Design for Usability by Ubiquitous Product Documentation

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Abstract. The use of current complex products is rarely intuitive and self-explanatory. The approach presented in the paper in hand therefore considers support of product users by facilitating ubiquitous and providing easy access to product information for different use case scenarios through the use of new in- formation channels. The approach includes a design method for the integration of accessible technical documentation into product development. A special em- phasis of the proposed product documentation is made on special quick guides with instructions for the installations and frequently occurring use case scena- rios, as well as references to more detailed information. To provide a first vali- dation of the approach, a case study is introduced towards the end of the paper.

Keywords: marking technologies, mobile computing, product documentation, product life cycle usability, QR-Code, RFID.

1 Introduction

The use of current complex products is rarely intuitive and self-explanatory. Many products in everyday life and the industrial environment are hardly or even not at all usable due to the lack of information regarding the handling of the product and the range of functions. Even the availability of standard documentation may not ensure the proper use of complex products. The technical documentation of complex prod- ucts often comprises several hundred pages, which can pose considerable effort to the users. Both the lack of information and too much information can lead to an inappro- priate use of certain kinds of products. This may even result in damage to users, the environment, or the products itself. Particularly affected are products the user is unfamiliar with or that are infrequently used.

The paper in hand introduces a design method for the reduction of usability prob- lems that is suitable in particular for complex products. The proposed method should be integrated into the product development process. To enhance the usability of a product, the method suggests the testing of products in different maturity phases in interplay with its documentation. The distribution of the developed documentation is enabled by the new generation of smart devices and can enable every product life cycle party to access the right information in the right place at the right time, after the

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point of sale. To render nearly any kind of device or product versatilely applicable, the presented approach exploits cloud computing and the Internet of Things based on internet-capable mobile devices and marking technologies. The developed method and its derived solutions shall lead to a shorter introduction time when handling prod- ucts. A special emphasis of the proposed product documentation is made on special role- and device-specific quick guides with instructions for the installations and frequently occurring use case scenarios, as well as references to more detailed information.
The proposed quick guide is intended as a supplement to the common product do- cumentation and may contain a reference to it. This short documentation is user- centered and therefore be provided in a multicultural and multilingual version, which can be used as a sales argument for the producer. Examples for products which are in the focus of the presented approach are highly complicated devices, rental equipment, portable devices, corporate devices that are used jointly, many resold devices without technical documentation, devices with a potential risk to human health and the environment, devices with high operating costs (energy and resources), and industrial machines without display.
The presented approach is suitable for all kinds of products. The paper in hand emphasizes the documentation process of quick guides for technical capital goods. The approach should be integrated into the development process of new products, but is also suitable for products, that are already in serial production. To provide a first validation of the approach, two case studies with serial products, a pump and a concrete chainsaw, which have been carried out in cooperation with the German department of civil defense "Bundesanstalt Technisches Hilfswerk" (THW), are in- troduced in chapter 4.

2 Related Work

2.1 Use of Product Identification Technologies with Mobile Devices

The number of mobile devices such as smartphones and tablet PCs has been increas- ing significantly over the last years. These devices facilitate mobile computing, mobile communications, and mobile internet use, which offer new ways of human– computer interaction. Many of these devices have embedded cameras, which can be used to read visual product identification technologies like barcodes, e.g. the QR- code. Some later generations of mobile devices even have reader modules for elec- tromagnetic identification technologies like Near Field Communication (NFC) or Radio Frequency Identification (RFID). Product identification technologies offer an opportunity for automated identification of marked physical product items without manual errors like assignment or typing errors, and allow to store a unique URL or ID on the mark and onto a particular product item. These URLs or IDs can be read by mobile devices to access and alter related data sets of a product item in databases via the internet.