Instant Measurement of the Difficulty Level of Exergames with Simple Uni-dimensional Level Goals for Cerebral Palsy Players

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Abstract. In this paper we propose a solution to introduce a function for difficulty degree of achieving a simple, uni-dimensional goal of a level of an exergame. This solution, takes advantage of a statistical method built upon the results of the specific cerebral palsy (CP) player under study, inspired from normal distribution. It is appropriate for CPs, since it favors a content-based approach which is formed upon each player's personal results. Using a population of 20 CP patients trying to achieve the goals of games, we arrived to an 85% correlation between number of goal achievement failures and our introduced difficulty function.

Keywords: Difficulty degree · Exergame · Cerebral palsy

1 Introduction

Cerebral palsy (CP) is a group of permanent disorders of movement and posture, causing activity limitations, which are attributed to non-progressive disturbances of developing brain [1]. It is the most common motor disorder among children, affecting approximately two children per 1000 live birth. One in five children with CP (20%) has a severe intellectual deficit and is unable to walk [2]. Many therapies and rehabilitation approaches exist to improve their quality of life. Physiotherapy is considered one of the most beneficial and effective parts of the rehabilitation process [3]. To increase the motivation of these patients, rehabilitation should be interesting, for example, through gamification. Rehabilitation computer games are gaining more attention of the scientists and health care providers for this reason [4]. They offer even bigger potential to draw player's

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