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Development of a prototype for Smart Glasses-based process modelling

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Abstract: The integration of mobile technology is considered a major challenge for the BPM domain. Wearable devices such as smart glasses have already been successfully applied in high-mobility fields such as technical services. However, the utilization of smart glasses to document and model processes still remains on a conceptual level and has not yet been instantiated. This paper demonstrates a prototype for process modelling on smart glasses. It is shown how glasses-specific functionality, e.g. voice recognition, can be incorporated into a modelling environment that facilitates the run-time modelling of processes, even for modelling novices.

Keywords: BPM, process modelling, smart glasses, run-time modelling

1 Towards mobile process modelling

Business process management (BPM) is considered one of the top five management topics for today´s enterprises [Lu12]. An integral part of every BPM endeavour is the modelling of business processes [BNT10]. Studies show that the mere documentation of operational activities within an enterprise is able to increase the organizational performance [Me05]. However, despite technological advances, process modelling still relies on traditional modelling methods using desktop computers and complex software suites. This is especially detrimental for high mobility domains such as technical customer service (TCS), which puts heavy emphasis on highly mobile service technicians that perform on-site services such as maintenance and repair [Ma17]. To cope with these requirements, smart glasses have emerged as a suitable tool to support service technicians during service execution [Ni16]. However, while smart glasses have proven to be beneficial in terms of additional information provision [Ni17], challenges arise when implementing process aware information systems on such devices. Major problems particularly address the integration and visualization of processes, since smart glasses come with specific hardware-related restrictions regarding visualization that are diametric to current forms of process models. Consequently, the research question is stated as follows: *"How can business processes be captured and documented in a way that allows for utilization within a process aware information system on Smart Glasses?"* Research on this matter has already conceptualized the use of smart glasses themselves as a means to capture processes [Me17]. Hence, the paper at hand introduces a prototype that addresses this issue by demonstrating how smart glasses functionality can be utilized for process modelling, even in run-time to process execution and on-site.

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2 A prototype for Smart Glasses-based process modelling

The prototype for process modelling with smart glasses is represented in an exemplary case from the TCS domain in Figure 1. The figure shows part of a process for the replacement of a coil. The technician as end-user of the prototype is recording the process using an intuitive user interface, which does not require modelling experiences. Each modelling action done via the prototype interface results in the ongoing construction of a process model in the background. In the presented case, the EPC language has been chosen for demonstration purposes. The primary form of interaction with the prototype is voice command, as the user has free hands to fulfill his task. The voice control is activated if the icon displaying a mouth (lower right) is green. If there is no connection and the symbol is red, other interaction interfaces like control buttons can be used. When documenting a process, the technician needs to insert and label a function via voice command, as done with the function "Remove Cover" in the example shown in Figure 1. Subsequently, the system requires a feedback to confirm the description. Afterwards, the system awaits the next user interaction, which may be a new function or e.g. a resource. Functions are followed by events that are automatically generated on the basis of the function label. The resulting model can for example be used for the process guidance with smart glasses: The functions will appear as instructions in the glasses' display, the events can be utilized as a confirmation step. Especially untrained technicians benefit from this documentation, as they receive instructions from their viewing perspective, which are easy to follow and provided hands-free.

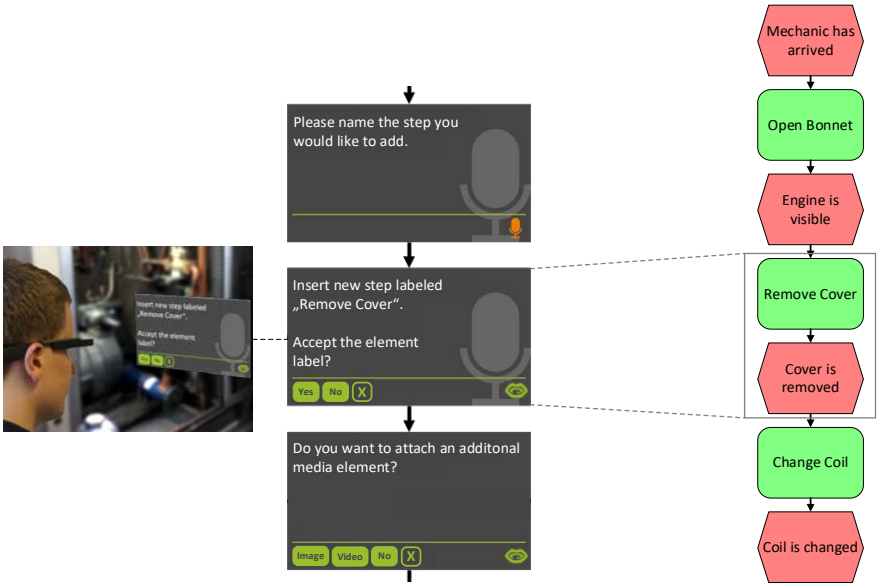

Figure 1: Adding and naming of a new process step

Besides the text-based instructions, smart glasses offer functionalities such as voice or video respectively picture recording. Thereby, the documented process is enhanced by further procedural knowledge as displayed in Figure 2. The technician takes a picture of a service object such as a coil in our example. Therefore, the voice command "record" initiates the camera. After 5 seconds, the picture is taken and displayed to the user afterwards. The user can decide whether to approve the picture or not. If the picture is disapproved, the system returns to the last screen to take another shot. If the picture is confirmed, the technician can proceed with the next step. The recordings are saved as information objects and are assigned to functions as resources. The documentation process can be stopped at any time if the user triggers the button marked with an "x" on every screen.

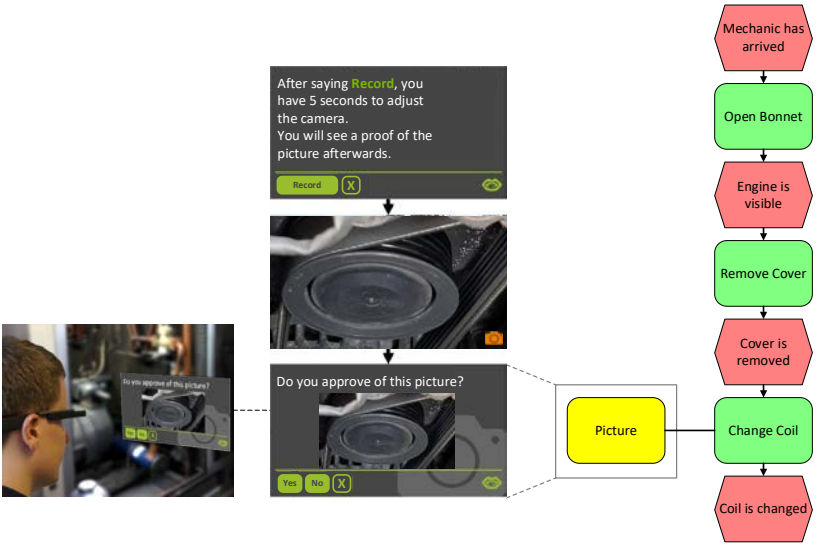

Figure 2: Adding of a media element

As service processes in TCS typically yield a high degree of variability, the documented processes can be adapted and extended at any time. Via voice command, the technician can add or delete new steps or create decision trees by inserting a split. The system transforms these splits into logical operators from the EPC language, such as an XOR to indicate alternative process paths. Additionally, the overall system architecture provides for a manual quality check and enhancement of the resulting models as shown in Figure 3. The architecture encompasses both modelling via smart glasses (focus of this contribution) as well as a back office system that offers traditional modelling software functionality. As demonstrated in Figure 1 and 2, the modelling concept provides that high mobility workers, such as service technicians within the TCS domain, use the prototype to document operational activities in form of process models. However, the expressiveness of such models is limited, since hardware-specific restrictions (e.g. small display size) have to be considered.

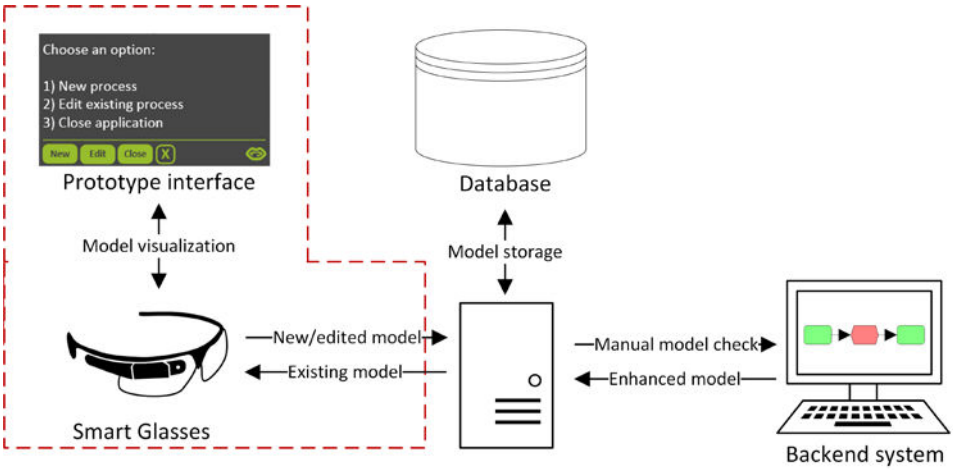

Figure 3: System architecture of the Smart Glasses modelling prototype

Additionally, technicians as end-users are often modelling novices, which may lead to modelling errors. Hence, the backend modelling system ensures that each modelled process using the prototype is manually checked from domain experts. Subsequent to model checking, the models are distributed to a central server, which stores them in a database. Afterwards the models can be used for guiding inexperienced technicians through service processes by visualizing them as instructions on smart glasses.

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