

# Personalising Interaction using Profiled User Interface Skins

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**User interface skins allow users to change the user interface quickly and without specialist knowledge. Skins facilitate customisation and personalisation of the user interface but there is limited information available to designers and users as to how interface skins can be most effectively used to enhance interaction. This research investigates whether more personally relevant user interface skins can be developed through a better understanding of the user population by isolating subsets or types of user within large user populations according to multiple factors including individual differences, as opposed to individual similarities. A research environment has been developed to enable remote collection of interaction data and user profiles using log file recording to facilitate large participant numbers.**

*User interface skins, log file recording, log file analysis, reskinning, individual differences*

## 1. INTRODUCTION

User interfaces have historically been static – in that the user interface itself could not be changed, unless the application itself was rewritten by a developer. Software engineering methods are now separating content from presentation [1] and this has meant that it is much easier to produce multiple user interfaces for a single application. This ability has meant that user-selectable user interface themes, or “skins” as they are commonly known, are becoming a feature of many applications. User interface skins are considered to be the graphical and auditory components of the user interface that the user directly interacts with. A skin may feature cosmetic changes, such as colour and sound palettes, or a fundamentally different user interface not only in terms of appearance and sound, but specifically in the position, shape and size of any interface components. Furthermore, user interface skins allow the user to change the user interface quickly and easily, without needing to reprogram the application itself. The problem is that users are now able to change the quality of their own interaction by changing the user interface, but there is little research available as to how best user selected user interfaces can be designed. Even so, user interface skins have the potential to improve interaction by providing a more personalised or more customised user interface (and subsequent interaction) than offered by a single generic user interface that has to accommodate all users.

User interface skins facilitate the customisation and personalisation of user interfaces but in order to produce such tailored user interfaces, interaction and user interface designers need to understand the target user population in greater detail than is currently available. However, User Centred Design (UCD) seeks to improve interaction by placing the user at the centre of the design process – in order to “know the user” [2]. However when designing user interfaces for widespread distribution with large user populations (e.g. mainstream personal computer applications such as word processors and Internet web browsers) knowing the user beyond basic demographics is of limited value because of the lack of ability to accommodate individual differences in a single user interface design. As a result of this, and in striving to remain user-centred, typical or average users of the interface are represented in the design process. Given the diversity of users within general populations and the multitude of potential user requirements, making assumptions about the target user population is a practical means to adhere to UCD when designing for large populations. For example, ergonomists define general populations according to a 90<sup>th</sup> percentile guideline [3] so that assumptions can be made of the intended users. The problem with this approach is that it focuses upon individual similarities by reducing the intended user population to a broad description of typical users. This does not take into consideration any individual differences, and explicitly excludes them from a user centred design process in order to keep design constraints to a reasonable level.

This research investigates whether individual differences can be used to inform the design process as well as individual similarities, and if so, which individual differences are relevant to the design process. Rather than designing for the average user [4], it is hoped that a more personal interaction may be produced by designing for subsets of a general population – for different types of user. The output from this research is to provide interaction designers a framework within which to develop effective user interfaces through a better understanding of large anonymous user populations.

## 2. APPROACH AND METHODOLOGY

The research approach being taken is to investigate whether correlations can be found between interactive behaviours (derived from log files) and user profiles (derived from questionnaire data), and then to construct a predictive model of interaction based upon recorded log file data. This will inform the design process by providing designers greater information about types of user within the larger user population, and this then allows for a more

tailored user interface to be constructed for users of a certain type (profiled user interface skins). In addition, such a predictive model prevents the need for self-reporting by users in answering multiple profiling questionnaires. By correlating behavioural data with questionnaire data it is hoped that the observed interactive behaviours can be better understood and designed for. A large participant population is required for this research for two main reasons: (i) to ensure variance in individual difference factors to define subsets of the larger population and (ii) to ensure that there are enough subjects in each subset to be a representative distribution. In order to be able to collect as much data as possible to represent a large user population this research is being conducted in a distributed manner as an efficient means for handling large numbers of participants. This entails collecting user and usage data remotely from within the actual context of use by using log files to capture interactive behaviours and then transmit them back to a central database. It is by segmenting a general population by individual differences using recorded interaction behaviour and then designing for the users of these subsets that it is hoped a more personalised interaction can be achieved, as opposed to a generic interaction intended for any user within a general population. To this end the experimental methodology can be summarised as (i) extracting personality information and construction of user profiles from log file data and (ii) relating user profiles to profiled user interface skins.

## 2.1 Research Environment

An Internet web radio application has been developed to support this type of external research in the actual context of use. A web radio was chosen as the experimental application because of the limited functionality, and subsequent interface requirements. It allows for enough breadth of interactive behaviours without being overly complex. The web radio features the ability for the user to change the user interface skin and logs any user interaction with the application. These logs are then transmitted to a central database for collation and analysis. The web radio has been called ProSkin (Profiled Skins) and is a two tier application. The ProSkin client is a .NET based Internet web radio that allows the user to listen to radio stations broadcast over the Internet. The client also features the ability to administer profiling questionnaires and then return the results to the server. Currently two questionnaires are included: a general questionnaire to profile the user in broad terms (age, gender, language, handedness etc.) and a version of the IPIP-NEO [5] personality inventory (open source version of Costa and McCrae's NEO P-I-R[6]). Additional questionnaires are being developed for use, including a version of BIS/BAS[7] and STOMP[8]. User interactive behaviours relating to the applied user interface skin are recorded, such as mouse clicks and hovers, radio station directory search and sort behaviours, and radio stations listened to. All log file recording is performed after participant consent and all questionnaire results are delivered immediately, and anonymously (double-blind as all interaction data and questionnaire results are stored against a random ID).

## 3. CURRENT STATUS

The ProSkin research environment is feature complete and in alpha testing, with a small first beta test to 10 users scheduled for June 2005 (status page available at <http://www.proskin.org>). Once beta testing is complete the ProSkin web radio client will be made available publicly and actively promoted for participation. The first datasets are anticipated before August 2005.

## 4. FUTURE WORK

Providing that subsets can be identified by certain individual difference factors, one of the challenges for this research and any future work in this area is to be able to provide user interface skins that target the factors describing the subsets of the larger population. For example if extroversion is found to be correlated with button clicking speed, how can an interface be designed that improves interaction for extrovert users? This research shall investigate this by developing and distributing skin variants and mutations that control for specific interface features as a means to isolate the affecting components of the design.

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