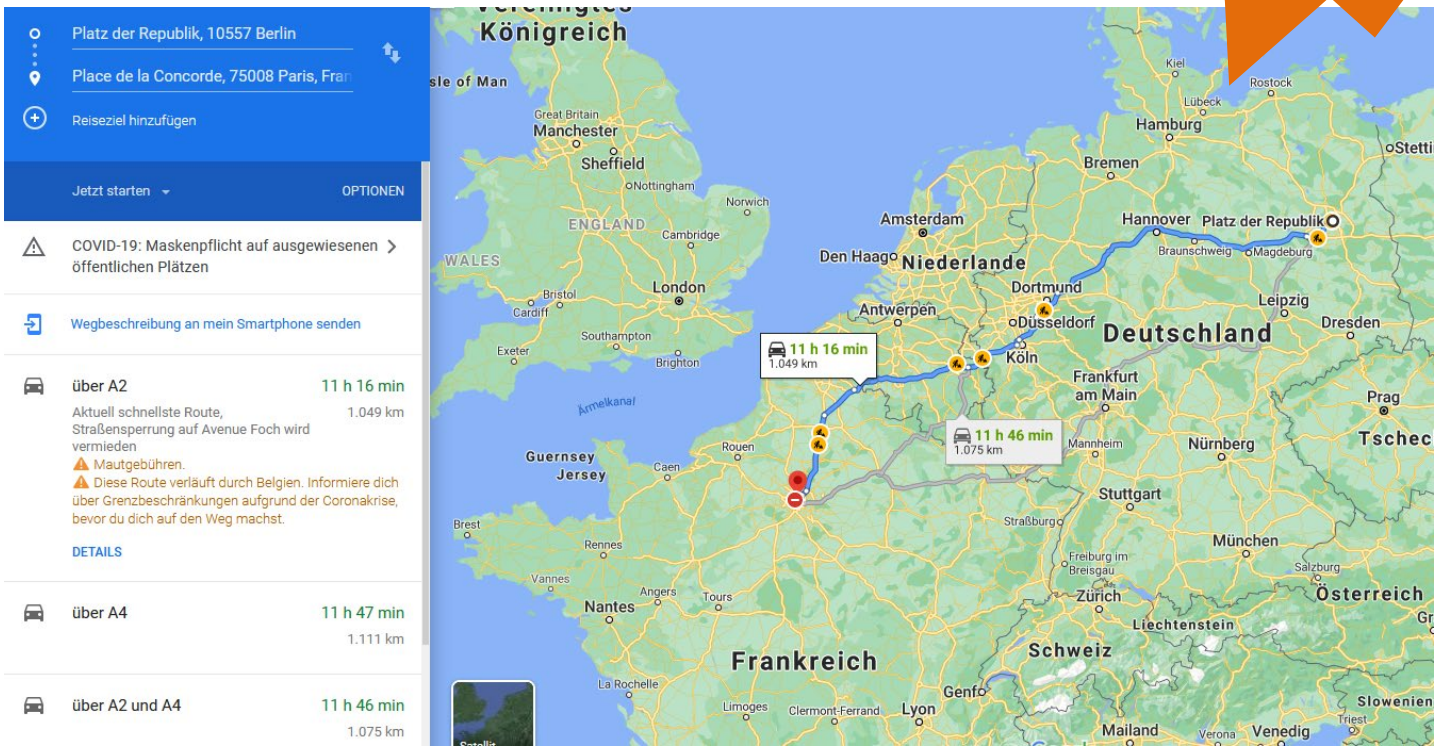
Implementation

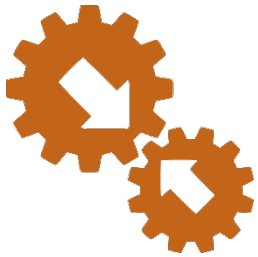


Herd Perspective

Integrating all available data from inside and outside the farm

Producing valid retrospection, status quo and prediction

Suggesting or taking over decisions, showing the optimal route for any farm



Industry Perspective

Integrating numerous farms, equalizing and benchmarking their respective data

Using farm data to improve and enhance existing PLF systems, giving information along the value chain

Developing and showing optimal production methods for different systems and parameters

Potential of improving
animal health, animal welfare, efficiency

So far little evidence that PLF does this

Proven ability to predict clinical disease
several days before onset of symptoms

Does this constitute a „diagnosis“?

Option to improve transparency,
documentation, rationality

Is this what the „consumer“ wants?

Precision Livestock Farming integrates
different stages of information technology

The purpose of PLF is monitoring, alarming, but ultimately:
Decision Making

The reward is clear. The destination is clear. The route is clear.
Uncertainty if everyone is going to make the trip.

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