A microservice-based architecture for story generation

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Abstract

The present paper proposes an architectural model for knowledge interchange between story generation systems in the interest of enhancing the interoperability and fostering the co-creation process. The selected architectural approach is the microservices model, because it provides a very convenient way for structuring the functional responsibilities in the architecture, and promotes a distributed strategy for solving complex problems. The communication between the services is based on the well-known REST architectural model. This approach aims at simplifying the communication process by means of a easily achievable representation of the information[1].

1 Introduction

Computational Creativity studies how to develop software that can take on some of the creative responsibility in arts and science projects. A story generator algorithm (SGA) refers to a computational procedure resulting in an artifact that can be considered a story [2].

Automatic story generation systems have been traditionally designed as monolithic systems from an architectural point of view. That means that a single application concentrated all the required functionality and assets. Obviously, this was a feasible solution for the earlier systems, which were built mainly for research purposes and implemented a limited-complexity functionality. As the story generation systems are becoming more complex, they are being designed in a much more modular way.

Despite there is not much literature on the subject, several efforts concerning collaborative story generation have been carried out. Slant [8] can be considered a significant example of storytelling systems interoperating for producing a enhanced outcome. It is an architecture for creative story generation that integrates different types of story generation systems. Slant also provides a convenient framework with a view to other systems to integrate with it.

Slant is the end result of an ambitious integration project that has involved many existing storytelling systems. From a technical point of view, Slant consists of a blackboard architecture that allows different storytelling systems or components to create stories collaboratively. The solution involves the integration of several different components from Mexica [9], GRIOT [5], and any other components specifically developed for this architecture.

2 A microservice-based architecture for story generation

The present paper proposes an architectural model for knowledge interchange between story generation systems in the interest of enhancing the interoperability and fostering the co-creation process. The co-creation model implies the involvement of several systems and humans working together in an iterative cycle of enhancement.

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As mentioned in the previous section, many of the existing systems have been defined as monoliths, which make the collaboration between them a really complex challenge. This happens because almost every system duplicates a considerable part of main storytelling functions. For example, the generation of the story in natural language is a typical stage in every story generator. If every storytelling system break its architecture into finer-grain components, such as microservices, these components could be used separately. Also, every microservice would be autonomous enough to be independently evolved according new requirements, without affecting the rest of the architecture. But the most remarkable achievement of this approach would be the possibility of building hybrid coarse-grain services by composing the existing microservices. This new systems would take advantage of using the best-of-breed for building a collaborative story generation architecture.

This is precisely the aim of the architecture presented. It combines three existing story generation systems: STellA (Story Telling Algorithm) [6], PropperWryter [3, 4], and Charade [7]. The involved systems will be decomposed in its basic functionalities, that is, as microservices that will expose their capabilities as REST-based API. [1]. Every service will understand and generate JSON messages containing the required information in each case. Due to the fact that all these systems existed prior to the definition of the collaboration architecture, some parts can be considered as a legacy system that must be adapted to this new purpose. This is the reason why certain core capabilities of the systems will be reconstructed, and a new tier, specifically designed for publishing REST services, will be built for wrapping them. A high-level component, the composer, will implement the orchestration of the whole system, establishing the order in which every system would make its part.

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