

The Computation of Self in Everyday Life: A Dramaturgical Approach for Socially Competent Agents

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Abstract

In order to participate in storyworlds with rich social interaction, autonomous characters must be able to participate in social games. A social game is a multi-character social interaction whose function is to modify the social state existing within and across the participants, possibly concurrently accomplishing a functional (non-social) state change. In this paper we present an autonomous character architecture that integrates high-level goal formation and goal refinement in the context of playing social games. Additionally, we present preliminary work on an ontology for describing social games as well as a social-game-centric ontology for character personality. Both the architecture and ontology are informed by theoretical work in sociology and social psychology.

Introduction

To create more socially competent, believable, human-like autonomous agents, sociological tools can be leveraged to more closely model human behavior. In particular, there exist sociological tools that would aid in the creation of believable agents for use in interactive narratives.

Interactive narratives often include a small number of agents in a particular setting interacting with one another in social ways (Mateas and Stern 2005). A well suited tool for understanding and predicting behavior in this type of context is dramaturgical analysis (Goffman 1959). Dramaturgical analysis views social interactions in the metaphor of a drama; actors, roles, props, setting, audience, and stage are all identified. This metaphor is particularly useful when modeling self-presentation, or the manipulation of how one is perceived by others. When social interactions are seen through this metaphor, the reasons behind their behavior become more decipherable. Models of personality-specific social game behavior can then be constructed through dramaturgical analysis and can

be used to inform the behavior of agents in interactive narratives.

In this paper, we present the notion of a *social game*: a pattern of multi-agent interactions whose function is to modify the social state existing within and across the participants, which is derived from cases of applied dramaturgical analysis. Additionally, we provide an ontology for describing social games as well as a social-game-centric ontology for character personality. Lastly, we provide a framework aimed at producing more socially coordinated and believable interactions in autonomous agents by leveraging the structure of the dramaturgical metaphor.

Related Work

Research on autonomous synthetic characters that behave in human-like ways has been an active research area in recent years (Loyall 1997). Each vein of exploration in this research area has different foci and interests. One such important distinction is modeling the emotional qualities of agents as opposed to explicitly focusing on the social aspects of agents. While emotional and social states are dependent on one another, the relationship between them is very complex and largely unknown. This leads to making heavy assumptions, generalizations, or ignoring entirely the area that is not the focus (as to do otherwise currently would be an intractable problem). This means the importance of this difference, with respect to agent building and simulation, is the level of abstraction at which the agents reason.

KARO is a framework that allows for agents to reason over their emotions (Meyer 2006). Emotional responses of agents are simulated via appraisal dynamics by EMA (Marsella and Gratch 2006). Additionally, there has been work done that is aimed at reaching from the realm of emotion toward social qualities through social emotions and attributions (Gratch, Mao and Marsella 2006).

Thespian (Si, Marsella and Pynadath 2005) and the system it is built on, PsychSim (Marsella, Pynadath and Read 2004), are multi-agent capable systems that model social interactions based on models of social influence. Each agent has goals, actions it can perform, beliefs (including a recursive model of other agents), and mental models to increase the efficacy of the simulated agents' behaviors. The social interactions are based around the rules of social influence.

Some research has focused on social group interactions. The SGD (Synthetic Group Dynamics) Model of multi-agent social interaction is based on having each group member being aware of the other group members and of the group itself (Prada and Paiva 2008). The SGD Model is based around four levels of agent knowledge: the individual, group, interactions, and context levels.

FearNot! is an application of virtual drama aimed at anti-bullying education (Aylett, Louchart, Dias, Paiva and Vala 2005) that has very similar themes to our architecture. Similar to how the concept of social games was informed by drama, FearNot! was inspired by drama in the form of Forum Theatre. The psychological model of appraisal is responsible for the agent's emotional and social changes during the course of the game. When FearNot!'s interaction is viewed in terms of social games, its internal structure is comprised of several social games: player introduction, interaction between the bully and a child, and the player giving the child advice.

Dramaturgy and Social Games

One way to get a sense of the concepts needed to represent and make use of social games is to critically observe social interactions with the intention of noticing social games via a dramaturgical perspective. We have two needs to fulfill when choosing a source of social interactions to observe: (1) a dramatic setting (to better correspond to interactive dramas); (2) access to a rich and plentiful source of social interactions. To this end, we decided to study a television show with a focus on dramatic interactions and character-driven story: the HBO show *Sex and the City*.

In this study, the situations and actions taken by the characters were cast into a dramaturgical metaphor. Individual interactions were viewed in terms of the roles taken by the participants, the setting of the interaction, teams composed of the participants, who comprises the audience, etc. With the interactions represented in this dramaturgical way, social games became easier to distinguish from within the drama. This process of viewing and interpreting a social situation is known as dramaturgical analysis.

In order to turn observations into social games, criteria are needed to perform the screen action to social game mapping. The first criterion consists of identifying a set of screen actions that are directed toward a common set of social state changes. Secondly, the set of social state changes brought about by the screen actions must further the goals of some subset of participants in those actions.

The application of these criteria to observations generates a set of social games, each of which contains at least one actor (participants in the performance who are not part of the audience) who has a goal consisting of the set of social state changes that result from the associated set of actions.

The dramaturgical analysis of *Sex and the City* helped formalize the concept of social games. First, a group of social interactions were observed and analyzed dramaturgically. They were then decomposed into a list of causally and temporally related events and a set of dramaturgical properties. From these analyzed social interactions, a schema for representing social games was developed.

The schema for representing social games consists of a description of the social game's dramaturgical qualities, the social and world state preconditions for the game to start, a dependency graph of social game events, and the state changes enacted by game completion (see figure 1). The dramaturgical qualities consist of a list of roles and their requirements, qualities needed in the setting, teams among the actors, and what qualifies as an audience for the social game. Social game events are composed of a list of participating actors, temporal properties, actions taken by actors, functional world change, and social facts modified by the event. Optionally, the events can reference other social games to create a hierarchical decomposition of social games. Because the social effects of social games can be different than the sum of the changes specified in its events, the state change upon the games' successful completion is also represented.

Other properties of social games that resulted from the dramaturgical analysis are that they are hierarchical and sets of social games can be played in parallel. Furthermore, personalities and emotional states of the actors have a great deal of influence on the performance of the actions taken by the actors when performing in social games. To illustrate the results of the study, an example of a social interactions analyzed in the study is helpful.

To begin exploring a scene in *Sex and the City* in a dramaturgical metaphor, some of the more general dramaturgical attributes need to be related to the social situation. The setting of the performance is composed of a wedding engagement party held in an expensive apartment in Manhattan. The audience consists of several dozen upper-middle class married individuals who are all in some way socially connected to the newly-engaged couple. The props present are objects typically found at celebrations: champagne glasses, tables, chairs, presents, etc.

The cast consists of two single friends, Miranda and Carrie, and a group of several female acquaintances, all of whom are married. Carrie and Miranda have two very distinct personalities. Carrie is an outgoing person who tends to directly face situations one at a time and is very focused on the role she is playing. Miranda, while being focused like Carrie, prioritizes the avoidance of bad things over proactively seeking her goals.

The scene begins and plays out in the following sequence of events. Carrie, Miranda, and the group of

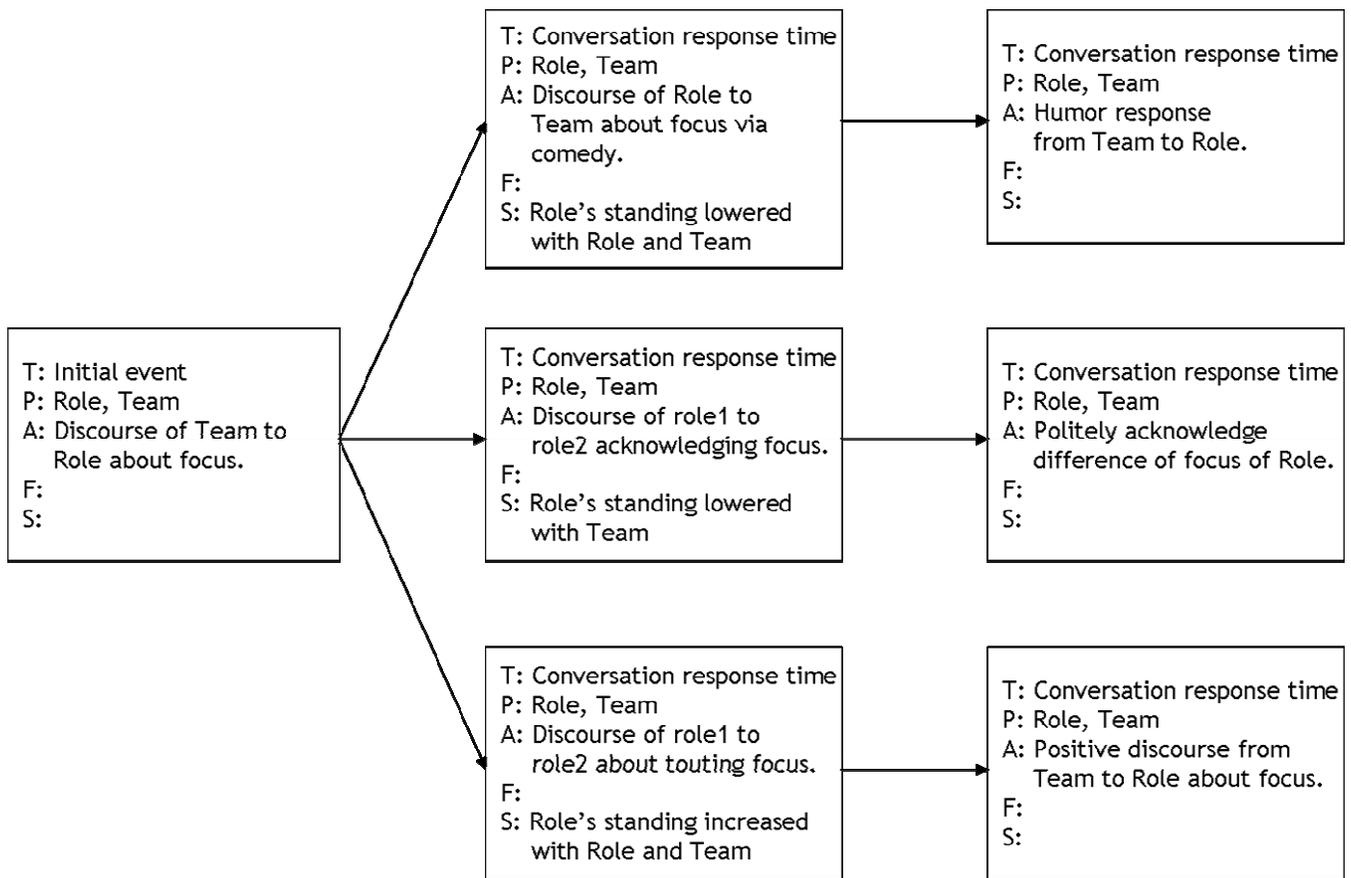


Figure 1- The dependency graph of events for the “not like the others” social game. The event attributes are T for temporal qualities, P for performers in the event, A for actions, F for functional world change, and S for social state change. The dramaturgical preconditions are that the members of Team have a social fact in common (the focus of the social game) while Role lacks focus.

women are engaging in conversation when the topic of relationships is brought up. The group of women discusses their current relationships. Eventually, the focus is placed on Carrie and she is asked about her relationship status. She states that she is single and content then passes the conversational back to the group. They then proceed to similarly ask Miranda about her relationship status. Miranda responds by going into a round of self deprecating jokes about her being single. She then excuses herself from the scene and exits the stage with Carrie; the scene ends.

When this scene is considered with the criteria of determining social games from scene actions, a clear game is present in the previous example. The actions taken by Carrie, Miranda, and the group of women result in the social state change associated with what the group will think of those who do not share a vital part of the group’s identity (the identity of being in a relationship). Two characters, Miranda and Carrie, have the goal of using the actions in the scene to manage the impression that the group of women will form of them. We call this social game “not like the others”.

This social game illustrates an important concept related to dramaturgical analysis: impression management. Impression management is a goal-directed attempt at

influencing the perceptions that are formed by others, which can be performed either consciously or unconsciously. It is not necessary for the subject of the managed impression to be the one performing the managing; the impressions can be of another person, event, or arbitrary object. When one manages the impressions of oneself, it is called self-presentation. Impressions are managed by regulating social information and interactions. Both Miranda and Carrie had the goal of self-presentation with regards to the group of women in the social game.

Seen in terms of the social game representation schema, the preconditions of this game are that there is a group with a similar social status that another, smaller group does not possess. Each of the events in the scene has associated social change, temporal qualities, actions taken, functional change, and list of participating actors. Taking Carrie’s response to questioning as an example, the social change is that Carrie establishes herself as an outsider of the group, while keeping the repercussions (such as stigmatization or being ostracized) to a minimum. Temporally, Carrie’s response happens after the questioning by the group of women, before she relinquishes the conversational turn back to the women, and takes an amount of time associated with her discourse. Her actions consist of turn taking, a

discourse act, and turn giving. The other participants perform the action of listening to Carrie. Movements involved in keeping conversational distance, lowered levels of champagne in glasses, and other common world changes associated with parties comprise the functional storyworld change. Finally, the participating actors are Carrie as the speaker and Miranda and the group of women as listeners. The dramaturgical qualities have been previously stated. Finally, the state change at the completion of the game is primarily comprised of the fact that the game was successfully completed and none of the actors broke the game structure or refused to play.

The context of the episode around the scene shows the compositional nature of social games. Because Carrie and Miranda are friends of the groom-to-be, they are playing a social game of supporting their friend's engagement. The example game played with the group of women was an event in the larger social game of supporting a friend. Furthermore, by planning to go to the party together, Carrie and Miranda are playing a social game of mutual support while simultaneously playing the example social game.

Agent Representation Areas

Employing dramaturgical analysis requires an ontology and representation for agents to reason about social games. Unfortunately, such an ontology that supports the areas of representation needed does not exist. As part of our study of *Sex and the City*, basic knowledge about the areas of representation needed to reason over social games began to coalesce. Social games provide a script that, when followed, keep the agent acting in a way consistent with social norms. However, social games do not fully specify behavior but instead carve a social space of related social interactions. The descriptions of the agent provide the specific ways in which social games are played that make agents distinct. Examples of the choices that have to be made are how to conduct impression management, and choosing a social game to initiate. Basically, we wish to represent that which makes Miranda's reactions to a social game different than Carrie's reactions.

We present the following categories as part of the preliminary work done on an ontology used to represent the social state needed by agents in our architecture.

Personality Descriptions. As previously discussed, social games detail a script of social behavior in which an agent can make personality specific decisions. In the example social game, Carrie behaves quite differently than Miranda given the very similar contexts and social games. To encompass this notion of personality specific variation in social game performances, a description of the factors from which the difference in performance stems is needed. In order to facilitate the process of social game play, both social games and personalities are described in a way that our architecture can reason over their contents and produce enactments of social games consistent with those descriptions.

Personality as used in this ontology is based on addressing the issues raised by studying social games. Primarily, the personality description needs to capture both the dimensions of variation in social games and the richness of individual impression management. This extends through the choosing of social games to initiate, negotiating what roles to play in social games with other participants, and the variation seen in the performances of the actions in social game events. Trait theory (McCrae and John 1992) is often used in agents to describe personality. However, it lacks the expressiveness needed to characterize personality-specific differences in detailed impression management. To address this requirement for expressiveness, there is a need for a personality description that allows for personality attributes that are relatively independent of any particular social game, such as a social game choosing parameters, and dependent attributes like reactions to different classes of social games (such as reciprocity and affinity games) and storyworld state (like claustrophobia or sense of personal space).

Social Emotions. The goal of describing personality is to facilitate the modeling of social spaces in which agents interact. Although they are not the primary focus of the description, emotions play an important relationship as they can influence the decisions made during a social game in a manner not captured in the social game structure. For example, Miranda may have been feeling an emotion that helped her to choose a self-deprecating performance over one in which she confidently claimed her singlehood.

The role of emotions on behavior has been explored in depth (Ortony and Turner 1990, Frijda 1986, Izard 1977, Parrot 2001). However, for us, the social role of emotions is the primary consideration in supporting the simulation of social games. Fortunately, when our need for additional emotional richness increases, there exist several research projects that can be leveraged which have explored the use of emotions in interactive agents (Marsella and Gratch 2006, Gratch, Mao and Marsella 2006).

Social emotions (Parkinson, Fischer, and Manstead 2004), or emotions intrinsically linked to social concerns and that cannot exist without a social component, are prominent in the motivation of characters that can play social games. The social emotions that are likely to be the most used in this ontology are the ones that have been the most often cited in literature and have associated appraisal models; jealousy, gloating/schadenfreude, guilt, gratitude, envy, anger/rage, and admiration are examples of social emotions that meet the criteria (Hareli and Parkinson 2008).

By keeping an emotional state that includes social emotions, agents can evaluate the social state change of a social game and modify their emotions accordingly. Through the modification of emotional state after each social game, the emotionally influenced actions and decisions made while playing social games will vary more believably and richly when simulated.

Beliefs. The facts present in an agent's memory do not represent the ground truth of a world, as each agent's conception of the world is a production of its past experiences and current social state. In keeping with the concept that everything is social from the dramaturgical metaphor, all facts, including those that are mundane facts of the physical world, are remembered by the agent.

In order to categorize facts in a convenient way, inspiration was taken from Searle's ontology of fact representation (Searle 1995). Facts are partitioned into basic facts, or facts that do not change with social influence (like the height of a mountain), and social facts that can change independently of the physical world (through social influence, what an agent perceives as the height of a mountain can vary from the basic fact of the mountain's height).

Social facts comprise the agent's view of their social state. Status facts and institutional facts (socially inferred statuses and facts that cannot exist without a social context, respectively) as well as relationships can be represented with a slight variation of Searle's status facts notation. This variation is: X is associated with Y in context C where X and Y are world objects or compositional social facts and C is a context consisting of a set of objects or social facts. This representation is useful for representing concepts like status facts. For example, Carrie is associated with the status fact of being single in the context of the social game played at the engagement party.

A special set of social facts are used to represent the concept of social norms (Goffman 1963). Social norms are the set of social expectations of the culture an agent represents. These norms are used in social game negotiation to help parameterize the dramaturgical qualities of the game. They also bring the potential for cultural conflicts to be present in social interactions.

Architecture Overview

To produce a system that simulates social games in a human-like way, there is a need for an architecture that is designed to handle the complexity of choosing social games and the flexibility to allow for the wide range of performance variation found in social games. Here we outline an architecture that supports the simulation of social games.

The agent architecture is comprised of several components: the agent and its constituent pieces, the goal setting processes, the intent forming process, the game negotiator, and a database of annotated social games (an overview of this architecture can be seen in figure 2). Each agent participating in the system follows this process in parallel with other agents. This system is designed to model the process of human goal setting and turn the goal into an actualized social game using dramaturgical analysis as an organizational framework.

The goal setting process begins by employing several partial behavior theories developed in social science (some of which are described later in the Goal Setting section).

An agent personality description is used to depict the types of goals the agent would be most likely to choose. A set of likely goals, such as to lower reciprocity (sociological concept of indebtedness) with a specific agent or to obtain power to influence another, is generated. Each goal is assessed for importance and persistence with respect to the agent (as described in Goal Volition section).

Next, the most important goals are matched with social games that progress toward these goals. Other agents are notified that the agent wants to play a social game. This begins the game negotiation process where the details of the social game (role assignments, setting, audience, teams, etc) are determined. When the game details are successfully attributed, the game is enacted in the simulation world. The social, emotional, and physical ramifications of the game are then assessed by each agent. Each agent updates their emotional, social, and goal setting states according to the assessments. After a social game is complete, each participating agent begins at the beginning of the process.

Goal Setting

In order to believably operationalize this notion of social games in an autonomous agent, the agents need a system of reasoning over social games and of choosing which social games to play according to their personality description and the current storyworld context. This necessitates instilling the ability to reason about and set goals to guide the choice of social games.

At the highest level of goal setting, the agent is informed by a more sophisticated version of the theory of ultimate psychological hedonism (UPH) (Mees and Schmitt 2008). In a way similar to how the maximum expected utility function in a rational agent guides many existing agents toward actions that should attain maximum benefit, UPH lays the framework for social agents to further social goals. In its ancient, original form, UPH states that one approaches physical pleasure and avoids physical pain, providing a basic motivational factor for behavior. Modern adaptations have extended UPH to include emotion as well as physical pleasure and pain to be respectively approached and avoided.

While the modern version of UPH provides a general motivation for behavior, it is not rich enough to support the construction of an agent that performs goal setting in a human-like way. Variations in personality, such as emotional tendencies and social norms, are not accounted for by UPH. Additional theoretical tools are required to build such an agent.

The following theories support goal setting in a human-like way. This list should not be considered complete or final because goal setting is not a solved problem. Each theoretical tool solves a small part of the goal setting problem and can be integrated with the other theories to provide a higher degree of human-like competency in choosing goals for social games.

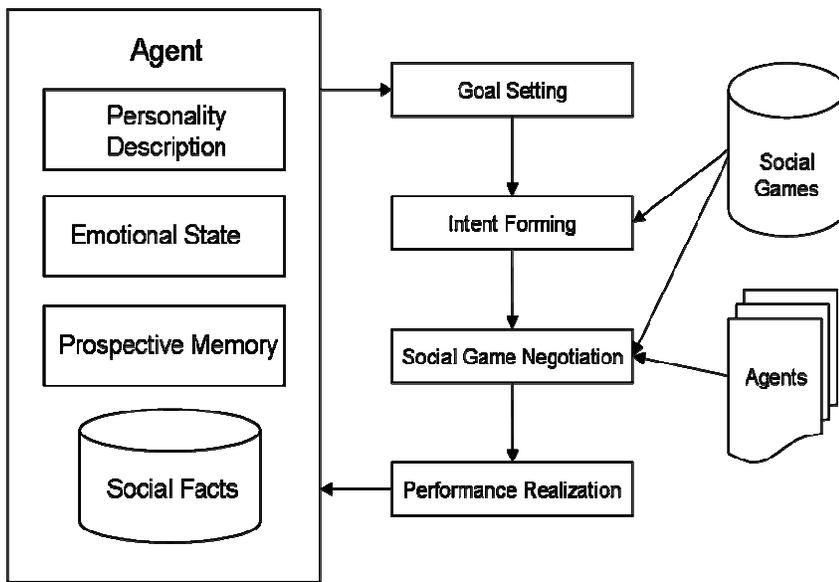


Figure 2 -. Overview of the process each agent follows in our social game enacting architecture.

TMMO. The modern notion of UPH is the basis for the two-dimensional model of metatelic orientation (TMMO). TMMO places individuals in a two-dimensional space with the first dimension being approach/avoidance, and the second dimension the directness or indirectness by which the goal is explored.

TMMO also makes a distinction between content-based (telic) or emotion-based (metatelic) goal motivations. Content-based motivations consist of low social and emotional impact goals such as walking to the grocery store or playing the role of a cashier. Emotion-based motivations are much more involved with social and emotional situations. Gaining retribution for slander or positioning oneself for a job promotion are both goals that are emotional-based.

Social Emotions. As previously stated, social emotions are related to social games and to the agents that participate in them. In relation to social game choosing, the desired state of social emotions can be a pleasure to be approached, a pain to be avoided, or as something to manipulate in other participants. Furthermore, social emotions can be motivators for conscious impression management. To return to the *Sex and the City* example, Miranda was motivated by the social emotion embarrassment when she decided to use humor as a tool for self-presentation during the “not like the others” game.

Goal Volition. An agent that plays social games needs to have a mechanism for comparing the importance of the current social game with social games that could be played. When considering alternate social games to play, the agent runs the risk of seeming single-minded if one social game is doggedly pursued. Alternatively, an agent who

constantly and rapidly switches goals seems unintelligible. Furthermore, if goals are chosen as important to the agent and are subsequently forgotten because they were unobtainable when set, the agent could be seen as vacuous or lacking human conviction.

Action psychology introduced the concept of goal volition, or a measure of the persistence an agent has in goal pursuit (Dholakia and Bagozzi 2002). The strength of volition for a goal is dependent on two major factors: goal intention and implementation intention. Goal intention is characterized by the desirability of the goal as determined by the agent, while implementation intention is a function of how well-formed the plan is to reach a goal. A goal that is desirable and is associated with a detailed plan for realization is more likely to stay an active goal with the agent than one that is not liked and vaguely planned.

Another important, related concept is that of prospective memory. Prospective memory is used to store goals that are not immediately obtainable but still have a high level of volition. Conditions to attain goals in prospective memory are acted upon when the volition of a stored goal is high enough to become an active goal. Additionally, active goals that can no longer be satisfied in the current world or social state are put into prospective memory to await the return of favorable conditions. Each goal in prospective memory is assessed for viability and has its associated volition updated during the goal setting process.

Intent Forming and Social Games

After a set of goals are established according to the agent’s personality description, they need to be refined into a set of actions and world state changes that can be manifested in the simulation. This process is known as forming intent. The practical implication of intent forming in this architecture is that it maps goals into social games an agent wishes to play. They resultant choices of social games are parameterized by aspects of the personality description. Additionally, the state of the storyworld has to fulfill the preconditions and the dramaturgical descriptions set by the chosen social games before the game can be a validly formed intent.

From the set that match the dramaturgical requirements and fulfill the social game preconditions, one social game needs to be chosen to be sent to the other agents to start the role negotiation process. To make this decision, the agent must match its goals against the social game’s completion effects and the changes caused by each individual event. If the social state changes of the social game match the goals of the agent, the social game’s events are examined to determine if any of the personality description is violated.

If there is no violation, the game is chosen and is sent to the role negotiation process.

Consider that Carrie and Miranda are agents in our system and that the results of “not like the others” left Miranda and Carrie with lowered self appreciation. Assume in Carrie’s personality description it is noted that she has the tendency to prioritize being a caretaker to her friends. Since Carrie is Miranda’s friend, it is likely that she will set a goal to improve Miranda’s image of herself. Now Carrie has a goal to help Miranda which is prioritized in her personality description. When this goal is acted upon, it must be matched with a social game that results in Miranda feeling better. Assume that Carrie’s library of social games consists of two social games: “insult other” (which results in the other feeling worse) and “compliment other” (which results in the other feeling better). Now she would look at the social games in her library and choose a game that furthered her goals. She would look at and reject “insult other” and would form the intent to initiate the “compliment other” social game.

Role Negotiation

After a social game has been chosen by an agent, the remaining details of the dramaturgical metaphor need to be determined. The agent (who wants to play a particular social game) cannot assign roles to other agents according to its interests; the potential participants need a chance to weigh in on their role in the proposed social game. After all, if a performer in the team of people in a relationship wanted to hurt Carrie’s reputation by placing her in a compromising role in a social game, would Carrie blithely agree to take on that role? It is likely she would refuse to participate in that specific role in the proposed social game. Keeping roles consistent with the personality and goals of the agents in a proposed social game is the responsibility of the role negotiation process. It is important to note that this process is typically one that happens on an extremely short time scale with humans; intent is formed, roles are taken, and social games are enacted many times in every conversation people participate in.

When an agent decides to play a social game, all of the potential participants are notified. Potential participants can be either those intended to have a role by the initiating agent, agents who wish to opportunistically take a role in the social game to attain their own goals, those who are in back stage teams, and those who are potential audience members. Agents can accept a social game role based on either their goals or their willingness to participate in social games that are goal neutral (as set in the agent’s personality description).

Social cognitive research provides further richness to role negotiation through the concepts of role cognition and role focus (Lynch 2007). Role cognition refers to the thought put into choosing and performing a role in a social game, while role focus is how cognitively and behaviorally consumed one is with the role.

The intensity of role cognition and role focus is denoted by a “hot/cold” metaphor. Hot role cognition refers to a

high level of effort put into performing a role while cold denotes a blind following of a social template or schema when performing a role. Similarly, hot role focus is characterized by single-mindedly adhering to one role in one social game. Cold role focus means performing many roles serially or in parallel.

Hot and cold social cognition provides a framework for agents to have varying degrees of permissiveness to pursue their goals (as opposed to simply participating in social games initiated by other agents). This provides a mechanism through which the desirability of multi-tasking social games or the rate at which an agent will switch goals can be specified. For example, Miranda displayed relatively hot role cognition due to the fact that her comedic performance took more effort than simply providing a rote response. Alternatively, if Miranda had a goal of meeting as many people in the party as possible and did so with a hot role focus, it is likely that she would have avoided the social game altogether in favor of meeting someone new.

The setting of the social game is largely a function of locations of the participating agents. If the initiating agent wants to better plan the location of the social game, other social games (such as asking another agent to move locations) can be used to create a deliberate setting. This type of deliberation is a direct result of hot role cognition and affects the volition of the appropriate goal by adding to the implementation intention. If a member of the team involved in “not like the others” had the goal of embarrassing single party goers, they could initiate social games that changed the location of the team in a better location to find those who are single (like near the entrance of the party or some other high traffic area).

After the role negotiation process is successfully completed, the social game is ready for realization in the storyworld. However, the exact manner in which dialog and acts are involved in instantiating the social game has not yet been specified. A system capable of generating actions and dialog acts from higher level descriptions, such as the dynamic generation of discourse structures (Strong and Mateas 2008), would complete the architecture.

Conclusion

In this paper, the concept of a social game as an organizing principle for defining meaningful social interaction between believable autonomous agents in a story setting has been introduced. An emphasis was placed on the large amount of variation found in the performance of social games that stems from impression management and variations in the personality of the actors. It was also shown how dramaturgical analysis is a useful tool for both extracting social games from social interactions and describing them in a form that can be reused in other contexts.

The outline of an ontology that can be used to express the needs of simulating social games was presented. This ontology explores the areas of representation needed to

describe social games and personalities in a way that allows for a complex, human-like performance of social games in a storyworld.

Also described was an agent architecture, similar in structure to a BDI (Bratman 1987) system, with an emphasis on playing social games. Components of the architecture were depicted with an emphasis on how they contribute to playing social games.

In the future, the concepts presented in this paper are to be instantiated as a complete system. The areas of representation of social games will be further expanded upon to capture a larger variety of social games and variability in those games. Finally, we intend to enrich the library of social games through further dramaturgical analysis of social interactions.

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