

Natural Interfaces for Collaborative Narrative Construction

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Certificate of Original Authorship

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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Abstract

This thesis addresses research with the design of a system for collaborative narrative construction that supports the process of conversation associated with narrative creativity and coherence. It presents a set of theoretical design features for a system that combines semi-autonomy with an interface that responds to natural user interaction, such as a touch enabled or gestural device. The design aim is that of a holistic software architecture or one that enables active engagement in the emergence of meaningful community narrative, the value of which is centrally based around the notion of narrative coherence. This research presents a set of design features that enable conversation and collaboration that both support the generation of coherent narrative.

In a holistic system design, the embodied action associated with conversation in verbal and nonverbal form is central to narrative exchange, and the process by which further knowledge is extended by communal agreement. These are systems that extend knowledge where the role of the participant is integral to the systems feedback and maintenance of its own self-organised behaviour. With the software architecture, *assimilate*, participants engage a multi-user space with a reactive interface that overlays a visual collaborative media environment. It consists of three tiers that are constructed in a networked architecture, including a template database with a priori knowledge, a self-organising application that merges concepts, and a physically responsive interface that supports collaboration and group conversation. The specific interface component provides expressive affordances that enhance narrative comprehension in the minds of the participants, allowing them to dynamically switch roles as narrator or participant. Common gestures associated with narrative construction are mapped to interface mechanics, such as *scope*, *merge* and these reflect participant intention, forming a narrative *point-of-view*. Embedding these metaphors into the interface design appeals to these narrative actions, thus supporting the recognition of meaning or intention.

The system design is supported by a knowledge generation application consisting of a self-organising network of concepts that are designed to directly reflect the collaborative mechanics of the interface layer. The basis of this model is inspired by Conversation Theory (CT) (Pask 1976), a 2nd-order cybernetic theory of learning and social interaction, that demonstrates how to maintain narrative coherence while taking into account the collective viewpoint and interpretation of collaborators. It places group conversation as central to its process and outlines a formal method of conversation as a negotiation of shared agreement, with the formalisms adapted for the system design into a conceptual level (*Storyworld*) and the procedural level (*Storyline*). The CT model allows for a cyclic interpretation and may be suitable to a range of narrative styles in a domain independent and scalable way.

From a series of evaluations with a practice based methodology, the findings demonstrate how each feature contributes to an increase in collaborative narrative coherence when combined in the proposed system. Three specific features have been identified. Firstly a series of interface schemas for narrative comprehension that are modelled within the physical properties of the interface. The findings suggest metaphorical schemes develop support for collaborative conversation through assisting with nonverbal conversation, providing a metaphorical boundaries, and showing how concepts may *merge* with the possibility of generating novelty. The second feature highlights the system as a collaborative tool and how it develops group conversation allowing dynamically shifting roles as *narrator, player or observer*. Group experiences directed the narrative into new directions providing emergent outcomes that contributed to coherence. Finally, the self-organising application modelled on CT principles presents a two-layered approach of *Storyworld* and *Storyline*. This was found to develop *agreement*, a CT principle by which a group understanding takes place. With a constrained corpus of templates and a strong familiarity with a *Storyworld*, the system developed clear boundaries of narrative context that contributed to group coherence.

In conjunction with natural user interaction, the combination of these features within the software architecture was found to support collaboration and this led to an increase in narrative coherence. These findings further understanding of how collaborative system design and natural user interaction combine for generating narrative emergence. This contribution is highly relevant for designers that aim for *holistic* collaborative system design and the possibilities that natural user interaction brings to new forms of collaborative knowledge generation and creativity.

