**Abstract**

This report outlines the development of an autonomous story telling system that generates football stories, whilst establishing novelty within the artefacts it creates. This report will also outline certain decisions that were made to make the system creative. This report will also show how some creativity evaluation techniques used in computational creativity(CC) have been used in the evaluation of this system and improvements that could be made in the future will also be discussed in this report.

1. **Introduction**

FFF is a story generating system that uses the concepts within the field of CC, this was the catalyst of the design and developmental decisions made when creating the system. The idea of template-based generation is used. To make sure all artefacts generated are creative, the templates are altered. Creativity brings about answers that are ‘novel and useful’ with four attributes that characterise creative answers. One of them being, the answer is novel and useful, and another being; the answer demands that we reject ideas we had previously accepted. The FFF system strives to create novel stories that rejects the use of previous stories, in order to create artefacts that can keep the user engaged. FFF falls under exploratory creativity as it involves exploring new ideas and possibilities in the form of stories. Nevertheless, this system has potential to be developed in the future and eventually adopt transformational creativity. This is due to the approach used to enable the system to be novel. This report will outline the research that was made, in order to establish the design and developmental decisions made as well as the methodologies that the system has used.

1. **Background**

The goal of the system is to create short creative stories that are based on football. To establish what counts as a well-designed and coherent story, the structure and narrative needs to be assessed. Stories have a clear plot and a structure that follows a logical progression of events. Artefacts produced by FFF are all short stories that follow this guideline. As well as clear and consistent stories, FFF also tries to produce creative artefacts, but deciding whether a story artefact is creative can be a very difficult task. Sharples(sharples,1999) has shown narrative creation as a problem-solving process. This process involves exploring a conceptual space based on rules provided by the creator, these rules will be altered in order to present new possibilities for the narrative. FFF aims to use this process , so that exploratory and transformational creativity can be performed, as outlined by boden(1990). Sharples(1999) has proposed a two-phase process for creating new story artefacts, these phases are the engagement and reflection phases. The story is created during the engagement phase and the discourse is created during the reflection phase. FFF uses these phases so that clear and concise stories, that are creative, can be created. A system that was important in the development of FFF was the Mexica system. Mexica builds schemas based on sets from previous stories, using other artefacts to make new creative artefacts. This system also uses the reflection and engagement phases to create frameworks for creative story creation. Mexica also has the ability to self-reflect, it will evaluate the coherence, interestingness and novelty and output a score. There have been a number of other systems developed to generate stories, these include; minstrel system(Turner,1993), or Tale Spin(Meehan,1977). To summarise FFF aims to use the engagement and reflection phases, as well as previous artefacts to create a coherent and creative narrative.

1. **Methodology** 
   1. **Engagement Phase**

FFF was designed using the two phase principle(section 2), in the engagement phase I created narrative schemas that will be used to create the story. These schemas are template based, meaning that some words, mainly adjectives and nouns, will be replaced and evaluated during the reflection phase. Also names of players will be changed. There are 10 narrative templates that can be chosen by the system, the selection of template is based on randomisation, templates chosen cannot be used again until all other templates have been used, so there is a certain element of randomness.

* 1. **Reflection Phase**

**3.21 candidate word generation**

After a schema has been chosen, FFF will generate candidate words to replace certain words outlines in the schema. FFF uses the Merriam-Webster API(M-W), this API has many features but FFF will use it as a search engine in order to get candidate words. In order to get replacement words, FFF specifies all candidate words, these words have been generalised to get words that help create a coherent story. M-W has the ability to effectively find and return synonyms of candidate words, using the M-W dictionary and thesaurus data. FFF uses the thesaurus and query function to extend the functionality of the system. The system can set the maximum amount of words that can be to replace candidate words, which is 5, this is because, if there are too many then the words might not have the best coherence. This should prevent the system from returning obscure words when the system is ran multiple times.

**3.2.2 candidate filtering**

FFF inspects the word frequency of candidate words and returns them in order of the most used words, so the 5 candidate words picked will be top 5 words used. FFF also ensures novelty within words picked, words used will be stored so that they cant be used again and wont be used again until all words are used.

* 1. **User Usage Tracking** 
     1. **Schema Usage**

FFF tries to create variance in templates chosen to output. It does this by keeping tracking of which templates have been used and puts them into a list, not allowing them to be used again until all other templates have been used. Keeping a list of templates used allows for chosen templates to be less common to the user, thus creating more novelty within the structuring of artefacts.

* + 1. **Previous Artefacts**

Creating template based stories can make these stories very repetitive and tedious, so there won’t be as much novelty, thus driving down the value of the artefact. So that this is avoided, FFF tracks the candidate words used in previous artefacts, not allowing them to be used again.

1. **Results** 
   1. **Engagement Phase**

The results produced by FFF are very positive, after cycling through different artefacts, there is good randomisation within the schemas as they were created to have different plots and storylines, also with the added functionality of randomising which schema is chosen, and storing it so it can’t be used again. But there are some down points as in order to keep a coherent story, the template is limited in the amount of words it can change, this leads to not being able to definitively use the grammar text structure. The system also can’t deal with a wide range of grammars, so the schema can reuse words once it has been run many times, but, with the amount of schemas used, it probably wont be for the same schema.

* 1. **Reflection phase**

The reflection phase performs word filtering well. This is because it searches for most used words, which usually will be closest to the original word. Words used are also tracked to ensure they aren’t used again in new artefacts, this will lead to novelty but not as much as how much the Mexica system might have, which ensures novelty, interest and coherence during the reflection phase, there is a minimal interest aspect in FFF. Also the resulting words chosen to replace candidate words could be seen as dull, this is due to trying to keep stories as coherent as possible, this system has a simplistic way of finding words.

1. **Evaluation**

FFF was evaluated using the FACE model(Colton et al., 2011). This model assesses the systems creativity by examining four different criteria; Functionality, appropriateness and aesthetics.

* 1. **Frame**

This criterion evaluates how well a system meets its intended purpose. FFF successfully meets it intended purpose as the system is able to generate football stories that are both coherent and creative, but there are some cases where some words might not make sense in the overall story, and would not be used by a human as it may seem grammatically incorrect, this is because, when using an api, it is very hard to narrow it down to words that are all grammatically correct within the system.

* 1. **Aesthetic**

As this system only produces stories, there is not much to judge in terms of design elements. However, a user interface could be created in order to make it more appealing to the user, for example have the name of the system at the top with a button that allows the user to generate, all this doesn’t effect functionality it could be something that could be implemented in the future in order to make the systems aesthetic adequate.

* 1. **Concept**

this criterion evaluates the underlying idea or theme of the system. It evaluates how original and innovative the idea is and how it fits within the context of the system. This criterion evaluates how innovative and original a systems out is. FFF aims to create novel and engaging stories. The stories produced by FFF are template based, due to this, they set the foundation for compelling and innovative stories that are original due to them being manually written. With knowledge of previous football telling stories such as “World Class, Dan Freedman”, the short stories generated by FFF are engaging and innovative. With the stories being template based, it does mean that after a certain point stories will have the same plot with different adjectives and nouns as well as different player names.

* 1. **Example/expression of Concept**

The effectiveness of a system in embodying its underlying concept can be evaluated based on how well the concept is executed and how well it meets the users' needs. For example, in the case of FFF, the system's concept is expressed through the stories generated and outputted by the system. These stories are designed to meet the users' needs by providing them with engaging and novel content that keeps them enticed. Therefore, the quality of the stories generated by the system serves as a measure of its success in embodying the underlying concept and meeting the users' needs.

* 1. **Overall**

The evaluation of FFF using the FACE model provides a comprehensive assessment of the system's creativity. Based on the criteria of functionality, appropriateness, novelty, and aesthetics, we can conclude that FFF performs well in terms of functionality, appropriateness, and aesthetics, with some room for improvement. However, the novelty of the system is somewhat limited by its template-based approach, which may impact the system's ability to generate truly original stories in the long run.

Despite this limitation, the evaluation using the FACE model shows that FFF is a successful implementation of natural language processing and story generation in the football domain. It meets its intended purpose and provides a useful tool for generating engaging football stories. With further development and improvement, FFF has the potential to become an even more valuable resource for football fans and writers.

1. **Conclusion**

In conclusion, this report has presented the development of an autonomous story-telling system that generates football stories with a focus on establishing novelty within the artefacts it creates. The system is designed to be creative by altering the templates used in the story generation process, and it aims to create artefacts that keep the user engaged. The report has discussed the various techniques used in computational creativity (CC) to evaluate the creativity of the system, and how the system uses engagement and reflection phases to create coherent and creative narratives. The report has also outlined the methodology used in developing the system, including the engagement and reflection phases, candidate word generation, candidate filtering, and user usage tracking. The FFF system has the potential to be developed further to adopt transformational creativity in the future. Overall, the FFF system has demonstrated how CC techniques can be used to create a story-telling system that produces creative and engaging stories, and this system can be used as a foundation for developing similar systems in other domains.

**References**

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