Data Homogenization in the Age of Industry 4.0

Digital Twin System as the basis for ease of communication between software, hardware and people in highly efficient production processes

A White Paper from Bosch Connected Industry

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Management Summary

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1. Management summary

The number of components that produce data and applications that consume it is steadily growing in the manufacturing environment. More and more frequently the stream of data does not stop at plant boundaries: IIoT software developers and machine manufacturers are just as interested in production data as machine operators on site. A common basis is essential in order to ease communication within this growing ecosystem of hardware, software and people.

The Digital Twin System addresses the needs of all those involved through comprehensive semantic data homogenization and by conveying manufacturing data along with contextual information. The principle behind the Digital Twin System is to link raw data to context. A single digital twin is a digital replica of a physical asset, such as a machine. The Digital Twin System groups the data produced by this asset into generally comprehensible information based on aspects, i.e. information groups such as machine faults or condition data.

Authorized users can easily find and use the underlying semantic models, the digital twins themselves or parts of them. This also allows external machine manufacturers or programmers to access the relevant production data. The Digital Twin System thus forms the basis for comprehensive digitization of production and logistics. This leads to new opportunities to increase efficiency in production: data can be compared and used by different systems, since the required context is always included; every recipient receives precisely the information he or she needs.

Once production is digitized using the Digital Twin System, it is possible to exchange contextualized information about the state of entire production lines. The external machine manufacturer or software developer can offer innovative services or develop new solutions without having to be on site. The Digital Twin System not only helps to optimize production processes, but also creates synergies across plant boundaries.

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