

# IDGEI 2014 – 2<sup>nd</sup> International Workshop on Intelligent Digital Games for Empowerment and Inclusion

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## ABSTRACT

Digital Games for Empowerment and Inclusion have the potential to improve our society by preparing particular groups of people to meet social challenges in their everyday lives, and to do so in an enjoyable way through games. These games are developing rapidly to exploit new algorithms for computational intelligence supported by increasing availability of computing power to help analyze players' behavior, monitor their motivation and interest, and to adapt the progress of the games accordingly. Intelligent Digital Games for Empowerment and Inclusion (IDGEI) explore the use of machine intelligence in serious digital games. In this introduction and in this context, we summarize the second international workshop on IDGEI held at the International Conference on Intelligent User Interfaces (IUI) 2014.

## Author Keywords

Machine Intelligence; Digital Games for Empowerment and Inclusion; Serious Games; Affective Computing.

## ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

## INTRODUCTION

Digital Games for Empowerment and Inclusion possess the potential to change our society in a most positive way by preparing selected groups in a playful and fun way for their everyday life's social and special situations. Exemplary domains span as far as from children with Autism Spectrum Condition (ASC) to young adults preparing for their first job interviews or migrants familiarizing with their new environment. The current generation of such games thereby increasingly demands for computational intelligence algorithms to help analyze players' behavior and monitor their motivation and interest to adapt game progress.

The development of such games not only requires expertise from the general gaming domain, but also particular

understanding of a game's target domain, as well as technological savoir faire to provide intelligent analysis and solutions. The first international workshop on Intelligent Digital Games for Empowerment and Inclusion (IDGEI) was held at the Conference on Foundations of Digital Games 2013 and aimed at bridging these communities and disciplines by inviting respective researchers and experts to elaborate the latest perspectives and findings in the field of IDGEI together.

IDGEI's topics cover among others aspects of Machine Intelligence in Serious Games, Mobile and Real-World Serious Gaming, Emotion & Affect in Serious Games, Player Behavior and Attention Modeling, Player-Adaptation and Motivation, Novel Serious Games, and User Studies & Tests of Serious Games. In fact, it seems necessary to bring forth existing efforts and major accomplishments in the design of intelligent serious games, and to provide a forum for exchange in experience with intelligent serious games in practice, while encouraging the design of novel applications in context as diverse as health-oriented gaming, general learning and driving environments, or emergency preparation, and to focus on current trends and future directions in the field.

The 1<sup>st</sup> International Workshop on Intelligent Digital Games for Empowerment and Inclusion, IDGEI 2013, was held at the Conference on Foundations of Digital Games 2013 as a Full Day Workshop, 14 May 2013, in Chania, Crete [1]. It provided first insights to a broad scientific community, and created awareness about the international state-of-the-art in the field.

The 2<sup>nd</sup> International Workshop IDGEI 2014 targeted a broad audience of researchers and industrials interested in cognitive system aspects of game interfaces and their impact on human behavior, in the context of social inclusion. The workshop aimed (i) to bring forth existing efforts and major accomplishments in the design of intelligent serious games, (ii) to provide a forum for exchange in experience with intelligent user interfaces and serious games in practice, (iii) while encouraging the design of novel applications in context as diverse as health-oriented gaming, general learning and driving environments, or emergency preparation, and (iv) to focus on current trends and future directions in the field.

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**Workshop format**

The workshop started with a keynote speech by an internationally acknowledged expert in the DGEI. This was followed by the participants' oral presentations. In a break of roughly 60-90 minutes a technical demo-session was particularly suited to convey advancement in the field of Digital Gaming. Finally, to foster discussion and actively involve attendees, a panel discussion involving the keynote speaker and selected experts was held.

Funding was provided from three supporting European Projects (asc-inclusion.eu, masetov.eu, tardis-project.eu) that cooperate in a clustering activity, in collaboration with exploratory policy research led by JRC-IPTS, Spain, and the European Commission, to form a joint initiative on Digital Games for Empowerment and Inclusion [2].

**CONTRIBUTIONS**

The workshop presented the state-of-the-art in the field, focusing particularly on three main thematic aspects, as follows:

**Emotion Recognition and Expression**

Affective computing is a key component in intelligent games for its relevance to transfer social cues, such as, to extract and display motivation and intention for game users. The workshop identified novel aspects in emotion recognition and expression that have a strong impact on game play, such as (i) the analysis of emotion in body gestures as input for high level decision making, (ii) advanced facial emotion recognition for mapping and manipulating facial emotion appearance in real-time, to assist in communication processes; and (iii) the expression of different social attitudes to train the user in different situations that can occur in real life.

Complex interaction frameworks for inclusion games were described and discussed: (i) Automated emotion recognition by agents plays a major role in job interview simulation; (ii) serious games that assist children with Autism Spectrum Conditions (ASC) allow them to learn how emotions can be expressed and recognized via playing games in a virtual world. The framework demonstrated successful integration of several state-of-the-art technologies in one comprehensive virtual world, including analysis of users' gestures, facial and vocal expressions, for various training, learning, communication and animation purposes.

**Human Cognition**

Intelligent game interfaces must be capable of representing and reasoning about the user's mental state, in order to react appropriately, for example on social cues that inform the system about his/her social attitude. The workshop studied novel methodologies that enable formal models of Theory of Mind (ToM) that were introduced in the context of human-agent interaction with a focus on the affective dimension.

Cultural competency as a challenging aspect of human cognition was recognized as objective for game based learning approaches, with critical views on the assessment of their reach and impact.

Attention is a crucial aspect of cognition in the context of mobile games. Novel methodologies enable to track the focus and the workload of users in natural mobile interaction, opening avenues for a thorough understanding of mobile game behavior, such as, for navigation assistance.

**Novel Game Frameworks**

Finally, novel game frameworks were investigated that focus on upcoming challenges. Such a new challenge arises on user empowerment from increasing threats on information privacy, requiring games to make users aware about how to control settings. In the last decade, scenario-based serious-games have become a main tool for learning new skills and capabilities. The generation of scenarios can be facilitated and verified combining computer science techniques with the crowd.

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