

# A Mixed Reality Application for Linked Data in Engineering and Production

## Concept and Implementation of an Immersive Visualization

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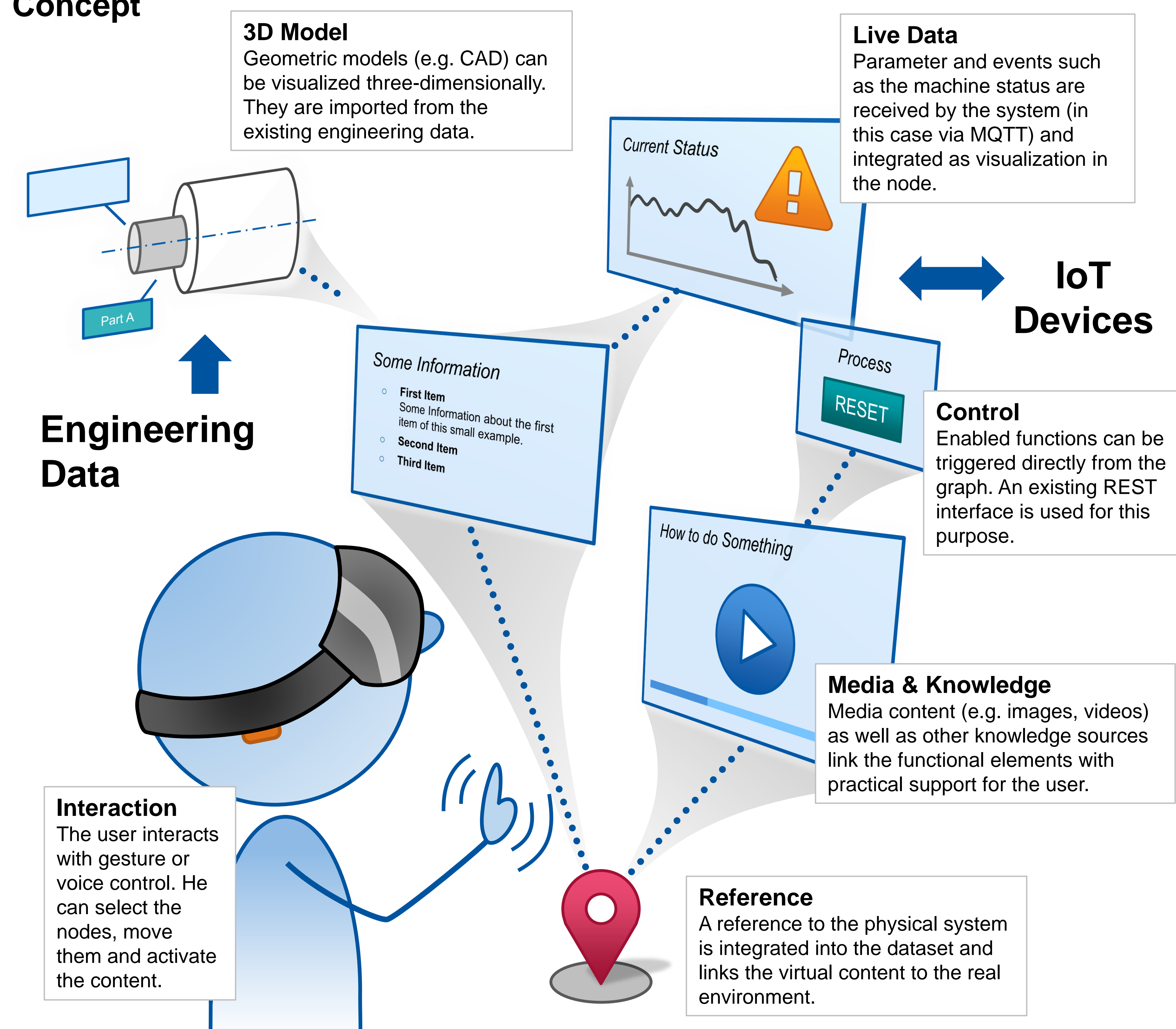
### Motivation

During the engineering and production process, numerous data and models are generated. The contents spread over various disciplines, stakeholders and life cycle phases; they form a huge space of linked data and resources. Visualizing this information space is challenging, especially as it is closely related to the physical process and the manufacturing environment.

Interaction technologies like Mixed Reality (MR) offer an alternative to the traditional screen-based systems, that are still common in automation technology. They combine virtual content and the real environment – which raises the question:

### How to present associated information from various sources with Mixed Reality?

### Concept



### Linked Data in the Internet of Production

Information availability plays an important role in a highly networked manufacturing system, the Internet of Production. During the production process, various data is generated that describe the integrated system under several aspects:

- Engineering and simulation models
- Machine and operation data
- Communication and organization
- Documentation and knowledge

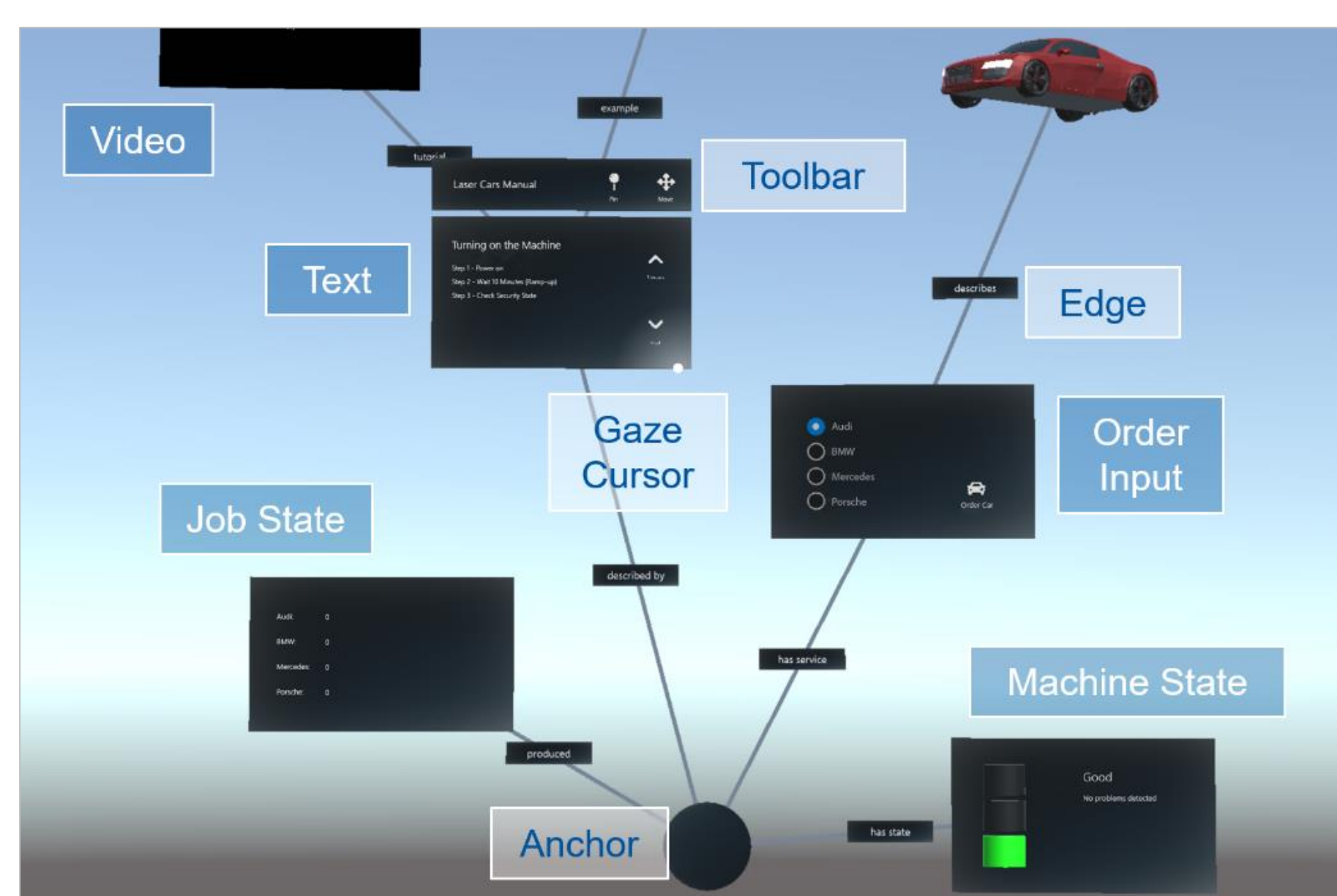
The challenge is to create an infrastructure that semantically describes this data and links it from single applications throughout the entire system – from automation to information technology, as well as to the human workers.

### Implementation

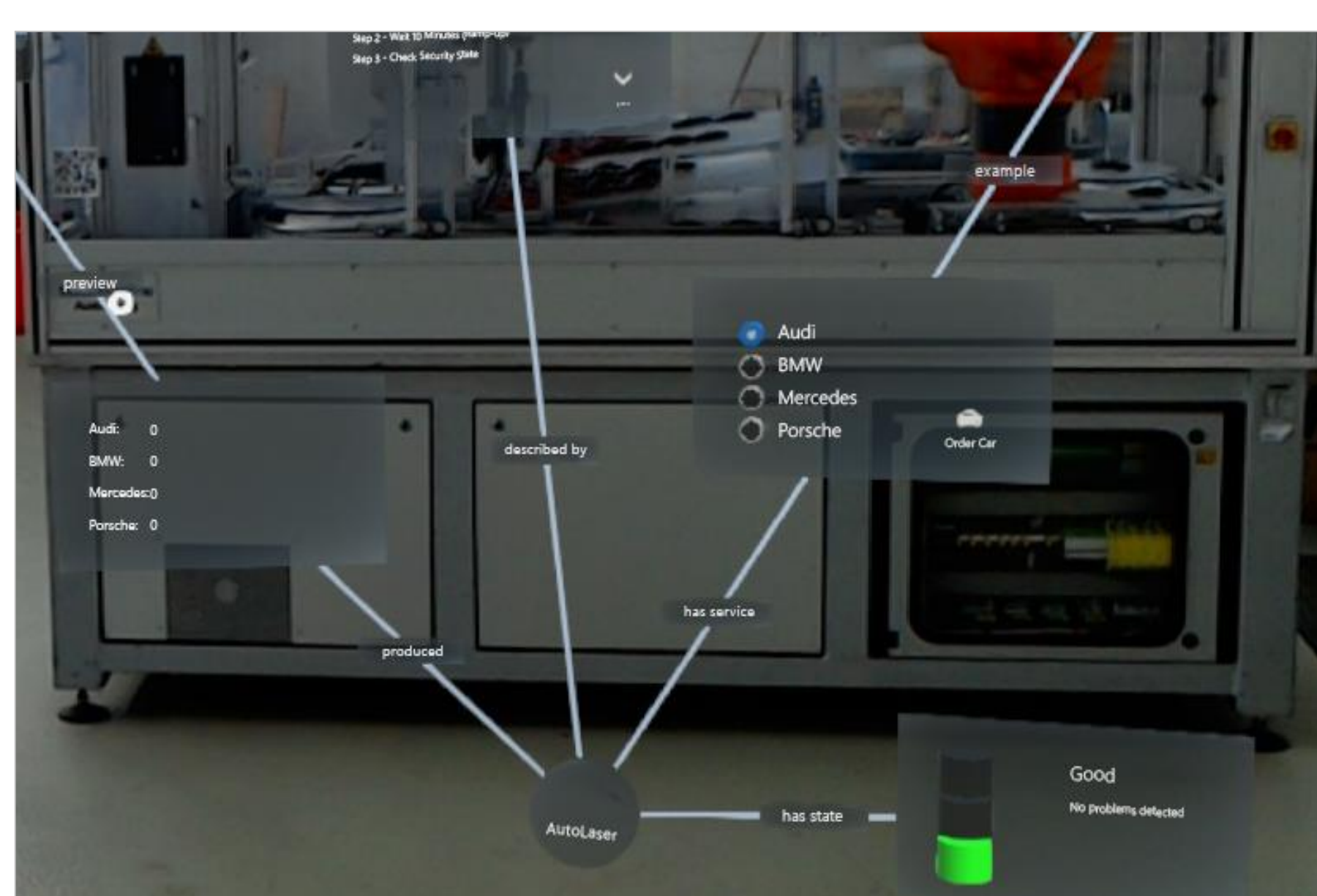
- Development for Microsoft's *HoloLens* with Unity3D based on the provided Tool Kit, especially for spatial recognition and voice control.
- Demonstrated for an "Industrie 4.0" demo cell that was equipped with *IoT interfaces* for communication and control.
- Force Directed Graph* as initial concept for the algorithm to arrange the nodes.

### Conclusion and Outlook

- Concept to explore and "experience" the information space of a production system.
- Combination of unidirectional information presentation with interactive elements for control.
- Infrastructure for semantic linking of the data is current work in the research project; questions such as information selection and productive integration are derived from this.



Labeled rendering of the demo graph

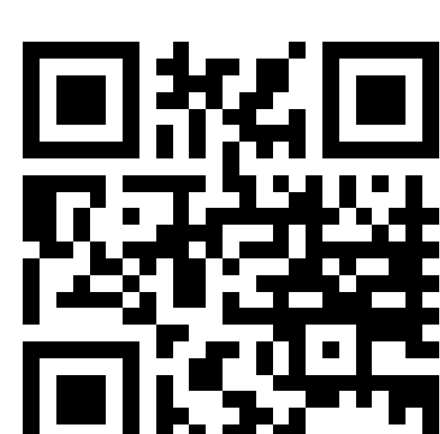


Graph as seen by the user through the *HoloLens*

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