A Web-based Narrative Construction Environment

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Abstract

This paper describes a web-based environment for constructing narrative from story snippets contributed by a community of interest. The underlying model uses an argument based structure to infer the next event in the narrative sequence. The approach makes use of both events and higher level story elements derived from Polti's dramatic situations. Dramatic situations used are consistent with a theme, and events are generally constrained by the dramatic situation. The narrative generated is a function of the event history, the dramatic situations chosen and the plausible inferences about next events that are contributed by a community of interest in the theme. At this stage, a player's actions are simulated using a random selection from a set and the implementation of a nonsense filter. Example outputs from the system are provided and discussed.

1 Introduction

In our model, a story is comprised of sequences of dramatic situations drawn from the thirty six categories annotated by (Polti 1927). A story may commence with a sequence of events that we call a *story snippet* which instantiate the Polti dramatic situation *daring enterprise.* This situation involves a bold leader, an object and an adversary. A sample snippet labelled *Robin entering the archery competition* includes Robin as the dramatic situation's *Bold Leader*, the trophy as the *Object and* the *Sheriff* as the *Adversary.* A snippet contains a sequence of event choices such as *Robin [does/does not] enter the archery competition* and actual *events* such as *Robin does enter the archery competition* The theme, in this case, *Robin Hood,* describes the setting and characters permissible.

Our model develops the narrative by invoking a procedure to infer the next dramatic situation from the current dramatic situation and the outcomes of recent snippets. An inference procedure selects plausible event choices from a database derived from an audience or community. The community contributes to the construction of a narrative by subscribing to a specific theme (such as the Robin Hood theme) and supplying relevant snippets that instantiate dramatic situations. The community also contributes what is thought to be the next most likely events given the current dramatic situation and event history. Using a community of people to develop the inferences means that a large human knowledge of narrative, drama and character responses are captured in the inferences that are used to generate narrative dynamically.

An inference generated from a community supplied case base, takes into account an inter-dependency between plot and story in that the most plausible next Polti dramatic situation, which could be the continuance of the current one, is inferred from the current dramatic situation and the recent history of story events. The approach is in contrast to artificial intelligence planning approaches that, in general, search for all possible action sequences that will achieve character goals given a state of the world (Young et al 1994).

Louchart and Aylett (2004) proposes that we can consider different levels of emergence in narrative based on the level at which we allow or enable improvisation. Narrative can be seen to have a hierarchy of levels that may be represented as, overall plot, plot elements (dramatic situations might be one example of these), character-level abstract action sequences involving cognitively or reactively determined physical behaviour. The architecture used in this paper allows improvisation at all of these levels. The overall plot is not predetermined, the sequence of dramatic situations is not predetermined, character actions exert a definite effect on what happens next but not in a completely repeatable way (as determined by an external observer) and actions performed by supporting characters are determined by the history of previous events and the dramatic situation as well as character actions. So the end narrative has high levels of

emergence from this perspective. The basic decision in an interactive narrative is to determine what happens next. From the myriad of possibilities we want to choose an event that is believable and interesting within the context of the overall narrative.

The use of an inference procedure in the way advanced here draws on an approach for representing knowledge called the Generic Actual Argument Model (GAAM) by (Yearwood and Stranieri 2005). This model has been applied to the development of numerous decision support systems in law including; Split Up, predicting the percentage split of assets a Family Court judge awards divorcees (Stranieri et al 2001), Embrace, assessing the strength of claims for refugee status (Yearwood and Stranieri 1999), GetAid, determining eligibility for legal aid in Victoria (Stranieri et al 2001) and witness selection in Scotland (Bromby and Hall, 2002).

A sample narrative is provided to illustrate the approach.

2 Sample narrative

We can use the main theme *Robin Hood,* decomposed into sub-themes such as *rebelling against tyranny*, characters including *Maid Marion, Prince John, Sheriff of Nottingham and* settings such as *Nottingham Forest* to define events for that dramatic situation. We imagine an actor engaged with a system to generate a narrative. This may ultimately be implemented as a player in a 3D game environment performing actions. The narrative commences with the system selection of a dramatic situation. Figure 1 illustrates this is the snippet that instantiates a *daring enterprise* situation and includes events to do with winning a golden arrow. The starting event is a variable that represents that the bold leader does or does not enter the competition. The actual event, *Bold leader does not enter the competition* is a terminating event in this snippet and signals the need to select a new snippet by inference from the database. Figure 1 illustrates that the actor has in fact selected that choice, the *Bold leader does enter the competition.* This is called an action. An inference procedure is invoked to infer a plausible next event choice from a database of snippets. The event choice *Bold leader shoots in or flees is presented.* The actor selects the action *shoots in* and the inference procedure infers the next event choice until a terminating event is reached. In that case, the inference procedure is required to infer the next snippet that typically instantiates a different dramatic situation.

The model outlined in Figure 1 extends the approach described by (Yearwood et al 2006) and illustrates the model that has been implemented on the website http://phoebe.ballarat.edu.au/NarGame/. Currently a database of snippets sufficiently large to enable inference procedures to learn from past snippets has not been assembled. The current implementation simulates an inference with random selection. A sample story generated in this way is reproduced below. However an issue that arises is the need to eliminate next events and next snippets that are non-sensical. For example, if Robin is jailed as the terminating action in one snippet then he ought to be still in jail in the next. The next section describes steps toward the implementation of a nonsense filter for this purpose.

3 Filtering nonsense

A set of rules has been constructed to reduce the possibility of 'nonsense' stories being created. The rules act as a nonsense filter, attempting to allow only those snippets that could follow the previous dramatic situation, given the event actions. A simple example of this is when the main character (Robin) is in jail or has been injured at the end of a dramatic situation. The next dramatic situation must start with the same context values. Robin escapes from jail, or Robin is being nursed back to health. This rule is labelled Last Context Variable (LCV) – where the value in the previous context variable must match the starting context variables in the next DS. The rules are formalised in a grammar that control the sequence of snippets/dramatic situations.

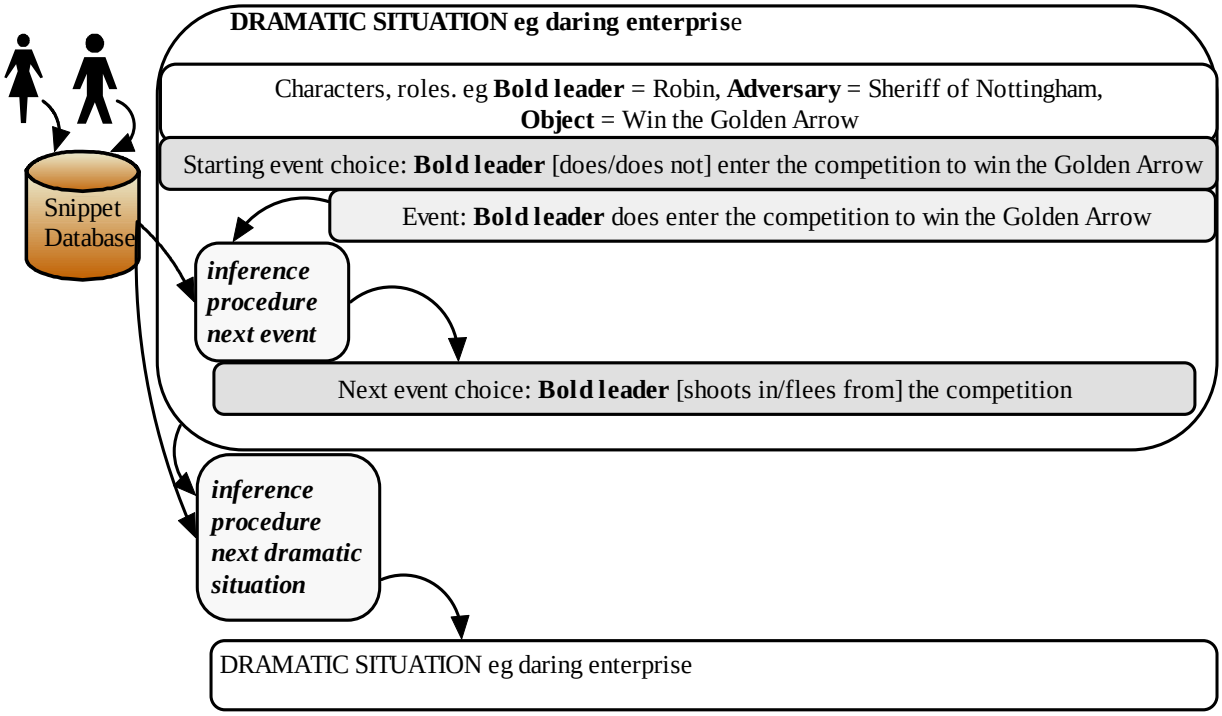

Figure 1: Illustration of the Model

The Previous Context Variable (PCV) rule disallows actions that rely of a previous action taking place. An example of this is when a story snippet requires a particular member of Robin's band to be present. If that member has not joined the outlaws, the story snippet cannot take place. The example constructed story included below begins with a story snippet concluding with Little John not joining the outlaws. In this case Little John cannot be included in story snippets later in the story. The rules are attempting to make the overall story a more readable, believable story.

4 Generated story

Below is a series of story snippets which make up a story. It was randomly generated using the inferences that have been stored in the database. Each snippet is generated by the system by putting together events. The snippets are sequences by random selection from the database with filtering rules. It can be seen that there are problems with connection and coherence between the snippets. This is attributable to the random selection and is expected to be remedied once sufficient snippets are collected for inferences. A web-site that assists contributors has been developed and provides a start for a story and simply asks 'what happens next'. This simple device seems to support the contribution process. The Story submission site is at http://phoebe.ballarat.edu.au/collection/

Robin has to cross a stream using a fallen tree on his way to Nottingham. At the same time another man named Little John is crossing. Robin and Little John do battle for the right to cross the stream, and Robin wins. Little John does not join the outlaws, instead choosing to make his way to the village by himself. Robin returns to camp alone.

Maid Marion has been lady-in-waiting for the Sheriffs daughter and the Sheriff has become suspicious of her loyalty. The Sheriff was approached by a man who was seeking a wife for his son and the Sheriff has agreed to the marriage. Robin hears of the danger to Maid Marians freedom. Robin believes that Maid Marian will be safe in the marriage to the man's son. He does not respond to Maid Marians plight and allows the marriage to take place.

Robin was standing under a green tree by the roadside. While he was listening to the birds among the leaves, he saw a happy young man, dressed in a fine suit of bright red cloth, passing by. Robin says to himself that he will not trouble the young man as he is obviously on his way to his wedding. The next day Robin stood in the same place and seen the same young man travelling the road again. This time the young man had no fine clothes and sighed as he walked. Robin stepped out in front of the young man and asked him for money. The man offers a gold ring as his fiancé has been betrothed to a rich old man, and they are currently

travelling to a church to marry. Robin cares not for the young man's sad tale and sends him on his way having relieved him of the gold ring.

5 Conclusion

This paper describes an approach to interactively generating narrative. Whilst most approaches to the generation of narrative have operated at the event level this approach makes use of both events and higher level story elements called dramatic situations that overcome many of the problems of an event based approach.

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