ManDown - A Social Drinking Management App: Application User Interface - Component Report

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***Abstract*— This component report investigates the design and implementation of the Application User Interface for ManDown, a social drinking management app. The project aims to manage alcohol usage through reducing the incidence of intoxication, and therefore reducing the long-term health ailments imposed by its occurrence. ManDown accomplishes this by determining a user's inebriation levels, and then offering advice on how they should safely proceed with further consumption. Intoxication will be determined through combining and analyzing multiple independent data sources, ranging from spatial sensors on mobile devices, to smart-watch heart rate sensors. Additionally, users will have the opportunity to actively input data, by manually logging consumption quantities, and engaging with games designed to test certain user characteristics. As users will be interacting entirely with the mobile application, both in terms of inputting data and receiving intervening output, it is of paramount importance that the interface design of the App is easy to use and appealing to users, incentivizing them to engage with the App and consequently increasing the chances of successful symptom management [1]. This report examines key user-centered design principles and how they can be applied to lock-in users, and provide them with useful management procedures. The paper also details initial design concepts and outlines future works.**

I. Introduction

The success determining factor of a mobile Healthcare application, is not only the functionality and performance of the system's architecture, but also the enjoyability of the experience while interacting with the App [2]. The easier an App is to use, and the more aesthetically appealing it is, the greater the chances a user will return and engage with the App in the future. This is of paramount importance for ManDown, as its effectiveness depends directly on users frequently visiting the App, so that the Healthcare system can receive both active and passive input, as well as providing management output when necessary.

User-Centered Design (UCD) principles and techniques will be explored and utilized to ensure the App conforms to the needs of users, both practically, and emotionally. Studies have shown that young adults (16-35 years of age) are most frequently admitted to hospitals due high intoxication levels [3]. This makes them the primary demographic targeted by our application. As such an interface will be designed to fit the needs of their User Persona.

A. Target Demographic

The aforementioned mentioned age group, otherwise known as the Millennials, has been the subject of many psychological studies and research in recent years, revealing much about general social habits and viewing behavior. Studies revealed, large portions of the demographic resort to social media, such as Facebook and twitter, amongst others, for temporary relief from issues they may be facing. Receiving 'Likes' or messages on these social media platforms, acts as an affirmation ones self-worth and belonging, and consequently releases dopamine in the brain [4]. It is this very same feel-good' chemical compound, that is released when one smokes tobacco, gambles, or drinks alcohol [5].

Instead of turning to friends or families, these young adults choose to turn to their devices, social media and alcohol for stress relief. ManDown hopes to engage this demographic so that they may use the App and improve their long-term health prospects. Hence to capture the attention of this group, ManDown should offer its own means of instant gratification, through competitions, rewards, and social interaction. This can be realized through the implementation of games which would not only appeal to the instinctive desires of the target audience, but also act as an active means of gathering indicative intoxication data, such as response times and motor skills.

B. Related Mobile Apps

Smartphone Health Care Apps are growing in popularity, with 247 Million people downloading health related apps in 2016 [6]. Such apps are playing a key role in numerous health promotion initiatives. Studies have shown that Health Apps, such as 'Let's get Wasted!', are effective in managing people suffering from long-term alcohol dependence by offering support, resources, and information to combat their symptoms [7].

However, the limiting factor with numerous health Apps analysed in the study, is that they're management solutions depend entirely on manual input from users. The ongoing repetition of entering consumption data manually eventually bores users, and causes them to stop using the App altogether.[8]. Consequently the ManDown App hopes to create a captivating experience that will lock-in users through a user centered interface, complemented by gratifying games, as well as an intelligent intoxication identification system which allows for autonomous intervention and management,

II. User-Centered Design

User-Centered Designs are design processes which place great emphasis on the needs of end-users throughout the design's conception. There are a variety of ways in which users are involved in UCD ranging from product surveys, focus groups, to beta testers. The influence of end-users is particularly important during the requirements specification

phase of the interface design, so that late feature additions can be minimized [9].

Key principles supporting the creation of effective user interfaces, based on User-Centered Designs in industry and academia are outlined below [10].

1) Enable shortcuts: As frequency of use increases, the number of interactions needed should reduce to increase the pace of interaction, to avoid user fatigue. Abbreviations, and macros should employed to hasten a user's tasks.
2) Offer feedback: For every action or operation there should be an affirmative response. For frequent, minor actions, such as entering consumption quantities, the response can be modest. A substantial response for infrequent, major actions, such as requested emergency help.
3) Support self-control: Users have a desire to sense that they are in charge of the system and that it responds to their commands. Design the system such that users are the initiators rather than the responders. Although this approach enhances the users experience, in the case of a health care Apps it is a challenge to maintain, as the core principal of operation depends on offering intervening output to manage users symptoms.
4) Simple error handling: System should be designed so input errors can be identified, and offer simple mechanisms for amendment or reversal.
5) Reduce short-term memory load: When in the mobile environment, a user has to potentially deal with more distractions than with a desktop computer [11]. Combined with Human short-term memory limitation, leads to the need of simple displays, which require little memorization to perform tasks [12].
6) Dynamic Context Design: Users may be in different circumstances when they may have one, or both hands occupied while using a mobile device. Therefore App design which allows for operation for 1 or even 0 handed operation should be considered [13]. Using alternative interaction modes for outputting data such as sound can be beneficial [14], however may be inappropriate for bar or pub settings, where both volume and privacy is a concern.
7) Offer Personalization: Different users have different usage patterns, preferences, and threshold levels. So it is important to allow for variations among users. These will range from display option, such as text size, to preferred alcohol consumption

Moreover no feature should be added to the product, due to ease of implementation. The most important aspect of the UCD process, is to provide the user with the real usage context [15].

III. Interface Implementation

The ManDown App will initially be designed for Android systems. The chosen development platform is Android Studio running the 'Kitkat' version (4.4) of the operating system. Although some Android devices operating using older system version, 'Kitkat' was elected as it offers smart-watch APIs, which the App intends to use for data collection, as well as management, purposes.Newer versions of Android were not chosen, even though they offer greater API support, so that we maximize the user base that can use ManDown. Moreover, all Android versions are backwards compatible, hence those with the latest operating system can still download and access the ManDown App [16].

A. Feature Requirements

The required features to support the intended functionality of the project scope are outlined below. These were determined by conducting a focus discussion amongst the project team members, all of whom belong to the target demographic group.

1) Manual User Input: Mechanical input is used to collect specific consumption data from the user. This mechanical input may be independently input by the user, or the user may be prompted via an appropriate trigger, such as identifying a drinking gesture via smart-watch sensors, or due to being in the vicinity of a bar or pub.

2) Intoxication level display: The estimated intoxication level must be available for users to view.

3) Trends display: The past history of a user's intoxication and consumption levels must also be accessible to users. This aids users in appreciating the patterns of their drinking which could help them self-manage their consumptions

4) Managing output: The application must also offer user's personal recommendation on how to manage their alcohol intake to be within safe limits. The App must also have an absolute safety measure which can help the user, even if they're completely inebriated and cannot be held responsible for their own safety.

5) Option personalization: Lastly users should be able to update their display settings to suit their needs as well as their maximum intoxication threshold. Giving users a greater sense of ownership and control over the App.

B. Design

Preliminary user interface designs were undertaken with the 7 mentioned design principles in mind. Additionally, colours and graphics were chosen that convey happy and or comedic impressions. This is to keep users away from negative perspectives which they may be more susceptible to, due to being in a vulnerable, inebriated state.

The Home Page layout was based on the De facto navigation regime illustrated in figure 1, whereby re-visualization of the main screen is minimized by placing navigation buttons, which direct to other screens, below and above the main content [17].

Figure 2 displays the first iteration of ManDown's Home Page. A top-down approach was adopted which presents high-level information first and allows users to decide whether or not to retrieve the details. For instance the current intoxication level is displayed graphically by a pint of beer, with the level of beer in the glass representing how inebriated

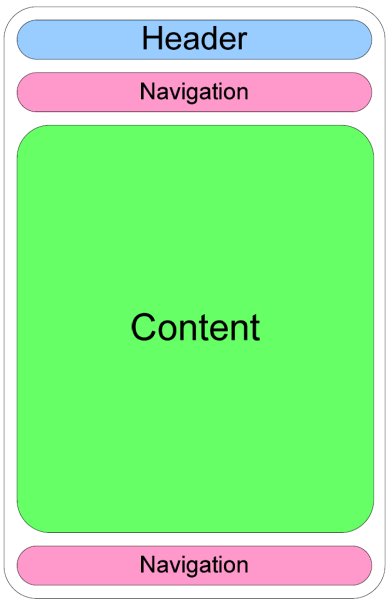

Fig. 1. Prominent Navigation Design [18]

Fig. 2. ManDown Home Page Interface Prototype

the user is, with a full glass meaning the alcohol intake limit has been reached. Clicking the beer glass would direct users to another screen displaying further information in regards to the current drinking session, including units consumed, preferred drink (if inputted), and how many more units can be safely consumed.

Additionally 3 graphical buttons below the intoxication display are used which direct to games, history, and the consumption journal. Again graphical buttons are used to make it easy for users to identify the conceptual model of the system, the alternate actions that can be taken, and their resulting execution. At the top left of the page we have an Options icon, which would direct users to another screen displaying the different settings that be amended. One possible means of personalization, would be offering different beverages, such as glass of wine, or a cocktail, as the graphic which displays the current level of intoxication. On the top right we have a contact help button.

IV. Active Input Processes

The application interface will involve users manually logging consumption quantities as well as data collected from the user engaging with games.

A. Prompted Queries & Personal Logging

A query, prompted by an event which suggests that the user may be consuming alcohol, will be triggered to ask the user whether they are indeed having an alcoholic beverage and if so they will be asked to enter the number of alcoholic units it contains (a unit being 10ml of ethanol). This could be done in the form of tapping a generic drink, such as a pint of beer, glass of wine, or shot of liqueur. The different drinks will have the standard number of units encoded.

This graphical approach will be adopted to simplify the process for users, so that the need to type in values is eliminated, thereby making it easier for users to comply with the query, no matter where they may lie on the spectrum of intoxication. A similar approach will be used for the manual entry journal, however this would offer the users numerical input as well for greater flexibility if they so desire.

B. Gamification

Games will be available to test user characteristics, providing other indicative metrics to be used in the evaluation process. Additionally, users can have the option of grouping up in a party, allowing them to view permitted statistics and compete for game high-scores. Potential implementations are highlighted below

- Whack-A-Beer: A game which involves tapping beers as they exit ice buckets, while avoiding bombs. This will allow ManDown to measure user reaction times.
- Tightrope Waiter: A game where players walk in a straight line while trying to keep the phone parallel to the ground in order to balance A virtual drink in the centre of the screen. Movement fluctuations measured through the phones gyroscope, will then be used to measure loss of fine motor control and walking pattern. Other games may also be permitted which explore multiplier aspects, expanding on the social theme of the App.

Additionally, if time permits, user progression system will be implemented, which awards badges to users based on how often they check-in when drinking alcohol. The badges rank users based on the frequency of check-ins and offer titles such as ‘Newbie’, progressing towards badges such as

'Liquid Lunch' and 'Brew Master'. This system increases the amount of direct user input as it would incentivise users to compete with each other among their social group within the app[19], in turn adding a valuable metric to be incorporated in the machine learning algorithm.

V. Drink Management

A. User Warnings

Health risks of alcohol consumption are minimised by consuming a maximum of 14 units per week, and no more than 5 units in a single sitting [20]. To manage consumption within these limits, ManDown provides intake recommendations to warn users if their consumption approaches either threshold, displaying how many more units they can consume safely. The recommendation system could be personalised by providing specific warnings to each user. If a user has consistently consumed 5 units of alcohol on both Saturday and Sunday evening, then a 'Stop drinking tonight if you want to enjoy the Weekend!' notification appears if 6 units are consumed over the current working week.

B. High Alert Intervention

The consumption warning system relies on direct user input of alcohol intake, which users may or may not provide. Consequently, a more robust management system will be employed to mitigate the risks of extreme intoxication. When high levels of intoxication are identified via autonomous methods, and users are found to be motionless, indicating they have been incapacitated, ManDown will inform the user's friends of their whereabouts and their need for help. An additional solution would be to contact emergency health services; however, this approach will be disregarded for the current evaluation and testing scope.

VI. Testing and Future Work

To validate the design of the user interface, we will conduct a pilot whereby a prototype will be distributed to testers to ascertain its effectiveness with real user contexts. Those involved in the pilot will complete a survey, which would ask users to rate the features they used based on attributes such as clarity of purpose, ease of use, aesthetic appeal, and functionality. The results would then be used to make improvements where possible

The next step would be to build upon the Home page interface by designing the subsequent screens for the various features. Once the screen flow is finalized, the front-end user interface will be combined with the remaining sensing and processing modules, as well as data server, to produce a complete prototype system.

VII. Conclusion

Being a Mobile Healthcare Application, The user interface design for ManDown plays a crucial part in achieving its objectives as a social drinking management app. A well designed user interface can attract the initial user base, while the performance of the system, and functionality of management output, can keep them using it. The user-centered design methods, and feature requirements, proposed by this paper, will act as a constructive foundation for further developments to ManDown's Application User Interface. Through combining appealing aesthetics, gratyfying games, and critical user features, with intelligent, autonomous intoxication identification, ManDown can succeed where all other alcohol apps have failed, to be the De facto Drinking companion across all mobile platforms, which helps users enjoy their drink responsibly and safely.

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