Towards Using Context Personas to Support Prototyping of Mobile Business Apps

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ABSTRACT
In this paper, the novel approach of combining personas and user scenarios in the usage of context personas to derive user requirements during prototyping of mobile business apps is presented. The approach focusses on considering various usage contexts that might occur during the use of a mobile device. Therefore, multiple context personas are created to consider those aspects.

Author Keywords
Mobile Applications, Prototyping, User Experience, Persona

ACM Classification Keywords
H.5.2 User Interfaces: Prototyping

General Terms
Human Factors; Design.

INTRODUCTION AND RELATED WORK

The usage of the persona approach for prototyping of mobile apps is very common in User Centered Design. Persona descriptions also involve a short section, in which the prospective usage context of the person is described. Regarding mobile apps in general, the creation of personas faces the challenge of the usage context being unclear, because the app might be used in different environments und certain circumstances. Regarding mobile business apps, this alleged broad scope can be narrowed down. The usage of a business app relies on certain business processes and tasks and can be foreseen to some extent.

Alan Cooper introduced the use of personas as a practical interaction design tool [1]. Personas describe a user archetype representing the specific needs of many (a class of) individuals. They are based on results coming from user research and describe a representation of a group of potential users, who have similar behavioral patterns in e.g., use of technology and products, motivations, lifestyle choices, and the like [7]. The proper use of personas allows interaction designers to concretize their design decision towards the expected end-users and help them to design for their needs [3]. The design of mobile business apps differs in various ways from the design of desktop applications for stationary work [8], [11]. One of the major design challenges that interaction designers for mobile applications face is the proper usage of context information [4]. Several definitions of usage context exist in literature [2], [6], [9], [10]. Most of them agree that context consists of the surrounding environment that is differentiated in the physical environment (e.g., light, noise), the user environment (e.g., location, mental state), and the computing environment (e.g., devices, connections). Thereby, it is important to only gather the relevant context information. Existing approaches often specify too much, too less or even the wrong context and result in complicating the work of the developers.

Today's mobile devices are equipped with several sensors (e.g., GPS, gyroscope, or personal information of its user like calendar or address book) allowing the device to collect and interpret information of the user's current context. Therefore, the mobile device and its sensors need to be added to the definition of context because the mobile device forms as an integrated component of the user's context.

The use of information provided by the sensors enables interaction designers to build intelligent, context-aware applications that support the users in the fulfillment of their tasks with respect to their current context. Because mobile devices are used in a mobile environment, they experience a permanently changing context, which can have an impact on the task. This circumstance is currently not addressed by existing persona templates. There are approaches coming from the discipline of contextual design [5] that try to generate contextual personas. But those personas are mostly driven by the data coming from contextual inquiries and do not expand the persona itself with contextual information or scenarios.

The approach of a contextual persona described in the following uses the concept of persona and the concept of context from an IT perspective and combines them. This results is a mixture of a traditional persona and the description of contextual information. Therefore, the

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persona focusses more on the actual environment (e.g., current working place, current challenge, current business context, current user context) than a traditional persona. Thus, contextual personas exist in many different versions throughout a development process and address the current context and task the system will be designed for.

CONTEXT PERSONA APPROACH

The context persona approach is based on a conceptual model of the usage context that builds the ground of our work. The hypothesis is that using this model aims at narrowing the current context in which a mobile business app will be used and derive as precise requirements as possible. The conceptual model (see Figure 1) shows the different aspects the usage context consists of: physical environment, computing environment, and user environment. A business task is usually performed by the user in different but typical sets of the usage context. Those typical sets are described by context personas (see Figure 2) that lead to functional and non-functional requirements. Besides other factors, the physical environment consists of the time of day, weather condition, light, and noise. It comprises the natural environment of the user. In the context of mobile devices, most of the factors have a dependency to a sensor of the mobile device. The computing environment consists of the mobile device data, backend data and other devices. In our model, the mobile device data is not only consisting of the sensor data and connections to other devices. To leverage the benefit of mobile business apps, the user data that is stored on the mobile device that is typically also used in a private context bears the potential to provide huge benefits to the users. This resource is often underestimated and can be systematically used with context personas.

The user environment comprises the specific context of the user itself: mental state, task, and location. The mental state can also be measured using the mobile device. For example, the user behavior with the mobile device can indicate the stress factor of the user (e.g., regular and often locking and unlocking of the device). Especially in the context of mobile business apps, the stress level and the cognitive load of the user are of importance with regard to prototyping. A user that is most likely performing the task with a high cognitive load needs a simple and failsafe interaction that leads to his task goal quickly. Contrary to that, a user that has a very low cognitive load might benefit from an app that integrates concepts such as Gamification to increase the joy of use and engagement with the app. In addition, the current position in the task performance is of relevance, especially if certain steps of one task will be performed in different usage contexts.

One example of a context persona, Yoko Watanabe, is shown in Figure 2. It usually contains a picture that shows the person in the currently described usage context. In traditional persona approaches, it is recommended to show a portrait of the person. This helps developers to imagine a real person being confronted with the resulting software. We recommend showing as many aspects of the contextual situation within this picture as possible.

Further, the persona has a *Name*, few *Demographical Aspects* and a *Tagline* that characterizes the persona. *Core Characteristics* and *Core Challenges* are also general attributes for all different context personas of this type. The different contextual personas that can be built for Yoko Watanabe in this case don't differ in the attributes explained so far.

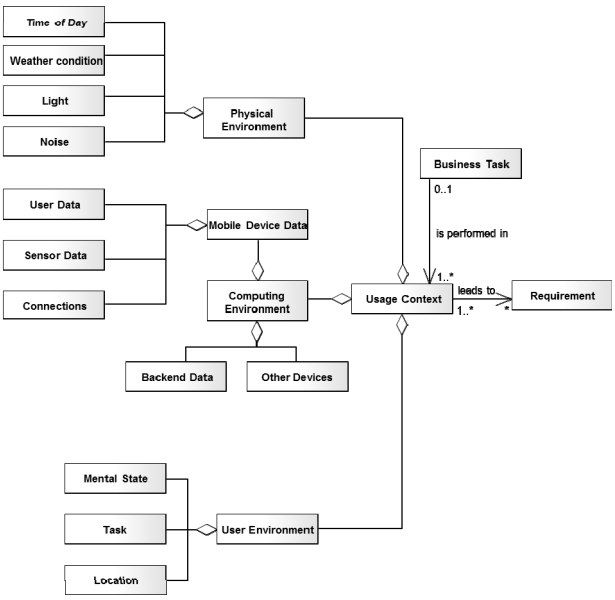
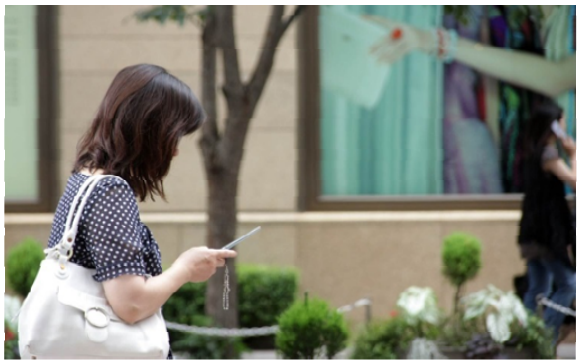


Figure 1: Conceptual model of context (simplified illustration)

All the following attributes are individual for each context persona of this type.

The *Current Challenge* and the *Business Context* refer to the task and the business process the person is performing. The *Current Working Place* describes the physical environment. The *Mental Model* describes the expectations the persona has of mobile devices in general and in this scenario. Usually, non-functional requirements can be elicited from that item. The mental state of the user is described in the *Current Usage Context*.

Additionally, the context persona consists out of a brief scenario description covering a concrete situation of the persona with respect to context description and the performed task. Based on this scenario, requirements are derived and directly shown as part of the context persona. This enables developers to combine required features to specific situations of the persona easily.



Yoko Watanabe

Personal Assistant at Toyota
30
single
Addicted to new technologies

„Social media increases my business productivity"

Core characteristics (general):
- Stress resistant
- Loves to manage multiple tasks

Core goals (general):
- Take the load off from the CEO
- Care about friends & colleagues

Current challenge:
- Schedule multiple appointments of CEO

Current working place:
- Public environment

Mental model:
- Accustomed to using her Android phone in business; apps should be simple and clear (focus on productivity); it is important to be connected to colleagues and friends

Current smart device context:
- docomo Arrows V F-04E; 4.7 inch HD display; Android 4.2.2 Jelly Bean; GPS available; LTE available; connection quality to backend: strong

Current user context:
- Medium cognitive load and stress level; walking in public and noisy environment surrounded by people

Current business context:
- Schedule several meetings with customer on the afternoon; CEO is only available at 3PM to 4PM; Customer will also meet with Mr. Nakazato and Mr. Hiroshi

Context scenario:

1. In the morning, Yoko receives an email of the customer Takahara that he requests an appointment with Mr. Nakazato, Mr. Hiroshi and the CEO.
2. Yoko takes out her smart device and checks the availability and current location of the people requested as they might not have their calendar updated on business trips.
3. Yoko creates immediate meeting requests for the requested people
4. Requested people are receiving an urgent meeting notification and confirm the meeting request – in case they are busy right now an automated notification is send to Yoko
5. Yoko schedules the meeting and responds to Mr. Takahara
6. Yoko gains reward for scheduling a meeting within 10 minutes after the request

Requirements:

- App provides simple and fast method of checking availability of several persons for a certain timeframe
- App provides the ability to see the location of related persons
- App provides the opportunity to send instant meeting requests for confirmation
- App provides reward system
- App provides direct communication to other app users

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Figure 2: Example context persona: Yoko Watanabe

Context personas can be used before and after each prototyping iteration step. Before creating the prototype of the mobile device, the context persona is used for deriving requirements that need to be taken into account while developing the prototype.

In addition, context personas can be used while validating the prototype, i.e. the prototype needs to be tested in the different contextual situation described by the personas. This would usually require having an executable prototype early available that can be used on a concrete mobile device

CONCLUSION AND FUTURE WORK

The context persona approach shows how important the aspect of context is for the design of mobile business applications. Where a typical mobile application is mostly used in an unpredictable context, the usage context of a mobile business application can be stated more precisely. This fact is based on the nature of mobile business applications, which are designed to support a specific task of a mobile worker in a limited set of possible contexts. Existing tools for interaction designers are sometimes not suitable to address the aspect of context in an adequate way if they are used to design mobile business applications. The approach of the context persona is one step towards the systematic engineering context-aware apps. It adapts an existing and well-established tool towards the special needs of a context-aware mobile business application. Thus, interaction designers are able to use a familiar approach fitting to their current needs. But a context persona is not only useful for business applications. Any application that uses context information or is used in a specific context can benefit from the context persona. But the more precisely the usage context can be predicted the more useful a context persona gets. This paper presents a first version of a context persona template. It was already successfully used in different practical settings and refined based on the experiences gained during usage. Nevertheless, a formal evaluation in a controlled setting is still needed to approve the benefits of the approach corresponding to traditional persona usage.

Refinements of the template and more evaluations in practical settings will therefore be part of future activities to sharpen the context persona approach.

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