

Touchscreen interaction for healthcare applications



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Abstract

Topicus is a provider of healthcare related applications. Currently all applications are developed for use on regular computers with a monitor, keyboard and mouse. My research focussed on the question if it would be feasible to offer both a regular interface as well as a touchscreen interface to the users. This way the application could still be used like it is used today, but new ways of interaction are added to the application. To answer this question research was performed on touchscreen characteristics and user interface rules which resulted in a proposal on how to offer both interfaces in a single application. To evaluate the research a prototype was developed which was evaluated by use of a heuristic evaluation.

The main finding from this research is that it is very well possible to create an application that incorporates both a regular and a touchscreen interface. There are certain drawbacks to this solution but these don not weigh up to the advantages.

Chapter 1

Introduction

When we look at our living environment we see touchscreens rapidly becoming more popular. Although the technology was developed in the 1970's [?], it was not until recent that touchscreens started to appear in our everyday life on a large scale. Well known examples are portable devices like the iPhone, Nintendo DS and TomTom navigation devices. Besides these portable devices we also see touchscreens on larger devices like ATM's, ticket boxes, (information) kiosks and tablet computers.

These developments are of potential interest for Topicus, that has not yet integrated touchscreen in their line of applications. The focus of my research is to determine the feasibility of touchscreen integration for healthcare applications developed by Topicus.

With the use of my research Topicus should be able to advise its customers about touchscreen, be able to determine if an application would benefit from touchscreen interaction, and finally be able to develop touchscreen applications with limited development and maintenance costs.

1.1 Topicus

Topicus is an innovative ICT-solutions provider with about 130 employees. What makes Topicus successful and unique is the companies philosophy. Topicus can be seen as one living entity consisting of different cells. Each cell consists of a number of employees that are specialised in a specific market segment. From four buildings in the center of Deventer Topicus develops SaaS (Software as a Service) and processmanagement software for the financial, healthcare, and educational markets.

My research was conducted at the healthcare cell of Topicus. This cell is a leading provider of web-based services for the healthcare market, with clients such as general practitioners, hospitals, pharmacists, nursing homes and specialists, using services such as electronic health records, e-consults, medication prescriptions, appointments, and referrals.

1.2 Goals

During initial talks with Topicus it became clear they are seeking answers to the following questions:

- How to determine if an application would benefit from touchscreen interaction? (with focus on both users and application processes)
- What rules to follow when developing a touchscreen interface?
- Is it possible to incorporate these rules in the current development process, without building a separate touchscreen application?
- What would a touchscreen enabled implementation of a current Topicus healthcare application look like?

These questions boil down to one overall research task;

<i>Investigate the applicability of touchscreen for healthcare applications developed by Topicus</i>
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To be able to answer all questions provided by Topicus, the research is divided in several sub questions;

- *What is a touchscreen?*

To be able to say something about the usability of touchscreen devices, interaction and interfaces a firm understanding of the technology and properties is required.

- *What factors determine the feasibility of a touchscreen implementation?*

Not all applications benefit from touchscreen. An overview of factors that help determine when to implement touchscreen, or when to use more traditional input devices is drawn up, with a focus on both the application and user properties.

The factors are tested against all applications developed by Topicus to come up with a list of applications that would benefit from a touchscreen interface.

- *What rules to follow when developing a touchscreen interface?*

Developing a touchscreen interface differs from developing a regular interface. The research should point out what rules have to be followed during the development of a touchscreen interface.

- *Which Topicus applications would benefit from a touchscreen interface?*

By applying the feasibility factors and interface rules a selection of applications (or parts of applications) is made. One of these applications will function as the basis for a touchscreen enabled prototype.

- *How to implement a touchscreen interface?*

Together with the development of the prototype a technical implementation proposal is created. This proposal functions as a basis for future touchscreen implementations.

1.3 Requirements

Several requirements were stated that need to be fulfilled for the research to be usable for Topicus. This section describes these requirements.

- *One application*

Several strategies can be followed when developing a touchscreen application. Most touchscreen applications are built as stand-alone applications with a custom designed interface suited specifically for a touchscreen device. Although this strategy has its advantages, like a touchscreen tailored interface, its main disadvantage is the time, and thus costs, involved in developing and maintaining a separate application. The most important requirement as stated by Topicus is the use of a single application for both the regular interface and the touchscreen interface. As stated, this saves development and maintenance time, and users familiar with the regular interface will be able to use the touchscreen interface without a learning curve.

- *Limited implementation costs*

To reduce implementation costs the goal is to automate as much as possible in the conversion of the regular interface to the touchscreen interface. To accomplish this goal a general framework is to be developed which will convert as much as possible of the regular application to be compatible with touchscreen interaction.

The following section outlines the approach used to answer the provided questions and gives insight in the process followed during my thesis research.

1.4 Approach

The research started with a literature study into touchscreen devices, interaction and interfaces, as outlined in chapter ???. The goal of this literature study was to map the different properties of touchscreen displays and to gain insight in the feasibility rules for different processes and target groups.

To determine if an application would benefit from touchscreen interaction a feasibility schema was proposed in chapter ??. This schema is to be used to determine which Topicus healthcare applications would possibly benefit from touchscreen interaction and which would not. To make the schema easy to use for future applications a web based application was created in which several factors can be altered to reflect a specific application. The application will thereafter provide the users with a easy to understand touchscreen feasibility advice, based on the provided input.

The proposed feasibility schema was hereafter applied to all healthcare applications developed by Topicus. Each application was studied in-depth to extract the required information for this schema. This way, a selected group of applications that could possibly support touchscreen was selected for further research. Chapter ?? provides an overview of all applications and concludes with a single application that was used as the basis for the prototype.

Before building the prototype, research was conducted on user interface rules for touchscreen applications. Chapter ?? provides a series of rules and solutions to convert web based applications as developed by Topicus to touchscreen applications.

The combined research resulted in the prototype which is discussed in chapter ??. An overview of findings and conclusions is provided in chapter ??.