Designing Affective Video Games to Support the Social-Emotional Development of Teenagers with Autism Spectrum Disorders

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Abstract. Autism spectrum disorders (ASD) are a group of developmental neuropsychiatric disorders, comprised of three diagnostic entities – autistic disorder (AD), Asperger’s disorder (AS), and Pervasive Developmental Disorder Not Otherwise Specified (including atypical autism) (PDD-NOS). A number of intervention techniques are currently used to reduce some of the associated challenges, with techniques ranging from behavioral therapy to dietary interventions and traditional counseling. This positional paper proposes the use of video games which leverage affective computing technologies as intervention in autism spectrum disorders in the context of the use of traditional play therapy with adolescents, who may feel uncomfortable engaging in traditional play with toys they may be too old for. It aims to explore the potential for greater ‘social physics’ made possible by affective computing technologies. This involves computationally ‘recognizing’ emotions in a user, often through the use of multimodal affective sensors, including facial expressions, postural shifts, and physiological signals such as heart rate, skin conductivity, and EEG signals. However, it is suggested that this should be augmented by researching the effect of social game design mechanisms on social-emotional development, particularly for those who experience difficulty with social interaction.

Keywords. Affective Computing, Autism, Video game applications

Introduction

Autism spectrum disorders (ASD) are a group of developmental neuropsychiatric disorders, comprised of three diagnostic entities – autistic disorder (AD), Asperger’s disorder (AS), and Pervasive Developmental Disorder Not Otherwise Specified (including atypical autism) (PDD-NOS) [1]. The characteristics of autism vary from person to person, though each sharing the common elements of impairment in social interaction, social communication, and social imagination. Individuals diagnosed with autism may have difficulty making eye contact with others, find it difficult to make friends, may not understand other peoples’ emotions, and have difficulty managing their own emotions. A number of intervention techniques are currently used to reduce some of the associated challenges, with techniques ranging from behavioral therapy to dietary interventions and traditional counseling.

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There has been some limited research into the use of non-directive play therapy in treating autistic children [2]. Traditional play therapy literature often cites the work of Huizinga [3] and the influential Homo Ludens, hailing the inherent benefits of play as well as the natural tendency for humans to engage in play-related behaviors at all stages in life. Gallo-Lopez and Schaefer [4] further observes that playing continues into adulthood, negating the idea that adolescent developmental tasks should preclude participation in play for therapeutic purposes. However, adolescents may feel uncomfortable engaging in traditional play with toys they may be too old for. Moreover, as it is the fastest growing developmental disorder, the cost of trained personnel will be increasingly expensive [1].

1. Aims

Thus this positional paper proposes the use of affective video games as an intervention in autism spectrum disorders. Games designed primarily for entertainment should be modified to leverage affective computing technologies in order to engage autistic teenagers on a social, emotional, and behavioral level. This is particularly relevant, given the close affinity autistic teenagers feel for technology and games [5]. Griffiths [6] reviews the literature in using video games in therapeutic settings, and argues that in the right context, video games can indeed have a positive therapeutic benefit to a large range of different subgroups, including children with particular emotional and behavioral problems (ADD, impulsivity, and autism).

The research also aims to explore the potential for greater ‘social physics’ made possible by affective computing technologies. This refers to computationally ‘recognizing’ emotions in a user, often through the use of multimodal affective sensors, including facial expressions, postural shifts, and physiological signals such as heart rate, skin conductivity, and EEG signals. Recently, such work has been applied to social-emotional computing applications to support high-functioning individuals with autism spectrum disorders [7] [8] [9]. However, it is suggested that this should be augmented by researching the effect of social game design mechanisms on social-emotional development, particularly for those who experience difficulty with social interaction. This addition of principles of video game theory extends current nascent research into affective technologies for autism, by providing a framework with a “variable and quantifiable outcome”, one to which “the player feels attached” [10].

Additionally, such affective technologies need not be limited to traditional, ‘sedentary’ games; instead, game structures could effectively augment real-world social interactions. Such games are known as mixed reality, augmented reality, hybrid reality games, or even pervasive gaming, or ubiquitous gaming, though it can be defined broadly to games utilizing technologies that combine the real and virtual in any location-specific way, where both real and virtual information play significant roles [11]. Therefore, it is proposed that affective mixed reality games could be one form of affective game-based intervention for autism as described above.

References