User Modelling Using Social and Game Principles

Peter KRÁTKY*

Slovak University of Technology in Bratislava
Faculty of Informatics and Information Technologies
Ilkovičova 3, 842 16 Bratislava, Slovakia
kratky.peto@gmail.com

User modelling is an essential part of adaptive systems because the user model represents the data relevant for adapting/personalizing the user experience. In our project, we are interested in a generic type of user modelling based on personality traits. Our goal is to identify user's personality within information systems in general, and computer games in particular. Classic methods based on questionnaires hinder smooth user experience especially in games that should provide entertainment. In our research, we explore to what extent the personality-based user modelling can be conducted unobtrusively in computer games (information systems). Games are interaction rich artefacts, and identifying player's personality while he/she enjoys the game provides significant factor for further personalizing the gaming experience according to player's psyche. Games are different, and various game mechanics can work differently with different players' personality profiles.

In order to study effects of player's personality on games in general we have designed a feature-rich causal browser game in which different game mechanics, functional components of a game (points, leaderboard, challenges, timer) [], can be turned on/off based on the user experiment design. The game is tracking both the user interface actions and game actions, providing a complete footprint of user's personality in terms of the manifested game play. Correlating the activity logs with different personality measures (Big Five and Index of Learning Styles, in our case) reveals the relationships between player's personality and game play.

The core principle of the game is to collect reward by eliminating shapes placed in a grid using the mouse cursor (mouse move over the shape). The shapes appear on the grid in different sizes and different rewards. The whole game consists of several short levels lasting 30-60 seconds, which difficulty rises with its number. Other gaming features, which correspond to the game mechanics we are studying in our research, enrich this core game play. Points are awarded for eliminating shapes so that bigger shapes receive lower rewards compared to the smaller shapes. The leader board

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displays current position of the player in comparison with few other players. Challenges game mechanic is in the form of objectives to fulfil, specifically, eliminating specific sequences of shapes. Skills game mechanic is integrated as characteristics that player can improve in (fast hits and sniper hits).

The aim of our experiment is to collect relevant data from game play, process and analyse it and evaluate model of predicting player's personality. We have designed several experimental groups each having game with different game mechanisms enabled. Logged raw data (e.g. position of a new shape in the grid, type, position of eliminated shape and duration in the grid) are is aggregated into numeric indicators that are then correlated with the personality measures (Big Five and Index of Learning Styles) obtained by questionnaires. The first groups of indicators hold characteristics of mouse controller usage (average movement speed, percentage of time inactive, etc.). The second group of characteristics deals with game mechanisms (number of points, challenges, skills per minute, etc. and availability of mechanisms coded 0/1).

We have conducted our study in a web-based platform Peoplia, and have collected data on 65 players (university students), totaling 601 game levels played. We have examined how the Big Five factors influence interface indicators using correlation analysis and the results based on 12 users who reached at least Level 9 show high correlations of neuroticism with mouse speed (0.53), path efficiency (-0.56) and hits success (-0.53) and high correlations of agreeableness with inactivity (-0.62) at the significance level 0.10. We constructed a regression model for predicting traits based on interface interaction can be used to determine neuroticism and agreeableness with the coefficient of determination R^2 0.49, 0.40 and p-value 0.13, 0.03 respectively.

To summarize, in our work we seek possibilities to predict player's traits according to game log by exploring influence of personality traits of the player on his/her game play. We have designed a browser game which tracks both interface and game play characteristics. We found interesting correlations of interface actions and personality traits. We continue with analysis of game features influence on game play of players having different personalities.

References

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