

Fraunhofer project center (FPC) has assigned this bachelor assignment. Currently, FPC is working on the development of a testbed. With this testbed, a company can develop, improve and test and a production environment in a synthetic environment and thus without disturbing the real production process. A testbed contains, among other things, a pilot production environment controlled and visualized by a virtual dashboard. The pilot is a (not yet) existing production environment simulated in a different environment. This can be in a completely digital environment but there is also a possibility to connect it with a real environment with real objects in it. The pilot production environment will be visualized and communicated by a virtual dashboard. The user controls the environment from this dashboard. The assignment was to create an approach for the development of this virtual dashboard.

Before creating the approach, the assignment was started with a case study. This case study was based on a created restaurant scenario and used as a thinking model, to create an imaginable and understandable production environment. First, the virtual dashboard was made for the restaurant and after that research was done to how this visualization was made. In this research, the division between three approaches was made, namely the approach for the visualization of information, the visualization of the virtual dashboard itself and an approach for information management. When looking at the visualization of information it became clear that a definition phase is needed. In this definition phase, the objects are placed in a room or multiple rooms and certain parameters are determined. The appearance of the objects will be distracted from the database and the defined parameters will be stored in the database. After this phase, the simulation can start. The working production environment will be visualized in this operational phase. In this phase, stakeholders will ask unpredictable questions. The answers to these questions need to be visualized. When the question is asked, it should be determined of what sort and type the answer should be and about which object the question was. After that, the visualization approach per type of information can be used to create the visualization. However, this approach cannot yet be made because the scenarios differ too much. When the first couple of scenarios are made, a general approach can be created by looking into the different choices and the design rationale.

The second approach, the approach for the visualization of a virtual dashboard was harder to determine. A lot of visualization methods are possible and this amount is only increasing due to fast-developing technologies. The goal of this part of the research is to discover if there exist important differences or similarities between the visualization methods. Hereby three different methods were compared because with these three methods could already be proven if the differences and similarities exist or not. The three methods are the visualization on a tablet display, with a projection, and with augmented reality. For the lateral, the focus was only on the visualization with augmented reality glasses.

The information that should be visualized was already determined in the first approach and will thus be the same for all visualization methods. However, for some methods, more information about the objects is needed than for other methods. With augmented reality, a three-dimensional environment can, for instance, be created. This also means that the objects should be shown three dimensional and that the information for that thus should be stored. Not only the needed information will change per method, but also the user experience will differ a lot. When looking at the visualization on the display of a tablet, it will be hard for the user to imagine

how the environment will look like in reality. The connection between the real and virtual world is thus harder to think of. This will be different when the user can walk through a real room and see additions with the augmented reality glasses.

To create a general approach for the visualization of the virtual dashboard in the end, first, some choices for specific scenarios should be made. Later on, these choices and argumentation can be compared and with the experiences it can be defined if the right choices were made. Based on this, a general approach for the visualization of the virtual dashboard can be created for recurring situations that are not yet known.

The third approach, the approach of information management, is focusing on documenting the information that was found in the first two approaches. Besides that the information should be findable. both are important for the reuse of the data.