Complex Character
Model for a Non Player AI Character for Interactive Narrative Discourse

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Abstract: Non Player Characters (NPC) in Interactive Drama, *Façade*, are built based on the Believable Agent model. This model is made for effectively managing character behaviour, as believability is expressed by visible actions. Yet NPCs in *Façade* do not render their 'rich characters.' The dialogues do not respond well enough to express any complexities the characters may have. For dramatic narratives, authors in Interative Narrative (IN) need ways to reveal complex characters. How can AI be used to build a complex character for interaction? More importantly, how should these complexities be revealed to the reader? This paper proposes design contexts for a complex Non Player Character (NPC) for the interactive comics framework, Cyber Comix.

1 INTRODUCTION

Interactive Narrative (IN) research has two main problems: practical and theoretical. These problems can be related the early ideal model of what an IN system could be, represented in Murray's Holodeck (Murray, 1997). Holodeck is a fictional, virtual simulator from TV series *Star Trek*. In Holodeck, the user is in a photo-realistic fantasy theatre where all his entertainment whims are met by Holodeck, be it a plot change or interaction with characters in the story. One of the practical problems of Holodeck-like systems is that the storytelling is taking place in a 3D virtual environment. This constrains IN under the monstrous task of managing animation in real time play.

Photo-realistic, animated visualization is technically possible, yet practicality it is a bottleneck because such technology requires most of the technical resources in a production (Aylett et al., 2011). This practical handicap prevents individual artists from taking part in developing IN in general, simply because the complex technology is limited to highly educated experts in computer programming and animation. If we consider two IN systems developed after Holodeck ideal, *Façade* (2005, in 3D on PC) and *EmoEmma* (2009, in CAVE VR), most of their research resources are used for managing 3D animation, which is more of a representational technology. It is not surprising that none of the prototypes are replicated outside of the lab. The efforts to realise the ideal model of Holodeck should not be underesti-

mated. However, we could acknowledge that IN is not limited to a 3D animated virtual environment. This paper investigates an alternative graphical narrative medium that is not necessarily animated, yet suitable for IN systems. This may invite more participation from general authors in developing IN. Disregarding animation may be considered drastic by some, however I argue that the boundary of storytelling is much bigger than animated expression, and it needs to be explored.

A theoretical problem in IN research is that the discussion of interactivity for narrative discourse is user-centric: how the user benefits from interaction. We know that users benefit from increased presence, sense of agency, and pleasure of navigation in simulated interaction (Murray, 1997), (Carlquist, 2013) as well as understanding what kinds of players they can be (Aarseth, 2007). However, we know very little about what interaction means for the authors. How can interaction serve the narrative discourse? Should the author make up a story first and translate or adapt interactivity for the users without any artistic benefits? In this regard, the author has been marginalized as someone who must give up narrative control and is in conflict with the user who wants more freedom. This might be considered a misplaced claim, as we did not seriously consider what interaction means for creating narrative discourses from the author's point of view. For example, if we look at interaction as an expressive form for storytelling, we may have different ideas regarding what benefits the users as well.

The top-down approach in present IN practice can be summarised as: here are what users like to do in interactive narrative, make up a story that produces such interaction. Narratives found in computer games seem to be just such practices. This may lead authors to limit their creations, as well as discourage potential authors from participating.

To address both aspects to the benefit of authors, the Cyber Comix framework is developed (Holmen, 2014a); proposing an accessible technology in graphical IN, and testing a different interaction that may be artistically interesting for a discourse. The research question regarding this paper is: how to reveal complex characters in interactive narrative discourse?

Cyber Comix uses 2D comics (non animated) graphics for IN system, and a chatbot character to interact with. A user is role-playing in interactive comics, and can type in dialogues to have conversations with a Narrative Non Player Character (NNPC) within a narrative discourse. The interaction is conversational, and the focus of the IN research is how to build a knowledge base for a complex character in AI. In this paper, I will investigate a previous IN system, *Façade*, and its character model of Believable Agency, and propose a Complex Agency model to improve expressing characters' interior world.

2 NEO ARISTOTELIAN THEATRE V. MODERN LITERATURE

When PC and internet technology advanced in the 1990s, New Media was noted for its interactivity and user controlled content. 3D Computer Generated Images (CGI) technology also presented new possibilities to build photo realistic 3D virtual environments. New Media's hot trend was a VR system, also known as CAVE, where a user experiences and interacts in 3D virtual world. With this development, Brenda Laurel proposed an IN model based on Neo-Aristotelian Theatre (Laurel, 1993). As New Media world can be placed in a 3D virtual environment, interaction and storytelling are also constrained by 3D physicality. A traditional theatre, another narrative medium constrained by a physical world, seemed to be a natural place to start. Neo-Aristotelian theatre emphasises plots (events, actions) over characters (Mateas, 2001), (Szilas, 2004), (Murray, 1997), (Abbott, 2008). As on the stage, characters are meant to be shown, and acted upon, to serve the plot. Behaviours (actions) of characters should be believable, not to break the natural action. Aristotelian theatre

is about what events take place, not what characters do. The kind of stories it can tell is different from other narrative media. For example, Abbott explained that the narrative (literary) tradition has long been shifted from plot-oriented Aristotelian to character oriented since the 19th century(Abbott, 2008, p.130-133). Modern narratives are about revealing complexities of characters. In the literary tradition, the author employs focalization, free indirect style, and inner monologue to express complexities of human nature (Ibid.p.70-79). These are also important tools for authors in other narrative media. Film, another New Media, started as filmed stage, but found its own expressive tools to reveal complex characters: montage, camera angle, narration, frame composition among others. Thus, we may expect to have similar tools of interaction to reveal complex characters in IN.

3 *FAÇADE*: NEO-ARISTOTELIAN THEATER AND BELIEVABLE AGENCY

Mateas and Stern's *Façade* is a landmark achievement in IN research. It is the first, and presently only, working prototype that is still available for general users. Mateas based his model on Laurel and Murray's Neo-Aristotelian theatre (Mateas and Stern, 2002b), (Mateas and Stern, 2003), (Mateas and Stern, 2006) The characters' behaviour is driven by the progress of the plot, and they should generally be believable. *Façade* is an important example of dramatic storytelling that used conversation as interactive method. It is necessary to exam how *Façade* express rich characters, and why it may not succeeded.

Façade's plot is that the user, an old friend of the NPCs (Trip and Grace, a couple), visits for a drink. Soon he is faced with marriage trouble. The user may play marriage counselling, however, the plot options are clear: break up or reconcile. The user does not have an avatar, and uses type-in dialogue to interact. NPCs will reply with pre-recorded audio dialogue.

Façade has succeeded in the following:

- Procedural storytelling: the story and NPC action are made up dynamically along with the user input.

- Murray's idea of structuring the user agent as a visitor.

- Managing natural reactions (in real-time animation) of NPCs.

- Natural Language based interaction.

- Simulating Neo-Aristotelian theatre Interactive Drama model.

Façade is designed to be short and intensive, with a play duration of 20 minutes. Mateas envisioned *Façade* as a work of art, which the user will experience a 'strong agency' when played the first time and would want to replay again to explore the rich characters and drama intensive plot (Mateas, 1999). However, a user experience evaluation in 2012 revealed that users' story experience (curiosity, suspense, and identification) does not change between the first time and the second (Roth et al., 2012). This means that users of *Façade* did not benefit in the narrative experience from the repeated opportunity. Journalistic writings about *Façade* often mention how the users realize soon that he does not influence the plot or NPC behaviour, and soon try to test out the system by acting extreme.

The causes for the failure of *Façade* as dramatic narrative can be various, however, this paper will focus the main problem: NPCs.

- NPCs in *Façade* do not have capability to carry conversations outside of the plot's topic.

The plot is rather predictable: a couple is breaking up. To make the narrative interesting, we need complex characters. Trip and Grace might have rich characters, but the user does not have access to them. The user can not engage in any meaningful conversation with NPCs, nor are events designed to express the complexities of characters. Then, what happened to the rich characters Mateas envisioned?

In *Façade*, AI was applied to two system tools: one for story making (procedural story), and another for managing NPC reactions. The keywords for NPC can be believability, expressiveness, and emotional reactions(Reilly and Bates, 1992), (Mateas and Stern, 2002a). The term Believable Agent was defined in the OZ project at Carnegie Mellon University, which developed programming languages, Em and Hap, for automated emotions and actions (Bates et al., 1991). The Believable Agent took its cues from narrative psychologists, who argued that agents will be more comprehensible if their visible behaviour is structured into narrative (Mateas and Sengers, 1999). For Bates, Reilly, and Mateas, believability of a character should be expressed by clearly visible action. Thus emotions are visualized through facial expressions, and behaviour means corporeal movement. For example, a character who is frustrated may walk to a door, pause, breath out a sigh, then open the door. A sadness would be showed as a sad face, in crooked angle of eyebrows and mouth shapes. Believable Agent is a character who shows what he feels. These actions will exhibit rich personality, according to Mateas.

Exterior-wise, Trip and Grace do act with reasonably proper movement; walking, angry face, irritated expression, throwing out arms, etc. However, interior wise, Trip and Grace do not have a database for detailed personal information. What we can find out about them is mainly conditions in the plot, which we are clearly being told about. They have been married for 10 years, Trip was a bartender in his youth and somehow he is shamed of it (we do not know why, though know that he is afraid of being poor), they are not happy in their marriage, Grace wanted to be an artists, etc. Strangely enough, the pre-recorded dialogues are strictly used to deliver informations for the plot (unhappy marriage). There is no subtlety in Trip and Grace's dialogue and action. It is loud and clear that they are unhappy together, and are not meant to listen to what the user has to say. We learn the cause (Trip was bartender and shamed about it) and the effect (Trip is afraid of being poor), but missing a lot of irrational, emotional, yet dramatically interesting personal information, in the middle. Any attempt the user does to start a more personal conversation (e.g. what is wrong with being a bartender: what does Trip do for living now), is met by a wall, as NPCs do not have ability to handle talk outside of plot-oriented topics. In this regard, *Façade* failed interacting with the users.

Believable Agent in *Façade* is more about abstracting a general acting method. ABL (A Behaviour Language), the programming language developed for *Façade* (Mateas and Stern, 2002a), is described by Mateas as AI implementation of the actor's mind to chose proper movement (Rauch, 2006). Yet the characters of NPCs can only by felt by their dialogues, not by their actions. Characteristics of Trip and Grace exist in the 5 hours of pre-recorded dialogues and not in the behaviour. The trust in the idea of "action speaks louder" seems to be misplaced. When the user was offered a drink made by Trip, the user can not choose any other drinks but his cocktail. Should this say that Trip is a jerk? Instead of interpreting the behaviour as indications of character, the user may believe that the interaction has failed, making conversations with NPC meaningless. The pretension of conversation will be lost. The fact that dialogues are not oriented towards describing the characters but the plot, may render *Façade* unsatisfying as a drama for many.

Mateas did not consider chatbot as a possible model for building a character (Mateas, 1999, p.16), and seems to have believed that expressing personality is best as pre-written dialogues. The problem of this approach is that no author can make up replies for all kind of input from the user. Unfortunately, as bad conservationists, Trip and Grace turned out to be

generic characters that lack interesting and convincing personalities to make the drama more satisfying.

The lesson from *Façade*'s NPC model can be that a character in IN should be a complete entity, that can hold a conversation in various situations in his own way. In fact, I will argue that a character in IN should be built more like a chatbot, anticipating any inquiry.

4 THE COMPLEX CHARACTER IN CYBER COMIX FRAMEWORK

Cyber Comix framework (Holmen, 2014a) is an interactive comics system. Cyber Comix defines its user as the Reader-Player. The reader-player is role-playing a character (Reader-Player Character, RPC), and may interact with a chatbot character (Narrative Non Player Character, NNPC) by typing in dialogues in talking balloons. There are also Non Player Characters (NPC) in a story, however, they would not have a chatbot function. Taking 2D graphics as visual medium directs the research effort to the development of complex characters and conversational interaction. Cyber Comix is designed for lengthy serialized comics, to take advantage of the unlimited narrative time.

To reveal complexities of an interior world of characters, the Cyber Comix framework uses conversation-based interaction. The following are the main concepts in the framework:

- Dynamic Bubble is the name for the chatbot-enabling authoring tool for talking bubbles.

- The Complex Character is the framework for Narrative Non Player Character (NNPC) chatbot database structure.

- The story structure takes the design cue from Mad Lips (1953) by Stern and Price.

- Simulating Character Centric Interactive Drama model.

Deep Data Mars (DDM)(Holmen, 2014b) is the first prototype in Cyber Comix. The story is science fiction, and has one reader-player character, one complex character (NNPC), and multiple NPCs. The comics is a short serial of 10 episodes, each episode has 20-30 frames. Currently two episodes are published at the time of this paper submission. The plot is that Mary-Ann (RPC), wakes up after long hibernation, and slowly finds herself with KahToo (NNPC), the robot that she built before. She lost her memory due to her long hibernation, and finds out what happened in her past. The reader-player will decide if

she still loves her ex-lover, among many other small decisions.

The chatbot is largely used for expressing the complex character of NNPC, but also for explaining other characters. NNPC may be viewed as the narrator, who may explain other character's interior world. The knowledge-based structure is as follows and is hierarchical:

1. World profile: year, season, date, time, social etiquette, name of location (city, country), etc.

2. Character profile: character name, age, gender, marriage statutes, education, occupation or social standing.

3. Personal preference: personal hobby, friends with, engaged with, married to, in love with, etc.

4. Critical incidents: specific decisions that the user character must give an answer to, that affects significantly the story experience.

5. Secrets : The main story device.

Using comics as the narrative medium gives advantages in authoring control of both literary and graphical semiotics. The flexible nature of interpreting comics is an advantage for IN. For example, the comics images will change the meaning what the reader-player character types in. In Figures 1 and 2, the reader-player character's (the woman) and NNPC's (the robot) different interactions in the sample image are shown. With the different dialogue interactions, it can be seen that the narrative tone has been changed. The author may decide and direct the reader-player character by graphics and chatbot design: however, the executive decision is with the user, who can make the story whatever he likes it to be: play-along, play-against, or something else.

The Complex Character, a framework for NNPC, is combining managing plot progressing and the character. This is different from previous IN systems, that separate AI for plot and characters. As a character in the story, NNPC in DDM is a super intelligent robot, who is in love with RPC. To manage the plot progress, NNPC reveals a few important plot progressing dialogues along the narrative discourse. This is called Critical Incidents, where the reader-player may decide important facts for the narrative. For example, in episode 2, RPC, Mary-Ann, will be told by Kah-Too that her ex-lover is suspected as the murderer of her father. In later episodes Mary-Ann may decide if her ex-lover indeed killed her father or not, and then decide if she still loves him after all.

All categories are adjustable after RPC interactions. Cyber Comix has a pre-production period to test out its interaction design. This is after the Wizard of Oz method (Green and Wei-Haas, 1985), or
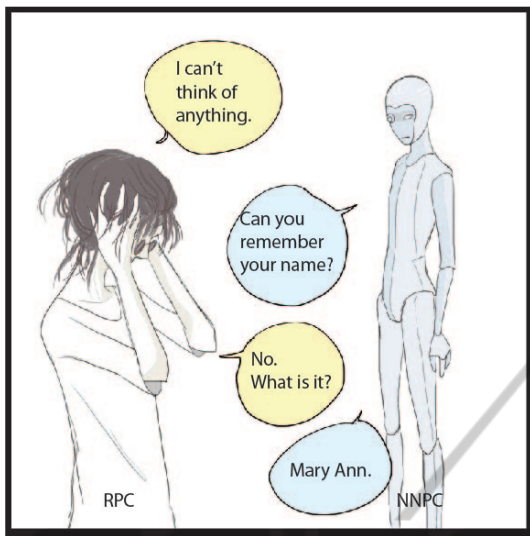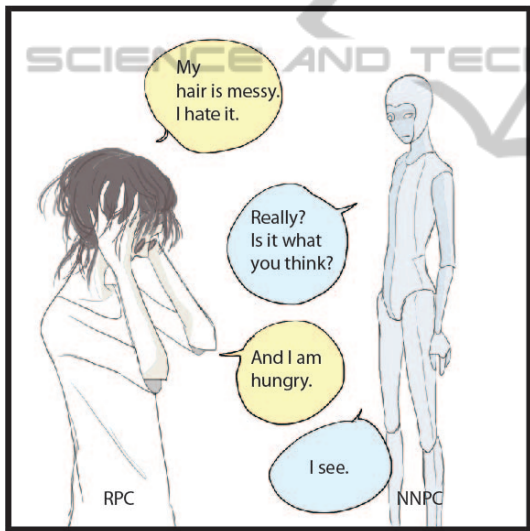
Figure 1: The user is playing along.

Figure 2: The user is playing something else.

heuristic approach to adjust after empirical data. In these periods, interactions are reviewed by the author to adjust balloons and responses accordingly.

NNPC is story specific. NNPC in DDM may not be used for other stories. NNPC may have a personalized dialogue style and way to react to RPC inquiry, uniquely in DDM.

5 RELATED WORKS

- ELIZA: The first and one of the most successful believable characters in AI. The chatbot creator Joseph Weizenbaum was credited as the first liter-

ary writer in computer medium by Murray (Murray, 1997, p.72), ELIZA is the first successful chatbot that is built on the simple principle of conversational pattern of a Rogerian psychotherapist. The chatbot influenced Interactive Fiction as well as other various chatbot character developments (Ibid).

- Expressive AI: The concept by Mateas is for devising interdisciplinary art and technology. "This effect of producing psychologically readable behaviour is not limited only to explicit anthropomorphic characters within the game world, but also to intelligences operating behind the scenes." (Mateas, 2003)

- Abbott's explanations for narrative discourse in literature, theatre and film promote the importance of characters (Abbott, 2008).

- Szilas investigated the problem regarding duration of interaction in 3D real time Interactive Drama, and proposed three different ways to tackle it: casual, semi-autonomy, and elliptic (Szilas, 2004).

6 CONCLUSION

Cyber Comix is a framework in progress. Complex Character model for IN may solve customizing NPCs for specific stories for conversational interaction. Currently it is planned to have 'non flexible' graphics, that is not changed by the meaning of conversation. However, to improve the drama experience, it is possible to consider implementing a separate drama managing AI to have dynamic graphics as well. To manage the chatbot, it might be more effective to have a unique programming language dedicated to Cyber Comix than using conventional chatbot AIML. The collaboration part of AI design is the awareness of an incomplete story, that can be a problem implementing the framework. The reader-player may or may not play along with the story, or the RPC. System AI for drama, or story progress, is designed by the authors graphical references in comics and NNPCs character. It is also important to be aware that NNPC in DDM will only exist when a reader interacts with him. Cyber Comix has a capacity to adjust NNPCs database according to reader-player interactions. When the database is built up by interactions with readers, NNPC will be formed as a new, bigger database, which is not defined by the author. Thus NNPC exists in the intersection of the author, the story, and the reader. Thus NNPC in DDM is largely unknown at the moment.

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