
Societies in Games: How do Players Perceive Groups of Game Characters?

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Abstract

In recent years, game worlds are getting increasingly larger. With their expansion, the number of characters populating these virtual environments promotes a vast interaction space. To guarantee that interactions between characters do not compromise players' experience, they must exhibit coherent social behavior. Currently, game developers rely on scripted content to create the illusion of social behavior. However, we argue that a heavy authoring approach does not suit the generation of large populations of characters. In this work, we will use a computational model called Cognitive Social Frames to understand how players perceive and interpret the social dimensions of game characters' actions. In this document, we describe how we applied a socio-cognitive agent architecture to a population of game characters. Using a game-like environment, we intend to study what aspects of social behavior are perceived by players as relevant when generating societies in games. We elaborate on a proposal for a user study that will focus on the adjustment of characters' behavior based on their interpretation of the world and the coherence of their actions within groups of characters.

Author Keywords

Societies in games; Non-playable characters; Social cognition

CCS Concepts

•**Applied computing** → *Computer games*; •**Software and its engineering** → *Interactive games*;

Introduction

In the past few years, there was an increased use of procedural content generation techniques in digital games. This algorithmic approach allows game developers to create content to be placed inside their games. However, most techniques focus on generating visual and physical game elements such as dungeons, ships, buildings and terrain [1, 4, 9, 12]. The emphasis on this type of content alongside large procedurally generated environments brought forward the need to populate them with believable non-player characters. However, the solution should not be filling these vast worlds with characters that do not interact with each other in a meaningful way. Instead, each character must be able to exhibit social behavior that allows players to interpret them as members of a society. As such, we argue that efforts should be made to research the algorithmic generation of groups of social characters in games.

Towards generating societies in games, each character must have the mechanisms to exhibit social behavior. Some researchers created interactive agents with the capabilities that allow them to have social interactions between them as well as with players. In “Prom Week” [7], each character, based on “Comme il Faut” [6], has a set of social goals and needs to fulfill them by interacting through social exchanges with other characters. In Mateas and Stern’s “Façade” [5], while accounting with player’s actions, characters adjust their behavior based on their moral values and the game’s plot filled with dilemmas. Both approaches were able to endow characters with social capabilities. Nonetheless, the resulting behavior required a lot of scripted content. On the other hand, some researchers were able to procedurally

generate social content such as languages [10], forms of speech and dialects [2], the evolution of virtual characters [3] and their affinities with one another [11]. However, these environments focused on showing the results of the generation rather than the gameplay. As such, the interaction with the game characters, when possible, was not engaging.

Taking into account the increasingly large size of worlds in games as well as the lack of enough algorithmic approaches to populate these environments with rich social characters, we argue that new methods to procedurally generate societies must be researched. Since the application of these techniques in games has not yet been explored, in this document, we elaborate on a proposal for a user study that aims to understand how players perceive societies in games. We designed and developed a framework to study how some social behaviors are interpreted by players and what contributes to the generation of identifiable societies. In the environment created, the game characters implement a socio-cognitive architecture called Cognitive Social Frames [8]. As a result of this study, we expect to identify the social characteristics of characters that help players recognize societies in games.

Cognitive Social Frames

To study the effects of social interactions between game characters on players, we will use the agent’s architecture Cognitive Social Frames [8]. This architecture enables characters with the capability of adapting their behavior based on their interpretation of the surroundings, called Social Context. The adjustment is made through the use of cognitive social frames (CSFs) that identify social contexts’ affordances. As such, a game character implementing this model will be able to identify socially adequate actions and shape its behavior. Game characters’ CSFs are inherited

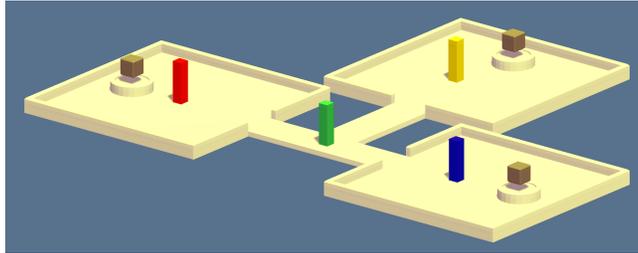


Figure 2: Current prototype of the game environment

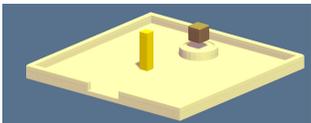


Figure 3: Zone

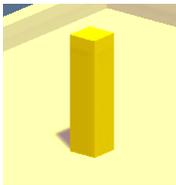


Figure 4: Character

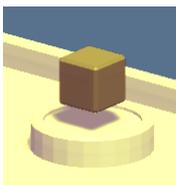


Figure 5: Token

Scenario

The scenario we propose is a 3D environment with multiple characters represented by abstract shapes that support several actions, such as changing color or texture. Figure 2 shows an early prototype of the environment implemented in Unity.

The game characters (Figure 4) are able to move across the entire environment and, based on their current context, they identify different opportunities for interaction with the world. Each scenario has a set of zones (Figure 3) that carry a social meaning assigned by each character. Each zone also has a physical token (Figure 5) that promotes the identification of a selected group of affordances.

Currently, we do not intend to manipulate the environment and see its effects on the characters' behavior. Instead, we want to explore how different interpretations of the surroundings and the inheritance of cognitive social frames might shape the social interactions between characters. To study the role of these processes in the generation of societies and the effect they have in players experience, we designed three scenarios that are detailed in the following sections.

Distribution of CSFs across characters

Within a population of characters, some members might adhere to a subset of CSFs while others might inherit a different subset. This varied distribution of frames promotes the emergence of distinct behaviors across game characters.

This scenario allows us to explore how different sets of CSFs can promote distinct patterns of behavior inside groups of characters. Looking forward to understanding how the variety of sets of frames might affect the players' perception of the population of characters, we will manipulate their distribution as follows:

- All characters will have the same set of CSFs
- All characters will have the same set of CSFs, except for one character
- All characters will have the same set of CSFs, except for a small group of characters
- Multiple sets of CSFs will be equally distributed in a population of characters

Complexity of the Social Context

The construction of social context is subject to the character's interpretation of the surroundings. To an extent, this process identifies the character's relationships with the remaining entities of the world by ascribing them social meaning. However, the detail of the social value assigned to other characters and physical things also depend on character's cognition.

In this scenario, we plan to study how different dimensions of social meaning assigned to the surroundings might influence characters behaviors and players experience. As such, we want to study the effects of different interpretative processes for the construction of the Social Context, namely:

- Based on the physical environment
- Ascribing social value to the physical environment
- Social relationships with other characters
- Identifying social categories and group memberships

Characters adoption of CSFs

To abstract the process of generating and learning each frame, we propose that each character inherits from the social reality a subset of Cognitive Social Frames. However, this process might be subject influences that modify the inherited frames. These mutations might serve as a basis to procedurally generate societies since it might represent unique interpretations of social affordances while guaranteeing similar behaviors among characters.

The processes that shape the CSFs offer an interesting opportunity to explore distinct algorithmic approaches that produce different populations of game characters. We look forward to studying how the resulting characters' groups affect players and what generative techniques reveal to be more promising. Currently, we intend to explore the following approaches:

- Random assignment of CSFs to each character.
- Random mutations that modify each CSF assigned to each character.
- Intelligent approaches that strategically deploy CSFs across multiple characters.

Expected Contributions

The three scenarios we proposed aim to answer particular research questions that we find relevant to explain before starting to develop robust procedural generation mechanism to create societies. As such, we expect that, after conducting these user studies, we can contribute with clear and practical guidelines that might help other researchers and

game developers to build richer social interaction in games and, eventually, societies.

Nonetheless, the flexibility of our framework allows us to study other aspects of social interactions between characters that occur in computer games. By selectively introducing changes in the components underlying our Cognitive Social Frames model and manipulating their implementation in populations of characters we observe and study particular social phenomena. So, we also expect to deliver a framework to study the impact of different social capabilities in games and entertainment systems, such as group dynamics, social learning, and social identity.

Concluding Remarks

Adding a social dimension to the interactive space of games may change players' experience, namely their interpretation of game characters and their relationship with these non-playable characters. In this work, we intend to answer some research questions about the effect that social interactions between virtual agents have in an external observer.

Using our model of Cognitive Social Frames, we designed three scenarios to study the impact of characters' interpretative process, the distribution of frames across a population and the inheritance/adoption of frames. We expect to contribute with knowledge about the effects that these factors might have in the recognition of societies in games as well as a framework to study other social phenomena in games.

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