

# Knowledge4Retail

## Artificial Intelligence for Retail



### The future of retail lies in a consequent connection of the analogue and the digital world

Let's have a look into a retail store of the future: Employees are in discussion with the customer, while robotic systems are in charge of stock-taking, replenishing and collecting scattered items. Smartphone apps direct the customer to the desired goods and answer their queries related to the assortment. Planning tasks and routine works are supported technologically and can be executed more efficiently.

This futuristic scenario shows how retail stores can improve their position with respect to online-sellers, namely by consequently connecting the analogue and digital world. The required technologies will be provided by Knowledge4Retail. The overall goal of the project is the development of an open-source platform (K4R platform) for complex AI and robotics applications in retail. At its core, the platform provides digital models of retail stores (semantic digital twins), which can be annotated with machine readable background knowledge and linked to other information systems. They provide a powerful basis for AI and robotics applications in retail. The potential of the K4R platform will be demonstrated in four representative application scenarios.

### Service Robotics for the Support of Store Employees

Within Knowledge4Retail, the DFKI develops a robotics application as an example for usage of the K4R knowledge processing services. For this purpose, a mobile service robot for the support of retail

intralogistics will be developed, which can be connected to the K4R platform and exchange knowledge with it. Supportive activities include autonomous transport of goods, stock-check, as well as perception of the store environment. In doing so, the robot extends its capabilities with the help of background knowledge provided by the K4R platform. On the one hand, by knowing locations of goods or shelves, availability of employees or other constraints (e.g. urgency, order of unloading, ...) actions and routes can be optimally planned and adapted in case of changes in the environment. On the other hand the system will be able to update the store representation in the digital twin by perceiving the environment through its integrated sensors and comparing it to the current digital representation. This bilateral exchange of knowledge with the digital twin helps making intralogistics more efficient and provides ergonomic benefits to the employees.

Duration: 01/2020 – 12/2022

Sponsored by:  Bundesministerium für Wirtschaft und Energie

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