

Creative Intelligent Systems

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The Creative Intelligent Systems Symposium was held at Stanford University from March 26-28, 2008 and included five major discussion sessions and a general poster session (in which all contributing papers were presented). The purpose of this symposium was to explore the synergies between creative cognition and intelligent systems.

Although it seems clear that creativity plays an important role in developing intelligent systems, it is less clear how to model, simulate, or evaluate creativity in such systems. In other words, it is often easier to recognize the presence and effect of creativity than to describe or prescribe it. The purpose of this symposium was to explore the synergies between creative cognition and intelligent systems in a cross-disciplinary setting that fosters cooperation both in designing creative systems and in creatively designing systems. To facilitate this exploration, the symposium was focused around three main goals: Artificial systems that are autonomously creative, Systems that augment or enhance human creativity, and Computational models for understanding creativity.

The focus of the submissions to the symposium varied widely and the selection criteria was based on their relevance to the goals of the symposium. The contributions of the selected papers and the discussion topics led to the emergence of four major themes: computational creativity, simulating creativity as a social process, creativity and computational linguistics, and computational environments for creativity.

The first theme centered around defining various "axes" for describing or assessing computational creativity. Assessing the value of a creative work may be as objective as validating the steps of a mathematical proof or as subjective as deciding on personal preference for a piece of art. The "product" of a creative system might be a tangible artifact like a proof, a design, or a work of art or it might instead be creative process or behavior. The creative value of that "product" might be rather obvious to the receiver, but it is also often the case that the value of the "product" must be "marketed" by its creator. Thus, the act or quality of creativity may not be independent from the promotion of that act or quality, and this raises the issue of whether there exists a difference between creativity and the perception of creativity.

The second theme was characterized by a view of creativity as a social process. Various methods to employ web 2.0 resources in (collaborative) creative projects are being explored, and the simulation of creative processes within multi-agent communities allows us to ask questions about macro-scale creative phenomena. One aspect of this "socialization of creativity" that raised some concern among participants was the potential for creativity to be judged as a popularity contest, and there was some discussion about how this can be avoided. Of course, there are many avenues for multi-disciplinary enquiry along these lines and collaborations with the cognitive and social sciences should be explored.

A third theme focused on frameworks for creativity in language. For a generator of creative language, it is critical to model the (language) receiver. For example, to produce effective narrative, it is important to consider the reader as a problem solver, constructing the narrative in such a way that the solution at which the reader arrives is the intended one. Metaphor continues to be a major subject of study (both in language-centric creativity and in more general creative settings), and the representation and re-representation of knowledge is key both to producing and to understanding metaphors. Here again is a topic for multi-disciplinary investigation that can leverage advances in computational linguistics and natural language processing and

understanding for modeling language (development and evolution) in creative processes and cultures.

The fourth theme addressed environments for creativity and the difficult problem of assessing creativity in humans. The main points of discussion focused on the idea that computers can help us to be more creative, including through the use of augmentations that can produce creative "products" that are not available to unassisted humans. Indeed, it follows that it may be possible to build systems that enhance creativity in anyone, rather than focusing on creativity aids for creative professionals such as artist and dancers. Computational environments can provide new, faster and enabling techniques and unique access to collaborators (both human and computational), leading us to consider hybrid creative systems as analogous to the idea of cloud computing.

We concluded with a discussion of possible "grand challenges" for the next five years (or so), and produced the following list of high-level goals:

1. To build creative systems that are accepted in appropriate human forums as creative agents in their own right?
2. To build a system that can re-structure problems and/or re-represent knowledge so that the product or behavior of the system is creative across a range of domains?
3. To build systems that can recognize their own emergent creativity, aesthetic preferences, etc. and communicate these to humans?
4. To build systems that can recognize, enhance or inspire human creativity, possibly in a collaborative manner?
5. To design a methodology and/or database of test cases against which researchers in computational creativity can evaluate their models?
6. To design models of creativity that help us to understand human creativity?

Dan Ventura, Mary Lou Maher and Simon Colton served as co-chairs of this symposium and the papers of the symposium are published as AAAI Press Technical Report SS-08-03.

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