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Feasibility Study: Conception, Implementation and Evaluation of an Industrial Internet of Things (IIoT) Network for Capture of Sensor and Position Data for Logistic Application.

ABSTRACT - Masterthesis

This is the first try since the beginning of the digitalization at Arcelor Mittal Bremen to design a concept for the mapping of logistical processes. For the mapping of a logistical process a high amount of sensor data such as positions of mobile objects and filling-levels has to be collected. It is also the first try to use wireless sensors over the whole seven square kilometers large company premises.

Therefore, this thesis explores the conceptual design, implementation and evaluation of a industry internet of things network. Wireless sensors are used to detect positions and filling-levels of objects such as containers and vehicles. To the use of wireless sensors, a new communications infrastructure has to be built that must be available across the entire Arcelor Mittal Bremen premises. For the selection of components for the wireless communication, position and filling-level determination, a research and comparison of the technologies has been done to today's state of the art.

With the revolution of the industry at 4th generation where lots of data will be generated and collected the evolution of smart devices and technologies is enormous. Due to the increasing digitalization and the resulting of increasing energy and resources consumption, this master's thesis pays special attention to the energy balance of techniques and components. Due to the criterion for using energy-saving sensors, the use of the existing infrastructure such as mobile or Wi-Fi is not the answer of the problem. Therefore the biggest challenge is a widespread data transmission and the use of energy-saving sensor nodes. The implementation of a new communication infrastructure has to ensure a system security against attacks by third parties. The use of a new wireless infrastructure should also ensure further advantages and scaling.

The aim of the thesis is to capture relevant information for internal transport processes and link them for automation. The collecting of data by intelligent devices such as sensors enable the detection of states or the execution of actions.

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