

Consistent Multi-device Design using Device Categories

Martijn van Welie, Boyd de Groot

Satama Interactive Amsterdam, Poeldijkstraat 4, 1059 VM, Amsterdam, The Netherlands
{martijn.van.welie, boyd.de.groot}@satama.com

Abstract. Mobile devices differ in many aspects such as screen, keys, browsers, java support and much more. The difficult task designers now face is how to design solutions that take sufficient advantage of specific device characteristics while offering a consistent and similar experience. In this paper we discuss an approach using device categories to tackle this design challenge. Our categorization is based on relevant design considerations rather than device features.

1 Introduction

The mobile industry is traveling fast. New devices are appearing constantly as device manufacturers try to beat their competitors. Operators that offer mobile Internet to their customers continuously update portals to deliver the most attractive mobile experience that is possible. In doing so they face the challenge to design for this large set of devices that is increasingly differentiating. In the early days, most phones had a simple WAP browser, where only the differences in browsers were relevant. Nowadays, the screen sizes have differentiated so much that special designs for large screens are necessary to provide an optimal experience. Some devices also adopted color screens and even touch screens with a stylus. Recently the Japanese I-mode technology introduced a new browser type as some devices now support XHTML and WML 2.0. Although devices are differentiating, operators and other application developers are struggling with their goal to provide a consistent design solution. Especially operators are interested in achieving this kind of consistency over a large set of applications. For end-users consistency provides a recognizable and predictable user experience. In the following sections we propose an approach that uses device categories to manage to the number of different designs that need to be made.

2 Device Characteristics

The first thing to understand is which device characteristics differ between mobile devices. The second thing is to understand to what extent they have an impact on the sort of design solution that should be made, which will be done in the next section.

- **The browser.** Even if a browser supports a standard such as WAP 1.X that does not mean that the browser interprets the WML files the same way. Some browsers implement browser specific tags that other browsers ignore. Later versions of WML are backwards compatible but lead to unsatisfactory results if a legacy browser views the pages.
- **The markup language.** The markup languages that are used nowadays include WML, cHTML, XHTML of which there exist different versions for each of them. Naturally, any design solution needs to be viewable on the device it is intended for. If not, the solution is not viewable.
- **Output capabilities.** Displays exist in all sorts of sizes and some are in color while others are in black & white or in grayscale. The most direct impact of display differences concerns the number of lines of text that can be displayed. Typically, this ranges from 3 to 9 lines of text. Another factor is the shape of the display. Most of them are vertically oriented but horizontally oriented devices are also common.
- **Interaction Style / input capabilities.** The number of keys that are used on the device differs significantly. Some have shortcut keys to directly access the browser while other devices require several actions to start the browser. Most devices also use soft keys in the browser but the number of available soft keys varies between 1 and 3. In I-mode phones the keypad is used for menu shortcuts while this is not supported in most WAP enabled phones. Some phones even have a stylus and touch screen that allows an entirely different way of interaction.
- **Data Connection.** Some devices use GSM others HSCSD and nowadays GPRS. The bandwidth and the time to connect differ significantly.

These aspects all influence what the best solution is for a particular device. Theoretically, delivering device-specific solutions would be possible if we could detect the exact device that is used to access the service.

3 Design Issues

The types of design issues that are involved in designing for a wide range of devices are numerous. A few examples include:

- *The use of page titles, brand headers, and section labeling.* On a small screen it is only possible to show a page title in order to leave as much space as possible on the remaining screen area. On larger screens, the content might be grouped and labeled which would be disastrous for small screens. For commercial services space is also required for brand elements such as logos.
- *The number of links that can be presented on one page.* Scrolling is problematic on small devices so it is important to make sure the number of links is matched with the number of lines that fit on one screen. This directly influences way the site should be structured.
- *The layout possibilities.* The larger screens make it possible to use a two-column layout of the information. Doing so may significantly improve the user experience.

- *The text length.* The width of the screen determines how link labels should be for links and other text elements. Using long labels leads to wrapping which may cause problems in distinguishing one link from the next.
- *The use of soft keys.* Good use of soft keys is important feature for speeding up the interaction. Will there always be a soft key for “back” navigation or should a back link be included in the design? If the number keys are used as menu shortcuts the menu items should be numbered.
- *Use of images.* Now that some devices have color displays, new types of applications can be envisioned. Images may also enhance the user experience by way of icons etc. However, using images dramatically increases the amount of data that needs to be downloaded. Adding one image may typically lead to a 4 times increase of data while the connection speed may only be 2 times as fast compared to GSM.

The bottom line is that “design-once run-everywhere” does not apply for the current mobile market. When designing for mobile devices it is simply a necessity to take the targeted device types into account.

4 Designing using UI device categories

At present it is at least partially possible to detect the device from a service point of view. The exact solution that is sent to the device can be delivered using techniques such as XML in combination with device-specific XSLTs. However, it is usually not feasible to design and build a XSLT for every device on the market. The logical conclusion is to design for a specific class of devices rather than for every particular device. The difficult part is define the classes and how to design for them. Ideally, the devices class would not have to change when new devices come out.

In choosing the categories it is important not to define it in any criteria that is very precise or easily outdated (e.g. the screen resolution). A possible more time-independent approach is to define it using the way the phone is typically used and by whom. Based on the current roadmaps of handset manufactures, we estimate that our approach should work for at least the next 1 or 2 years. Phone manufactures also develop their phones for particular market segments [1]. Nokia uses four categories [1] for its devices (series 30, 40, 60 & 90) which are centered around device features and cost for manufacturing. For designers, a categorization should be focused around the issue of *designing separate solutions* rather than classifying device features. In our case, the screen characteristics and the interaction style have the most impact on the design. For example, when designing for the Nokia series 30 & 40, the same design can be used since the differences are not large enough to justify separate designs.

These four basic categories will each require a “compromised” design solution coded in all markup variants. This way, the number of designs that must be made comes down to 4 while the number of *coded* solutions comes down to 8 or less. For the PDA categories it is nowadays not necessary to code solutions in multiple markup-languages, HTML is the defacto standard.

Table 1: A UI Device Categorization

Category	Definition	Usage
Basic	Small screen around 3,5x2,5cm, only the most basic navigation possibilities using 1 or 2 soft-keys. Often b/w screen but can also color devices are emerging. Technology is typically WML. Typically 4 to 6 lines of text can be displayed	Trendy youths where the phone has a high social value. Phones must be small.
Advanced	Larger screen around 3,5x5cm, typically color screens and feature rich phones using 2 or 3 softkeys and sometimes even extended key-pads. Technology is color WML, cHTML or XHTML. Typically 6-9 lines of text can be displayed. Two-column layouts can be used for icons.	Demanding users that require more than just a phone. Phones should be easy to operate and are hence larger than basic phones.
Horizontal PDA	Phone/PDA with a horizontal screen layout and qwerty keyboard. Technology typically XHTML and also WAP. Also exist in touch screen variant. Typically 6-9 lines of text can be displayed.	Heavy business users that need to write a lot of messages and need PIM features.
Vertical PDA	Phone/PDA with vertical screen layout. Has touch screen and possibly a mini qwerty keyboard. Typically uses XHTML. Typically 15-20 lines of text can be displayed.	Business users that do not need a keyboard but still require a feature rich phone/PDA combination.

The problem with any categorization is that there will always be devices that do not fit exactly in the category’s description. For example there are devices with a tall but narrow display that still belong into the basic category because of all other device characteristics.

5 Conclusions

In order to deliver a high quality experience on a mobile device, it is necessary to take device differences into account. Since designing solutions for every device on the market is not feasible, devices need to be categorized. In this paper we propose a possible categorization based on the type of usage.

References

1. Lee, L.: Nokia Vision on Mobile Java. (2001) Sun Nokia Conference, December 2001, Singapore, http://www.sun.com.sg/events/presentation/files/sun_nokia_conference/pres_luke.ppt