Analysis of Interactive Problem Solving

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This study aims to analyze the way users solve interactive tasks in the world of information technology. The main objective of this work is to examine the relationship between personality traits of players with their gaming expressions and thus creating a characteristic model of gameplay behavior for each characteristic group of players. An additional aim is to explore the impact of gaming conditions on emotional responses of players.

For this purpose we designed a casual browser turn-based game Hexa with logical and strategic elements. The game contains 15 levels that are formed by different hexagonal game map with predefined shape. Each game-map cell has one random color out of several available colors and can create a union with its neighbor cells of the same color. The core principle of the game is to occupy as many cells as possible. In each turn, player picks one of the available colors, and the cells of the selected color which are neighbors to previously occupied cells are occupied by the player in the current turn. Every level can be played in 4 different game modes: player against none, player against computer, player against player on 1 PC, player against player on 2 PCs.

During playing of the game, we track player's in-game interaction like mouse moving and clicking, colors picked and game time. Our aim is to collect data that reflect player's gameplay in comfortable conditions. Playing the game in calm conditions is necessary to create precise model of gameplay that we want to link to player's personality. The personality is measured by Big Five personality test consisting of 60 questions. We adjusted the results for population of Slovakia. Logged raw data are used to compute multiple gameplay indicators as mouse movement speed and effectiveness, speed and the level of optimality of player's moves. All players will be divided into several groups based on their personality traits and for each group we would search for its characteristic gameplay indicators.

For next experiment we want to track player's gaze by eye-tracker. The experiment consists of multiple eye-tracked levels for each player. The first would be used to calibrate eye-tracker to fit conditions of current player (head-display distance, eyes positions…) and the others would be used to create characteristic model

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representing a way the player is analyzing the game map with his gaze. We assume that data from eye-tracker would be accurate enough to show us precise trajectory and speed of player's gaze, the time when eyes movement stops and game map regions having the greatest player's attention. We are interested in correlations between created model and player's personality.

The aim of the last experiment is to demonstrate the impact of gaming conditions on emotional responses of players. The different gaming conditions are represented by 4 game modes. We assume that playing the game against different opponents would create different emotional response – fun. In this experiment, players will be divided into pairs (buddies), where for each player we would measure his galvanic skin response during playing games against different opponents. The first measurements will be made while playing the game without opponent. The second measurement will be carried out while playing a game against AI-controlled opponent. The third series of measurements will be conducted as well as the previous, with the only difference that the opponent in the game players would be his buddy (second member of the pair). Last measurements would be again during playing the game between friends, but in this case will be played on one computer while players would alternate after each move. We assume that the physical presence of both players of a pair would be important in this case, because by this measurement we want prove that physical contact during playing multiplayer game increases emotional reactions compared to playing against each other "at a distance". Players in all series of measurements will play a few games with the measured values of skin impedance which would be then averaged to average skin impedance for every game mode. By projecting the averaged values in a chart we will be able to capture the differences of the entertainment value of the game depending on the selected game mode.

The results of this project imply to create a model that helps us better understand player's game play influenced by his personality traits. This model may be used by game developers to make their games or applications with interactive content better balanced for every targeted player or user.

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