



Smart Graphics

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1 What is Smart Graphics?

As you read the title of the thematic part of this issue of *it* – Information Technology, you might have wondered what exactly was meant by “Smart Graphics”. The term itself was coined by the guest editors and Patrick Olivier, also one of the authors in this issue, and it was used almost 10 years ago as the title of a AAAI spring symposium. All of us were working in the domain of automatic graphics generation at the intersection between Computer Graphics and Artificial Intelligence, and we all had – independently of each other – discovered, that in order to generate comprehensible and beautiful graphical presentations, additional competences were needed from the fields of Cognitive Psychology as well as arts and design. We therefore decided to organize a AAAI spring symposium with the goal of finding out whether other researchers had found the same, and reaching out to the psychology and arts communities.

One thing we found out then, was that the actual term “Smart graphics” was interpreted in two different ways: The first interpretation was what we originally had in mind: the application of AI techniques to graphics generation, observing insights from psychology and design. The second interpretation was able to cope mostly without the AI part in the machine and instead referred to intelligently made graphics, which by adhering to the same psychological and design rules, enabled humans to make much better sense of them and thereby made them smart. Until today, both interpretations seem equally valid and equally interesting strands of research, and the recently emerging field of visual analytics added substantial momentum to this field.

2 History of the Symposium

The first public usage of the term “Smart Graphics” was in the title of the 2000 AAAI spring symposium mentioned above. Encouraged by the symposium’s success and the interest by well-known researchers in the field, we decided to repeat the event and extend it into a self-contained symposium. For the first two years, these symposia were

held at IBM’s T.J. Watson research lab in Hawthorne. The 2003 symposium then moved to the European Media Lab in Heidelberg, and in the following years, was held in Banff, Munich, Vancouver, Kyoto, Rennes and Salamanca. The first two proceedings were published by ACM press, and from 2003 on, they appeared within Springer’s Lecture Notes in Computer Science.

The symposium made it a habit to invite controversial speakers from a variety of adjacent fields, such as Jock Mackinlay, Joe Marks, Ben Shneiderman, Brad Paley, Marc Böhlen and Sara Diamond. The proceedings, however, mostly remained in the Computer Science culture and included less artistic contributions than we had originally hoped for. This is simply due to the fact that the publication cultures are totally different in the arts, where artists and designers are invited to participate in exhibitions, instead of submitting papers. In 2009, we are accounting for this by the introduction of a special arts track and by co-locating and coordinating the symposium with an arts festival.

3 Structure of this Issue

The structure of the thematic section of this issue revolves around the different perspectives onto the field of Smart Graphics and then rounds off the picture by adding some case studies.

Brad Paley starts the thematic section by a rather unconventional article he calls a “paper-lecture”. In this hybrid form between an instructional text and scientific analysis, he presents his views as an interface designer of what well-designed interfaces will look like, what type of graphical representations they might use, and how they end up being well-made graphics, i.e., smart graphics in the second sense. The paper is very inspirational in nature and provides guidance for interaction designers, motivated by a few examples from Paley’s own substantial body of work in this domain.

Brian Fisher then continues by analyzing the connections between Smart Graphics and the emerging field of Visual Analytics. His article describes the interesting



spots between the different research cultures of Cognitive Sciences and Computer Science.

Patrick Olivier and Nam Ha will then give an example of how technologies from Artificial Intelligence can be used to optimize the rendering of lights in order to take perceptual constraints into account. This theme along with camera planning has been one of the most prominent examples of Smart Graphics in the past.

The remaining two articles are devoted to case studies and special applications. Bernhard Preim and Konrad Muehler will discuss Smart Graphics in the context of medical visualization with a strong emphasis on intelligent visualization techniques, such as smart animations, view point selection and annotations. They will also present an example of non-photorealistic rendering, which has always been of particular interest to the Smart Graphics community. Jürgen Döllner und Benjamin Hagedorn finally focus on smart interaction techniques, including sketch-based methods to control camera viewpoints and to select objects in a complex 3D-scene. The presented approach falls into the Smart Graphics area since it takes affordances into account, which are not purely geometry-based but also reflect the semantics of the manipulated objects in the scene.

Received: December 1, 2008



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Prof. Dr. Andreas Butz received his PhD from Saarland University in 1994. After a PostDoc at Columbia University, New York, he co-founded a Company in 2000 and became its CEO for over 2 years. After his return to academia, he was appointed a Professor of Computer Science at Ludwig-Maximilians-University, Munich. His current research interests include visualization, interactive surfaces, and physical interaction.

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