Narrative as a Form of Knowledge Transfer: Narrative Theory and Semantics

Mischa M. Tuffield, Nigel R. Shadbolt, David E. Millard
IAM Group, Department of Electronic and Computer Science
Southampton University, UK
{mmt04r, nrs, dem}@ecs.soton.ac.uk

Abstract. This paper presents a theoretical discussion of semantically enabled technologies that adopt narrative theories to aid knowledge transfer. The paper aims to present the applicability of existing narrative theories as methods of transferring and retrieving knowledge, underlying the importance of semantic mark-up.

1 Introduction

Currently the World Wide Web facilitates searching through search engines, web sites that point users to documents that best match given keyword queries. This method of searching is what we have become accustomed to; one presents a search engine (i.e. Google) with a topic of choice and subsequently traverses a list of related documents, looking for the ones that best suit one's needs. Currently we have no method of querying the vast amount of information available on the Web that would produce a narrative overview of a topic, something that approaches the rich and engaging critiques that human authors might present.

It is possible that this short fall is due to the fact that information posted on the web does not contain the necessary semantics, in an explicit machine-readable manner, to be able to draw on and infer relationships from the vast pool of information, and present it in a structured and targeted fashion. The currently emerging field of Semantic Web technologies is challenging the manner that authors publish information, from the classic method of developing a document that is intended to convey a message to a human reader, to the publishing of nuggets of raw knowledge in the form of annotated media items that are linked together in a structured and meaningful manner. This new paradigm of publishing would allow for a narrative to be generated on the fly from the available knowledge nuggets in manner best suited to the user's profile [3].

Ever since a young age humans are exposed to, and relish, narratives as a form of knowledge transfer. Children learn their moral and social obligations in the form of stories narrated to them by their guardians and peers [13]. This paper aims to present how narrative theory can be applied to Semantic Web technologies to harness and exploit knowledge transfer in rich heterogeneous information pools.

2 Narrative

Narratives have always been communicated as methods of transferring knowledge within society and its subsequent generations. The traditions of oral storytelling that have evolved into our contemporary modes of narrative have been recognised as core to the transfer of knowledge within society [6].

Narratives or the study of, narratology, have been a central theme of the social sciences for a very long time and have become increasingly popular in the field of knowledge technologies [1][8][10][3][9][7]. The word narrative stems from the Latin root *gna*, which also is the root of the word knowledge. A vast amount of work has been undertaken to illustrate the transfer of knowledge within societies through the use of narrative mediums and the similarities between the various modes of transfer [6][12][2].

2.1 Narratology

Narratology has focused on representing and defining one of the core modes of human communication, as a result of efforts in this domain, there exists a growing set of different narrative paradigms such as formalism, structuralism, post-structuralism, and post-modernity [15]. The aim of this research is not to try and develop a new paradigm or even to create a taxonomy of narrative approaches, this is best left to narrative theorists, but to learn from and harness existing findings to aid knowledge transfer in semantically rich environments.

There are a growing number of areas where strategies and viewpoints put forward from narratology have been adopted and utilised within information system research, such as multimedia presentations [8][10][3][9], summarisation [1], and storytelling and interaction drama [15].

Recent advances in discourse generation from semantic data, have presented systems that generate targeted meaningful narratives [8][10][1][3][9]. For example, Bal's [2] view of narrative states that, from an abstract level, narrative can be seen to consist of 3 layers, the *Fabula*, which represents the raw chronological events and information, the *Story*, given a fabula one could derive a number of stories or trails through the fubula, and the third and highest level the *Narrative*. The narrative is said to be the final form of the rendered material. This conceptual model of narrative has been employed in narrative generation systems for the dynamic arrangement of multimedia presentations [10][9]. The analogy presents a corpus of "knowledge nuggets", annotated using enabling Semantic Web technologies, as the fabula, story grammars in the form of templates present the structural design of the system, and the resulting multimedia presentation is the final rendering of the generated narrative.

2.2 Narrative Intelligence

The term *Narrative Intelligence* (NI) was coined to describe the manner that human's make-sense of their world by organising events into more-or-less familiar narratives [4]. This notion has been identified as one of the main synergies around which AI research into narrative has been brought together [11]. Mateas and Sengers present a history of NI, an enumeration of the influencing studies on NI, and a subsequent analysis of the influences narrative theory has had on computer science. One of the areas touched upon in their paper is a field referred to as *Story Database Systems*. This field of AI was described as the study of using stories to present information in databases in an easier and more comprehensive method of retrieving information. At the time of this study Semantic Web technologies were still in their infancy, the next section will aim to present how advances in knowledge representation and these explicit semantics have been utilised to develop rich narrative pieces.

2.3 Narrative as a Mode of Knowledge Transfer

Advances in the techniques and tools for the semantic enrichment of information have allowed for relationships in data to be made explicit in knowledge rich domains. One of the cornerstones of developing SW applications is the development of ontologies. Advances in ontological driven discourse generation from semantically enabled knowledge nuggets have been reported in recent work [8][10][1][3]. This assembly of a structured narrative from a system's accessible fabula will only be enriched by the wide adoption of the Semantic Web, and the subsequent availability of more annotated knowledge nuggets. Summarisation [1], document generation systems, and system that aid biography tailoring [9] have benefited from semantic enrichment and narrative theories such as RTS [7].

3 Memories for Life

Memories for Life is being discussed as a grand challenge for computing[1], and aims to address the applicability of storing autobiographical knowledge in the form of multimodal electronic media and to identify any issues that may arise from such an experiment. This research aims to present how Semantic Web technologies could be adopted to help realise the potential of such a vision. Given a comprehensive collection of multimodal electronic autobiographical memories, a vocabulary of terms and their relationships is needed to annotate the "memory nuggets" to encapsulate their semantics. Work is currently being undertaken in the OntoMedia[2] project to define an ontology that can be used to mark-up media in its various forms. This

[1] www.memoriesforlife.org

[2] http://www.ecs.soton.ac.uk/research/projects/OntoMedia/

ontology has been designed to allow the mark-up of literature, film, at the fabula level in order to represent the story presented by a given media item.

Stories about real life seldom fit into the grand narratives of myth or fairytale and it may be that simple heuristics working on these semantics, such as chronology or human relationships, would produce satisfying narratives. Other scenarios, such as supporting new media artists in story creation or plot generation for interactive games, might be able to draw on the grander schemes. Work is currently being undertaken to adapt Bremond's [5] extension of Propp's functions [14] into a narrative ontology, which will be used to add direction to interactive games. One of the aims of this work is to explore the relationship between these different narrative approaches and evaluate their effectiveness across such diverse scenarios.

4 Conclusions and Future Work

Initial findings suggest that further research is needed to help identify the necessary semantics for an autobiographical memory system. OntoMedia is proposed as a starting point for these investigations. Further study into developing a narrative ontology to allow for dynamic narrative generation is also needed. Questions regarding the nature of queries presented to such a system, and best fitting narrative model are being investigated.

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