# COMPUTATIONALLY CREATIVE SEARCH FOR STORIES

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Storytelling is an ubiquitous phenomenon in human culture. We tell stories to entertain, explain, and illustrate. The production of novel stories is undeniably an act of creativity in humans. How can an autonomous computer system create novel story content? What can we learn about human creativity in the investigation of computational models of story generation? Relevant past work in story generation includes (Meehan 1976; Lebowitz 1985; Turner 1994; Pérez y Pérez and Sharples 2001; Gervás et al. 2004; Riedl and Young 2004, 2006).

Fictional plot generation can be thought of as a creative design process. The goal is to produce an artifact – in this case a plot, a sequence of temporally ordered events that involve characters in a story world – that has a particular set of properties that are either implicitly required or explicitly given. These properties constrain the space of possible solutions. Examples of implicit constraints are properties of plot that we assume that all "well-formed" plots should include such as logical causal progression, and character believability. Examples of explicit constraints are that the plot achieves some purpose – dramatic impact on the reader, pedagogical validity, etc. – and occurs in a particular given world consisting of particular characters.

Plot generation is often under-constrained, giving rise to the possibility of creative solutions. Boden (2004) describes two forms of creativity: creativity through search and creativity through transformation. Creativity through transformation is the notion that an existing, seemingly unrelated concept can be transformed into an unique new concept. Following Boden, plot generation can be considered as search for an artifact – a plot – that is *valued* (Riedl and Young 2006). Consider the space of all possible plots where a plot is a set of temporally arranged events that change the story world (for completeness we also consider the empty plot). In this space, plots are adjacent if they differ by only one detail: the events comprising the plot and/or their temporal configuration. One can walk the space of all possible plots, starting with the empty plot, by repeatedly selecting an event and adding it to the plot

at different temporal points. Assuming that a plot can be computationally represented by a plan, the process of walking the space of all possible plots can be formalized as a planning algorithm. A planner, starting with an empty plan, instantiates operators and then temporally arranges operators to ensure plan soundness.

As a general problem-solver, a planner can solve the problem of designing a plot. However, a planner can only searches a subset of all possible plots, constrained by input parameters such as world description and constraints inherent in the algorithm itself. For example, a conventional planner can only search the space of plots in which events are necessary for achieving some goal world state. By changing the planning algorithm, a plan-based plot generator can change the *walkable* space of plots. For example, Riedl and Young (2004) describe an algorithm that considers some aspects of character believability.

Recent work on plot generation has attempted to incorporate the notion of transformational creativity into plan-based plot generation (Riedl and León 2008). We are working on incorporating analogical transformation of plot segments into a search-based planning framework. Our recent work has resulted in two preliminary findings. First, case-based planning can open up new portions of the plot space that planners could not previously access. Second, Boden's notion of transformational creativity is in fact a special case of search.

## References

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