IAT460

A2 Implement a Rule-Based System

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Technical Documentation (System Overview & Design Decisions)

System architecture and design decisions

The fantasy story generator utilizes two generative techniques, Free Context Grammar and Markov Chain. CFG structures and logically organizes the story format, while Markov chains add variety while maintaining consistency. The design decisions for this project were driven by the balance structured storytelling and ensuring logical coherence in every generated story. CFG to structed the story, and Markov chain to make unpredictable action.

Description of Rules, Grammars, and Models Used

The project's procedural story generator uses two core generative models to construct Free Context Grammars (CFGs) and Markov chains. These two models are responsible for balancing the structure and randomness of the generated fantasy stories. The Free Context Grammar component uses text created based on Freytag's Pyramid, and the Markov Chain model adds randomness to the setting, action, and combat sections.

Analysis of the generation process

The generation process of this system combines context free grammars and Markov chains. First, the system generates a story from the CFG with a coherent narrative arc, including the introduction, conflict, climax, and ending. Next, placeholders such as {CHARACTER}, {PLACE}, and {ENEMY} dynamically populate the text generated in the CFG or by the Markov chain model. Markov chains are trained on fantasy-themed text, allowing them to generate contextually relevant and unpredictable phrases, ensuring that story variants are maintaining a consistent logical structure. The final output has consistent character names, correct story flow, and a minimum word count of 100 words.

Discussion of Challenges and Solutions

Ensuring grammatical coherence is a major challenge when incorporating Markov chain-generated text into a structured CFG framework. Since Markov chains unpredictably change key words, some phrases in the story can be difficult to understand. To address this issue, CFG is prioritized for use with key story elements, while Markov chains are limited to generating descriptive elements such as

actions and motivations. Another challenge is the repetitive or broken sentences in Markov chains, which need to be de-trained by a larger amount of text to have a better output.

Creative Statement

Artistic/creative goals of the project

The goal of this project is to simulate a fantasy story that is de-generated through markov chain and a predefined story grammar, primarily in the creation of immersive and unpredictable narratives. This method of generating programmatically can provide dynamically generated plots, providing inspirational tools for writers, game developers, and RPG world-building, thus encouraging creative storytelling.

Inspiration and design process

This project is inspired by the combination of games and literary works, originating from the game Harry Potter Hogwarts Legacy. Re-learning the process of game making, it was thought that having a generator for developing scripts would make the development of fantasy games more efficient. The design process of this project is to combine CFG and Markov Chain. A Markov Chain model is trained on samples of fantasy text to ensure that the generated text remains coherent. Finally, the text is filtered and adjusted to improve readability

Reflection on the Results

The project succeeds in generating coherent fantasy stories that are well-structured but unpredictable. The system performs well in generating narratives, but has some limitations. Markov chain models occasionally produce more than phrases or disjointed sentences. In the future, more features can be added to allow users to go for better tuning of their desired requirements.