

Exploring Online Experimentation

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Abstract—Online experimentation comprises remote and virtual experimentation also aided and complemented by other online tools based in virtual reality, augmented reality, sensorial devices, live videos, interactive videos and serious games which promote user immersion in virtual environments recreating the real experience.

This Special Issue collects an interesting set of short articles describing more than 20 different works in the context of online experimentation.

Index Terms—Augmented reality, remote sensing, remote monitoring, virtual reality.

I. INTRODUCTION

This Special Issue of the International Journal of Online Engineering intends to contribute with a diversified and interesting set of short articles based on many of the Demos presented in the Exhibition Sessions of the 2nd Experiment@International Conference (*exp.at'13*) and also to improve the concept of Online Experimentation.

The evocative name, Experiment@, is adequate to turn the event into an itinerant forum to foster the expansion and association of online experimentation [1].

Online experimentation comprises remote and virtual experimentation also aided and complemented by other online tools based in virtual reality, augmented reality, sensorial devices, live videos, interactive videos and serious games which promote user immersion in virtual environments recreating the real experience.

In an era in which Technology is unstoppable it is unquestionable that:

- people are constantly involved with technologies;
- industry, medicine, life sciences, research, education and training are using more and more emergent technologies and online experimentation, too;
- there is a continuing need to improve knowledge and life quality, everywhere;
- lifelong training has to be intensified in order to follow the fast evolution of technology and overcome the population aging (20% of the USA workforce will be over 55 years old by 2015 and by 2025 more than 20% of Europeans will be 65 or over) [2, 3].

Those are reasons why Online Experimentation has been increasing more and more its relevance in all areas, namely in the engineering area.

II. EXP.AT'13 & EXHIBITION SESSIONS

In this perspective *exp.at'13* reached its goals bringing together engineers, researchers and professionals from different areas, aiming to:

- contribute to foster the expansion of online experimentation and to enlarge the world capabilities in this particular area;
- encourage collaborative work with emergent technologies;
- promote synergy among different areas exploring new solutions for complex scientific and technical challenges;

and creating a forum of discussion and collaboration between academics, researchers, STEM and industry, highlighting engineering and medical applications as well as industrial training and lifelong learning and promoting professional interactions, encouraging high quality research in this field and disseminating experimentation for attracting new people for this area.

Looking to the youngster involvement, *exp.at'13* offered the possibility to open its Exhibition Sessions to STEM, inviting students and teachers from high schools. At University level, *exp.at'13* invited students from integrated masters either from Faculty of Engineering in University of Porto or from University of Coimbra, pursuing in this way its dissemination objectives.

Cisco UK, Insizium, Fraunhofer Portugal, PT Inovação, ISA, Ciência Viva, among others, are national and international organizations which have been involved and helped *exp.at'13* goals of finding new possible opportunities for enlarging collaboration efforts.

Organizations representatives, youngsters and *exp.at'13* participants contributed enthusiastically for the Exhibition Sessions atmosphere where thirty four Demos were presented. Many of those Demos are now described in the form of short paper in this issue.

Juries were organized in order to evaluate the works (Exhibition Session I: Alexander Zimin, Katarina Zakova and Mario Bochicchio; and Exhibition Session II: Liliane Machado, Raivo Sell and Igor Titov) and the final result was the weighted average between the jury evaluation and that of the participants.

The jury of each Special Session has been evaluating the Demos according to the following criteria:

- suitability of topic to the call;
- quality of the product in regards to its targeted audience;
- quality of presentation;
- technical correctness and completeness;
- online availability and possibility of reuse at home and at school or workplace;
- innovation.

The participants, excluding authors and co-authors of the demos present in the current session, were also free of

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evaluating, too. The final result has been defined by the average coming from these two components.

Applications based in augmented reality were receiving the best marks in both exhibition Sessions.

Fig. 1 and Fig. 2 show pictures from Exhibition Sessions atmosphere.

During Exhibition Sessions authors had the chance to discuss explanations and receive feedback for a comfortable period of 90 min, in which important interactions and

valuable ideas were exchanged with enrichment of each one work and possibly cross-fertilization of opportunities. And finally, when talking about developments in online experimentation it is important to remember that “the proof of the pudding is in the eating”!

“Online virtual system for straightness evaluation” and “Augmented Chemical Reactions: An Augmented Reality Tool to Support Chemistry Teaching” came out as the Best Demos @ *exp.at'13*.



Figure 1. Authors and participants interaction during Exhibition Sessions within *expat'13*.

Figure 2. Authors and participants interaction during Exhibition Sessions within *expat'13*.

III. FINAL REMARKS

A word of gratitude is due to the Exhibition Sessions Chairs, Maria da Graça Rasteiro, Jorge Lobo and Danilo Zutin and finally, last but not least, to all Demos' reviewers – Maria da Graça Rasteiro, Jorge Lobo, Danilo Zutin, Christian Kreiter, António José Mendes, Maria José Marcelino, José Carlos Teixeira and António Augusto Sousa.

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