

Avoiding Average: Recording Interaction Data to Design for Specific User Groups

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Abstract. Designing domestic user interfaces for broad user populations means designing for the average user. To design for more personally intuitive interfaces detailed interactive behaviours need to be captured and described in order to better inform the design process. By utilising technologies such as interface skins, log file analysis and user interface description languages, the PROSKIN project is developing an empirical tool for quantitative capture, description and analysis of interactive behaviour in a non-invasive and situated context. The purpose of the tool is to identify user groups by distinguishing behaviour or trait which will allow designers to develop more personally relevant user interfaces. The tool itself facilitates the analyses of large datasets of users and their interactive behaviours. This will allow designers to produce interface skins for user groups of similar interactive profile and subsequently providing a less average user experience.

1 Introduction

Interfaces are often boring by design because they have to be average. As individuals comprised of unique psychologies and physiologies with associated strengths and weaknesses, why are we often forced to use interfaces designed for the average user — designed to be average?

User-Centered Design seeks to “know the user” [3] but paradoxically once we know the user we tend to ignore them by designing for typical users. We create a single user interface that has to satisfy everyone, or at least 90% of them. This user-centered approach to design is widely accepted and is well documented in its effectiveness. The challenge for designers is to produce an interface that *all* users can effectively interact with. To design for 100% of your target population is very difficult to achieve, especially when the interface is used by a broad population. This is because there are too many design considerations and often the design compromises that are made either exclude certain members of the population or produce an interface that is confusing and inefficient.

Ergonomists often design for the 90th percentile as a more realistic design aim. This might be perfectly acceptable when designing an ATM or a car dashboard, but when it comes to entertaining users, 90% means a relatively boring interface. The industrial

designer is not able to design for me, or people like me, because they do not have sufficient information about me. The resulting interface might functionally achieve its design aim but is unappealing — in other words effective but unaffactive. Traditional definitions of design dictate both *form and function* but yet designing for broad target populations often means function without form. Logically in order to have both function and form one would need to understand the user population in great detail, even so far as individually. When it comes to entertaining and designing relevant interfaces (e.g. gaming and interactive digital television), an understanding of the *nature* of the individual serves not only to inform designers but to enhance the user experience beyond existing preference or history based personalisation.

The research project, named PROSKIN, is investigating ways to address these issues, of informing designers in detail about their user population and how to most effectively use skinning technology to enhance the user experience both aesthetically and functionally to provide for an interface more tailored to the individual and their differential traits, without having to design an interface for each and every user. PROSKIN seeks to establish and empirically validate a profiling tool to enable the identification of user groups within the general usage population based on large data collections of usage interaction. This information when fed back into the design chain enables designers to create user interfaces designed for particular types of users, rather than the average user.

2 Key Elements of PROSKIN

Three of the key tools to this investigation are interface skinning, log file analysis and user interface description languages.

2.1 Interface Aesthetics and Skinning

In order to achieve individual appeal designers have in recent years allowed the personalization of the user interface through interface skins. A skin is considered to be the appearance of the user interface, including graphic, haptic, and/or aural patterns. Skins are widely used to allow personalization of the interface and a number of different types of PC application are “skinnable” e.g. Winamp, Windows Media Player, ICQ, Internet Explorer and Messenger. Skins are used typically to change the “look and feel” of the interface components, often a cosmetic change alone (i.e. the colours change or a background image is applied, but the interface components remain unaffected in location, attribute or function). Changing skins (known as “re-skinning”) allows not only the visual and interactive components of the interface to be changed but also aurally with personalised sound profiles. Interface reskinning can provide significant benefits to interaction for specific user groups, for example by changing interface colour to facilitate reading for dyslexic users [2]. The ability to re-skin an interface provides designers with the *means* to adapt the user interface to better suit individual preferences (in form and function) but does not inform them as to *how*.

2.2 Observing Interaction: Usability Evaluation Methods

Usability Evaluation Methods (UEMs) are one means by which interactive behaviours are investigated. Typically they involve the capture of snapshot data, require interviewing of the participant, or are performed away from the actual context of use. An ideal approach would involve continuous non-intrusive observation over a long period of time in the actual context of use. This provides a number of benefits to the investigation; longitudinal data allows for trend analysis over time and produces more realistic usage data than a snapshot or a low repetition sample. The resulting output describes behaviour over time and contributes towards more robust results. The issue therefore is how to observe user behaviour in context but in an unobtrusive way so as to observe and record natural behaviours.

A number of technological developments have facilitated such remote, non-invasive interaction logging. The increasing ubiquity of both computing resources and network communication means that home networks, which connect domestic devices together, are becoming more commonplace. To truly understand users, measurement of user behaviour should be based on interaction behaviours in their context of use and connected homes provide the means to extract such real life data. Additional developments include broadband Internet access (i.e. “always-on” connectivity) to enable automatic long distance carriage of data back to investigators and programming tools and techniques enabling the description and recording of interactive actions within software applications.

2.3 Log File Analysis and User Interface Description Languages

Log file analysis is a computing tool that is frequently used by programmers and administrators. Logging in computing terms refers to the recording of data or events to a file, for example a security or event log. Other forms of logging include keystroke recording, where all user keypresses are recorded to a file and component message exchange logging, where communication between internal components is measured and recorded [1]. Logging techniques such as these provide the means for user behaviour to be recorded for remote analysis and provides for large participant populations without significant resourcing issues.

The system metrics to be measured are currently under review but typically could include low-level (keystrokes) and high-level user events [1], user event interval times, success/failure rates, frequency feature used and user skin configuration etc. This will provide quantitative datasets that in part describe the user and in part describe the system state, as well as indicators of user preference.

User Interface Description (UID) languages are forms of programming language that enable description of the interface components. By explicitly recording the interaction with these components it becomes possible to directly link the analysis with different interface components.

3 Approach

We envisage that increasingly connected homes and personal technology will mean increased availability of usage data and that existing evaluation methods, including existing UEMs, are not appropriate for the nature of the longitudinal data produced by online interaction logging. To this end we are developing a skinnable web radio application as a first prototype and a proof of concept for an empirically based tool for capture and analysis of user interaction logs. The radio will offer the user the ability to listen to a selection of Internet radio station, as well as features such as volume control, channel selection and skin selection. Being written into the program code are markers that allow for the required creation of log files for recording interaction. The log files will be periodically transmitted to a central database where it will be recorded for later analysis. All users of this application will have a detailed questionnaire to complete at installation of the software, to record a number of user metrics. These user metrics will be used to construct a user profile. Due to ethical limitations potential metrics are currently under review but may include: user age, user gender, personality dimensions, intelligence measures, domain experience, ergonomics/anthropometrics, perception, psychological classification metrics, geographical location etc. By correlating user profile with logged system behaviour we hope to establish an alternative means to enhance user profiling in a non-intrusive manner (i.e. not using user questionnaires). The output from these analyses will be given to designers and used to redesign skins based upon the results. The redesigned skins based will be redistributed to users with usage data logged to determine behavioural change. These analyses will provide user and group profile information designers currently lack. In so better understanding user and usage, designers are able to provide interfaces designed for particular user groups as opposed to general users, providing the means to design more towards the individual and away from average.

References

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