A Rule-Based Model for Socially Reactive Non-Player Characters

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# Introduction

Video games have come a long way since their early beginnings. Powerful graphic processors make games look stunning. Audio capturing and compressing techniques allow games to feature soundtracks played by full orchestras. It is now common to see books adapted to video games, and video games becoming blockbusters at movie theaters. As said in (Gómez-Gauchı́a & Peinado, 2006), video games came to par with the more traditional media and became a procedural form of art. This paper seeks to extend these media capabilities by exploring its most unique feature: the player’s interaction with the story characters. A rule-based model is proposed in the following sections to enable non-player characters (NPCs) to react to the players and other NPCs believably and realistically.

# The Heart and Soul of a Story

Characters, with their goals, beliefs, and emotions, are what make any story meaningful.

A believable character should be deep, have clear standards and goals, and act passionately towards them.

Characters are usually better constructed in the controlled environment of a movie or a book than in the interactive and unpredictable world of a video game

# A Rule-Based Model

In this work, I used CLIPS (Riley, CLIPS A Tool for Building Expert Systems, 2020) to generate a rule-based model to simulate NPCs' believable and well-motivated reactions in video games.

The first part of the model keeps track of facts representing an NPC’s goals, standards, and personality, which are stable along with their mood with is variable.

Goals represent the NPC’s objectives in life.

Standards are the principles that the NPC stands for.

Personality is how an NPC is predisposed to act and express their feelings.

Mood are temporary alterations in the way an NPC feels that will modulate their expression in addition to their personality.

The second part of the model is a collection of generic rules that, based on the current facts of an NPC, will generate well-motivated reactions.

# Some Model Integration Options

While CLIPS is an excellent tool to implement this work’s proposed model, one should also consider integration options to make the model usable by different programming languages.

As mentioned in (Riley, CLIPS Reference Manual Volume I Basic Programming Guide, 2017) and further explained in (Riley, CLIPS Reference Manual Volume II Advanced Programming Guide, 2017) and (Riley, CLIPS Reference Manual Volume III Interfaces Guide, 2017), CLIPS provides libraries and interfaces to integrate the system with a series of programming languages, but it does not support a generic application programming interface (API) agnostic to programming languages.

# Simulating a Small World

To experiment with the proposed model, I created three characters with different goals, standards, and personalities to see how they react to my actions.

Let’s analyze how each character reacted to my actions and try to explain it based on their definition.

# Conclusion

A rule-based model is capable of creating deep and believable NPCs by simply defining their goals, standards, and personalities. A CLIPS model can easily be extended, allowing developers to adapt the current system to their needs. This work was developed with video games in mind, but it could be used to generate and analyze characters' behaviors in any story, interactive or not. An interesting extension of this work would be modeling book characters, exposing them to known story events, and evaluating how similar their reaction would be to the original story.

# Summary

In this work, I have proposed a CLIPS rule-based model to create deep and believable NPCs that react players and other characters according to their personality and characteristics. I have discussed the possible ways of integrating CLIPS models to different programming languages and discussed the advantages of having a language-agnostic API for such systems. Finally, I tested the model in a small simulated world with three characters and analyzed their reaction when I interacted with them.

# Bibliography

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