



KI Wissen Final Event | 21-22 March 2024

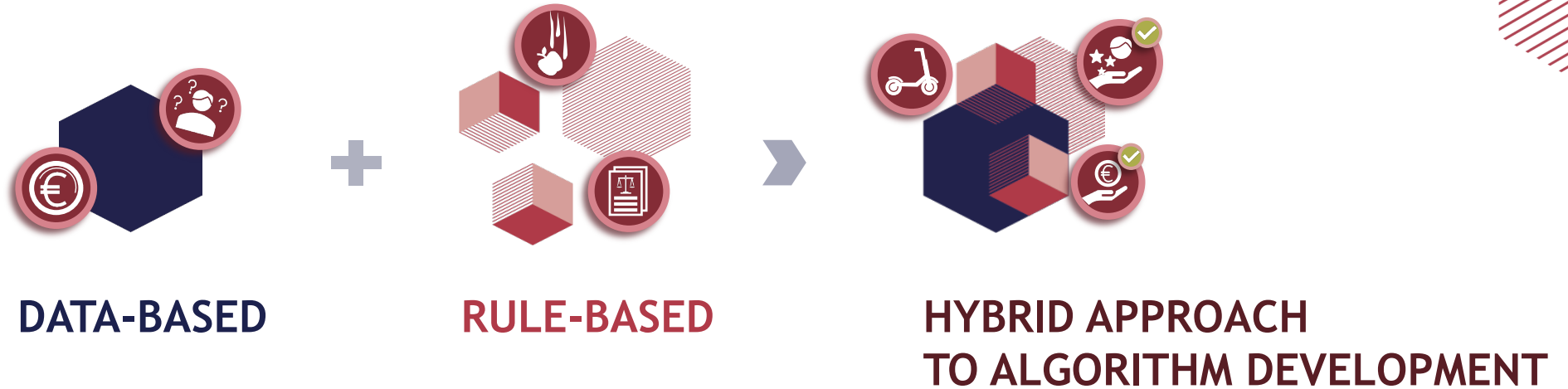
Project Overview

Simon Heinz, Continental

Motivation

»» Problem

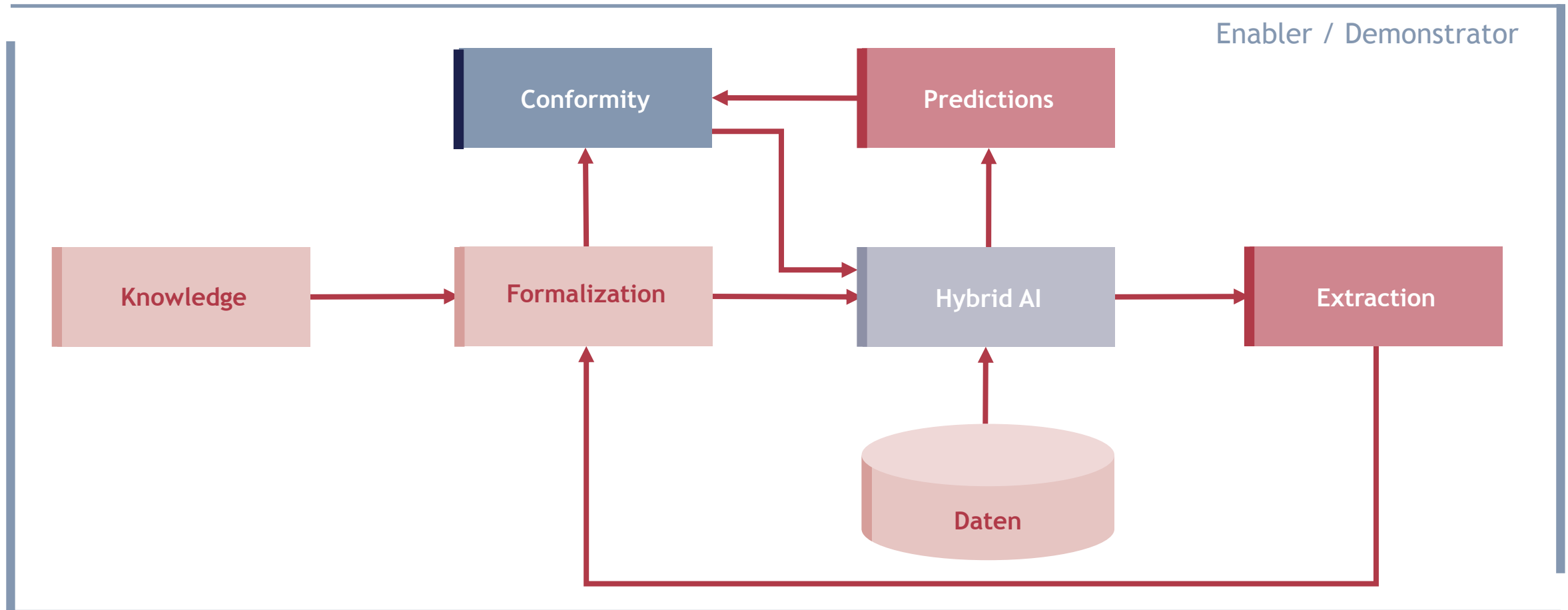
Current AI methods are data-driven. Enormous amounts of data are required for the training and validation of AI functions, which are very complex and expensive to collect and process.



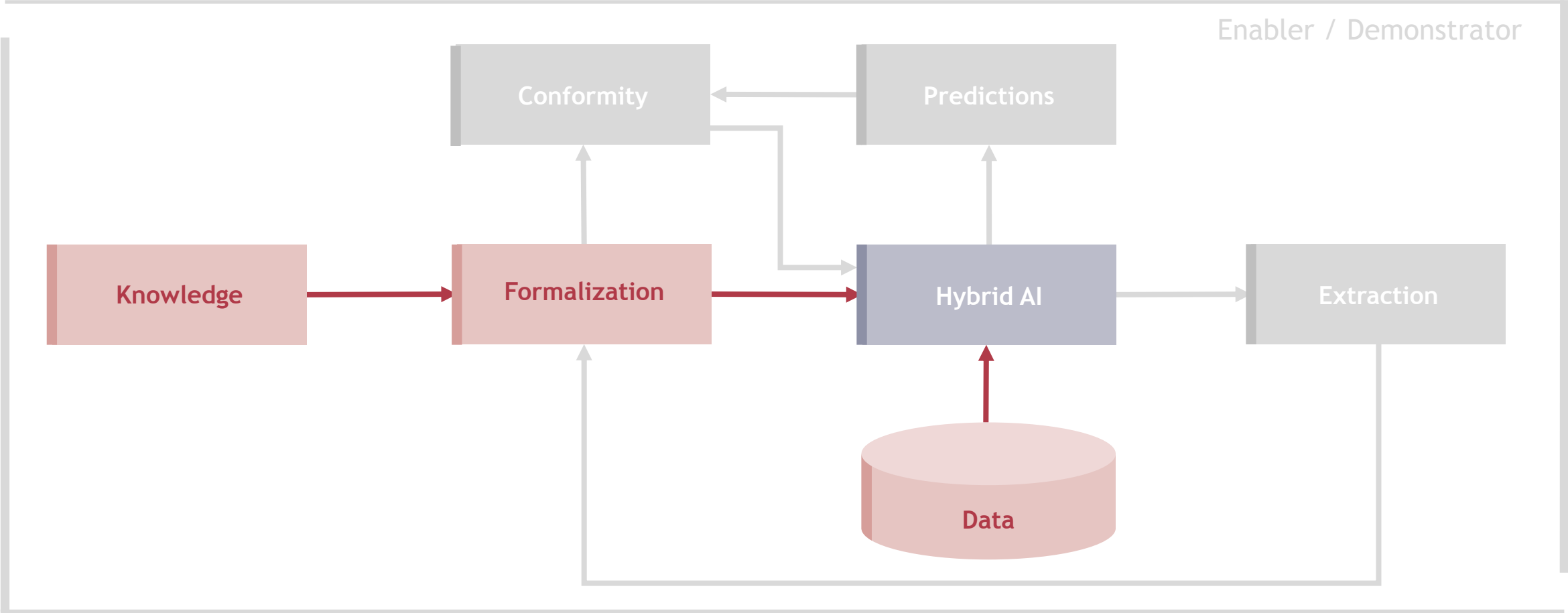
»» Motivation

By incorporating existing knowledge into AI functions, the efficiency and analyzability of decisions can be increased.

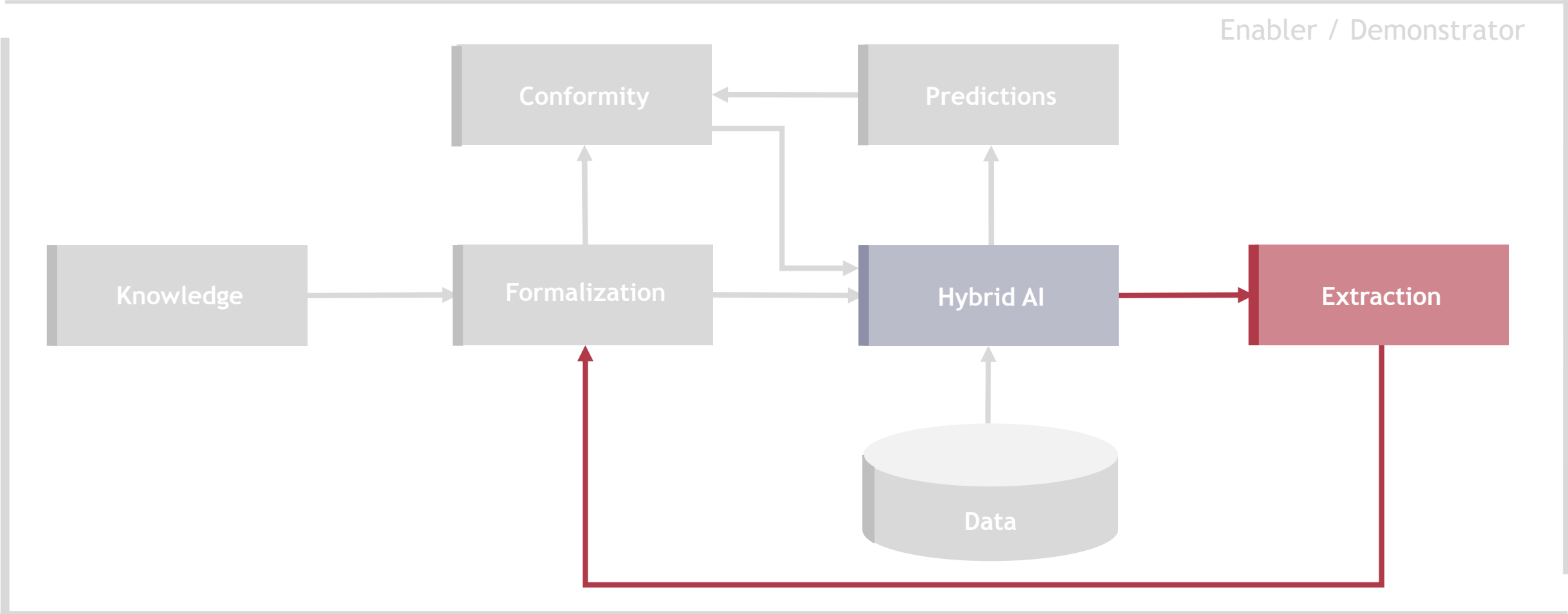
Conceptual Approach



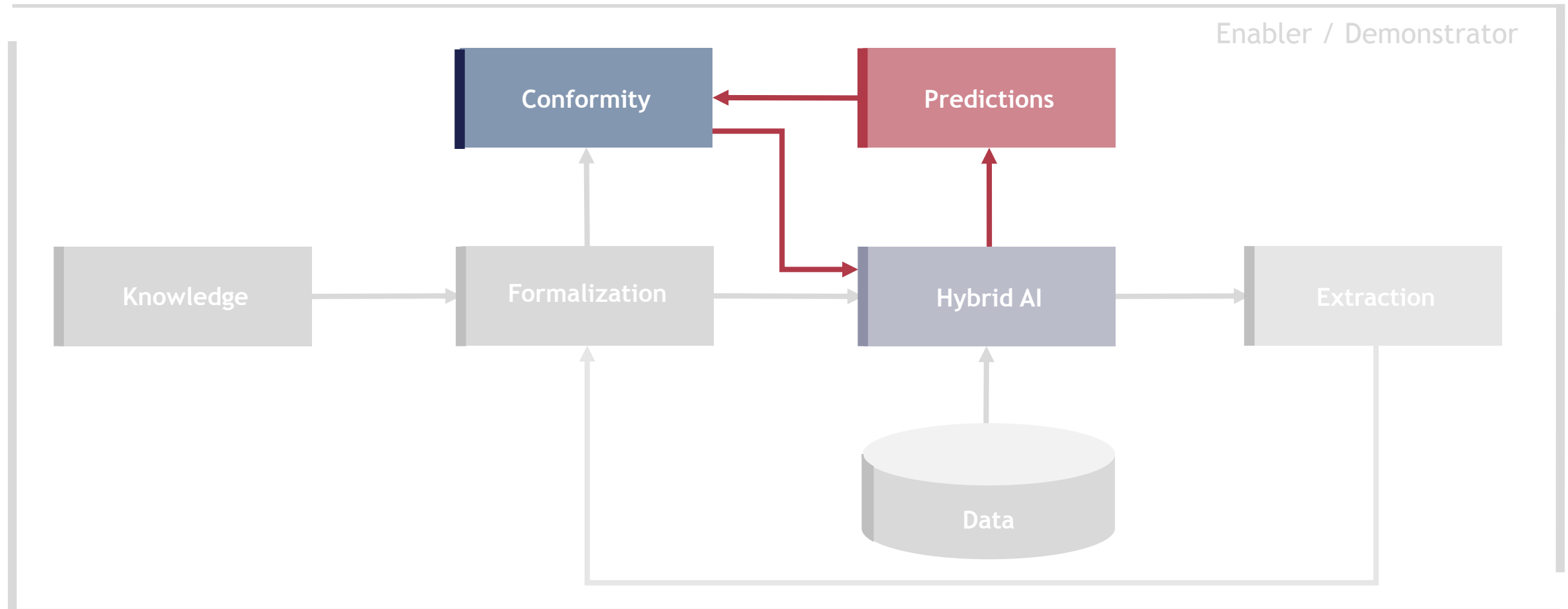
Knowledge Integration



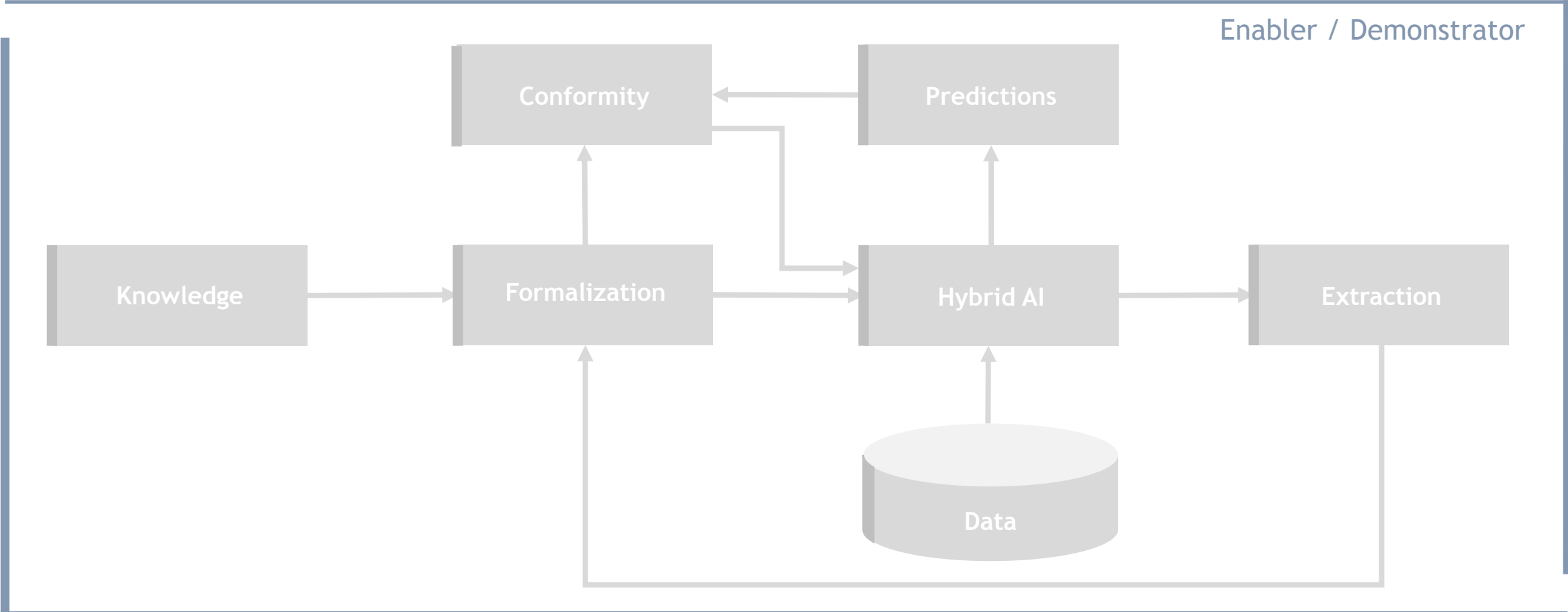
Knowledge Extraction



Knowledge Conformity



Enabler, Integration and Demonstration





» **What have we achieved?**



Integration of relevant domain knowledge

We have tackled the limitations of purely data-driven models. We improved data efficiency, i.e., **decreasing training costs** and data needs to generalize across driving situations and scenarios and to **reduce safety critical behavior**.

7
Patents

Qualitative Improvements on...

Coverage of
Rare but
Realistic
Test
Scenarios

Planning
Performance

Situation
Interpretation

Data- & Compute Efficiency

Robustness
to Scenario
Variations

Risk Assessment
& Situation
Interpretation

Traffic Sign
Detection

Tracking &
Plausibilization

Pedestrian (also under occlusion) &
Unknown Object Detection



Improvement of traceability

By focusing on the interface between output of the ML models and human interpretation we enhanced the transparency of the „black box“ characteristic and contributed to the societal demand of explainable AI.

6

Patents

15

Methods
(Explainable AI)

1

Demonstrator



Formalizing knowledge and checking AI decision making

With the newly developed knowledge conformity methods we are able to check behaviour and decisions of knowledge-infused AI driving functions. This leads to a tremendously increased reliability of AI interferences and the safety of AI driving functions.

4

Patents

47

Knowledge Building Blocks



Advanced simulation platforms

With the newly developed platforms we are able to represent **various use case scenarios in an accurate way**. We can now validate the newly deployed and integrated KI Wissen AI modules. **For the first time a robust foundation** was established for interoperable autonomous driving functionality.

10

Partners methods
hosted

2

Simulation
platforms

188.000

Frames of real data

300

Scenario variations
were used for the
synthetic data set

10

Simulation scenarios
for CARLA Simulator

KI Wissen - Automotive AI powered by Knowledge





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Funded by
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www.kiwissen.de

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