Using Ratings to Profile Your Health

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ABSTRACT

The widespread adoption of mobile technology allows personalised applications to be deployed in an increasing host of contexts; user modelling, profiling, and personalised recommendations are becoming an integral component of mobile information systems. Furthermore, mobile technology enables the recording and collection of facets of daily life, which has given rise to the notion of the *quantified self*; researchers operating at the intersection of computer and social science are now seeking to understand how these mobiles' data can aide the design of health interventions and inform future psychological and social science research. In this work, we describe the design of a personalised mobile application that seeks user feedback and builds a user profile about people's gastrointestinal health using ratings and tags. We describe the application's design and the personalised health insights it provides (and, particularly, why recommendations were not designed as a means for self-diagnosis).

Categories and Subject Descriptors

H.5 [**Information Interfaces and Presentation**]: General; J.3 [**Computer Applications**]: Life and Medical Sciences

General Terms

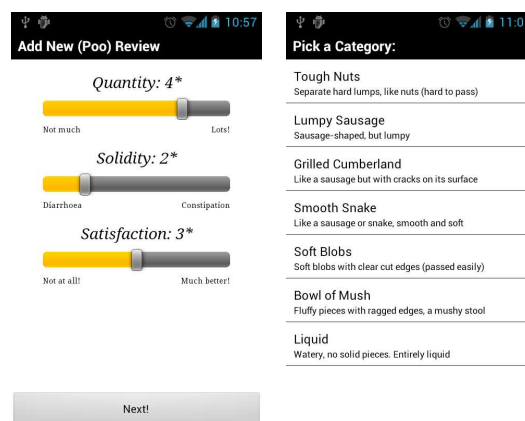Design, Human Factors

Keywords

Health, Android Application

1. INTRODUCTION

Mobile phones have become items that we keep within arms length throughout over 75% of the day [1]. Moreover, by ubiquitously connecting us to the web at all times, they are allowing for personalised information systems to be designed and deployed in contexts where they were previously

(a) Initial Ratings (b) Bristol Stool Chart

Figure 1: Adding ratings to *The Poo Review*. The user (a) first gives 3 ratings for *Quantity, Solidity,* and *Satisfaction*, and then (b) selects a category from the Bristol Stool Chart.

unavailable, such as health, where recommendations can be used to intervene on and change people's behaviour. There is a rising interest in using mobile phones to deliver personalised health-related interventions by, for example, monitoring people's mood throughout the day [2]. Historically, however, systems that aim to help people manage aspects of their health have been web and survey-based [3] and lack the data granularity and personalisation that recommender systems offer. For example, systems that help people manage minor bowel problems [4] lack a means for users to see if their health is improving, receive personalised information, or check if their goals are being met. We posit that the interaction techniques used in online recommender systems can be used in mobile applications to overcome this deficit. This work describes the design of a mobile application, *The (Poo) Review*[1], that uses ratings and tags to allow users to quickly input data about their gastrointestinal health and receive personalised information about their bowel's habits.

2. APPLICATION DESIGN

An application for the scenario above has two main goals: it should allow users to anonymously *input* data and create a personal profile and convey personalised, *educational*

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[1] https://play.google.com/store/apps/details?id=com.poo.review

information about the user's health; we designed an application for experience sampling [5] with personalised feedback. The main task of the application is for users to review their current bowel movement via a 4-fold review process: (1) **Numerical Ratings**: users are asked to give a 1-5 star score for the *Quantity*, *Solidity*, and the *Satisfaction* of passing their current stool (Figure 1(a)). (2) **Categorical Choice**. The second step asks users to tag their review with a category from the 7-level Bristol Stool Chart (Figure 1(b)), which was defined in [6] as a means to monitor stools' intestinal transit time and assess the effectiveness of treatments for bowel diseases. (3) **Current Location**: the user then has the option to add their current location from a pre-defined set of options (e.g., "Restaurant"). (4) **Textual Feedback**. Finally, users have the option of adding a short comment to their review.

Submitting a review results in instant feedback (Figure 2(a)), which comes in two forms. (1) **Personalised Feedback**. The user is given a fact that has been computed from the set of ratings given to date. A range of candidate facts are possible, relating to both time (e.g., the user's 7-day frequency average, the number of reviews in the last 24 hours, the time of the last review), and category (e.g., the last time they input a review with the same category): a personalised fact is chosen randomly from the available candidates. (2) **Generic Fact**. The bottom half of Figure 2(a) is a generic fact under a "Did you know?" heading. These facts have been collected manually from Wikipedia, and include snippets about defecation, the digestive system, minor bowel problems, and healthy eating. The server also returns the Wikipedia link to the source of each fact, which is used to set the target of a "Read More" button that accompanies the snippet. The set of reviews that users input are also used to create a user profile, which is also split into two halves. The first section reports the user's 7-day statistics (number of reviews, average reviews per day). The second section contains the aggregate data. This includes both the total number of reviews as well as distributions of aspects of the reviews: for example, Figure 2(b) shows the aggregate distribution of categories selected by the user.

3. DISCUSSION AND CONCLUSION

This paper has introduced the design of the *The (Poo) Review* Android application: a tool to rate and tag bowel movements in order to generate and deliver personalised health information. Future iterations of the application could extend this in order to visualise correlations between activities, moods, and health (e.g., comparisons with what you eat or other aspects of users' lifestyle).

The current version of the application allows users to review their bowel movements without linking their data to any means for automated diagnosis or comparing them to any notion of "normal" behaviour. Furthermore, personalised facts about reviews are presented as-is, without any qualitative information appended. This was a specific design decision: not only do we assume that the definition of *normal* may be culturally-dependent, but Internet-based interventions for those with bowel problems actively encourage people to *not* over-monitor their bowel movements as this may lead to stress (from questioning whether they are "normal") which may exacerbate any pre-existing problem. Conversely, it would be rather straightforward to encode a means to detect and alarm the user if reviews clearly reflect,
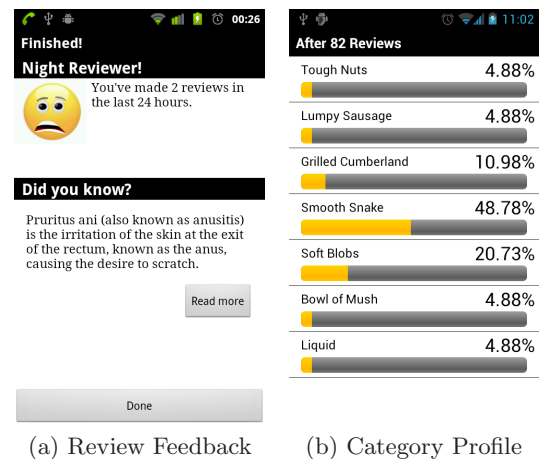

(a) Review Feedback   (b) Category Profile

Figure 2: (a) Example feedback that the user receives after "flushing" a review, including personalised and generic facts, and (b) an example from the user's profile page, showing the distribution of categories generated by all reviews.

for example, early symptoms of bowel cancer [7]: the relation between recommendations and the delivery of health interventions is thus an important issue that future recommender systems in the health domain must tackle.

This application is an initial step into uncovering the potential of merging facets of mobile and recommender system technology in order to tackle the broader context of behavioural intervention via personalised interaction and monitoring techniques. Ratings and tags have become the standard method for web sites to solicit preference data and for users to quickly interact with web content: in the future, similar methods may be used in health-related contexts in order to achieve similar levels of data granularity and analytic insight.

4. REFERENCES

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