The Art of Creating Emotional and Robust Interactive Characters

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1. Introduction

Creating interactive characters (also known as ‘‘believable agents’’) for interactive story systems will require advances in both technology and art. These two areas of advancement, however, are not independent. Previous work has focused mainly on the technology that is being developed in this area. This paper will focus on the art and how it relates to issues on the technology side.

An important artistic goal is to figure out how to use the technology we have to create the best characters we can. This means that we need to understand the strengths and weaknesses of the current technology so that we can develop the artistic techniques necessary to exploit the technology where possible and hide it where necessary. This paper describes some artistic techniques we have come across for creating good interactive characters given today’s technology.

In this paper, we will first describe a few sources of inspiration and information about how to approach this area from an artistic stance. Then we will focus on two areas where we can use artistic techniques to create interesting, interactive characters given the current state of our agent building technology. These areas are how to display emotions and how to develop robust interactive characters.

2. Sources of Inspiration

In this section, we will outline a few places that authors of interactive story systems can look for ideas and advice when designing their characters and story systems. In the following sections, we will see how we have used ideas form many of these sources in building particular characters.

One set of sources are those that would be useful to artists working in non-interactive media. For example, Aristotle’s *Poetics* [Aristotle87] deals with creating effective characters for drama. Thomas and Johnston’s book [Thomas81] is full of ideas for creating animated characters. Others have written about how to create characters for all sorts of media, from novels [Gardner91] to comics [McCloud93]. These authors have struggled with the problems of creating believable characters for their particular media, but much of what they know is transferrable.

Another set of resources are those that may not necessarily be artistic, but that *are* interactive. For example, understanding how and why video games are so effective is important. The characters in video games work for what they are. Our goal is to go beyond such simplistic characters, but we should learn what we can from them nonetheless. In particular, video games often use conflict to limit the interactions the user has with the “characters” in the game. So conflict turns out not only to be useful for good plots, but can also enhance the interactions with the characters if used properly. We will look at this a bit more in section 4.

Another source of information is the work in AI on agents that can pass limited forms of the Turing test. For example, Weizenbaum’s

ELIZA [Weizenbaum66] isn't a very interesting character, but it is interactive and people often do believe that it is a competent therapist. Similarly, some of Colby's techniques for building a simulated paranoid agent, PARRY, are interesting because trained psychotherapists were unable to tell PARRY from real paranoids [Colby75]. His approach isn't general enough to be able to build anything but paranoids, but the reasons that PARRY worked as well as it did are important.

We can also learn from some the work on agents in the Loebner competition (e.g., Mauldin's Julia [Mauldin94]). These agents attempt to pass a limited Turing test and they use some techniques for generating reasonable responses within this limited context.

A final source of ideas are researchers working in human-computer interfaces, such as Brenda Laurel [Laurel90]. This work combines art and technology to create interactive agents, though for a different purpose than our own.

We have used ideas from all of these sources in building interactive characters that are not as deep as those of good novels or even comic books, but that are interactive. We have also tried not to achieve this interactivity at the expense of artistically defined personalities. In other words, we hope that our characters are more interesting and personality-rich than ELIZA and our techniques more general than those used for PARRY or ELIZA.

3. Displaying Emotions

A focus of our research on the Oz project [Bates92] has been creating emotional characters for interactive story systems. On the technology side, we have built an emotion system (Em) [Reilly94]. We believe, however, that it is important to understand the artistic side of the problem for the results to be most effective. In this section we will examine some clues from traditional media about how to display characters' emotions clearly and how we have (or might) incorporate such ideas into interactive media.

In Disney's "The Ugly Duckling", the audience is moved because of the pathos of the poor duckling [Thomas81]. The animators created this pathos through all of the means at their disposal, including careful development of the story, the physical reactions of the duckling, music, scenery, and the staging of the action. If we want to create similar emotions in the characters in interactive stories, we also need to use all of the means at our disposal. Fortunately, some of those techniques are similar to those in traditional media. We will look at a few of these techniques from traditional media and how we can adapt them for interactive media.

Physical Reactions of the Characters. The physical reactions and movements are the most obvious ways to display emotions. Crying, smiling, and fist-pounding are all ways to show emotions. It is important in both traditional media and interactive media, however, that these simple expressions do not account for the entirety of the emotional display. Emotions should affect the character at all levels, from goals and interpersonal relationships to facial expressions and body movements.

Plot. In traditional media, plot can be very effective in helping to display emotions. The audience often knows how a character feels based on what has been happening to that character. This means that the outward emotional expressions can be more subdued and less melodramatic. It is not completely clear how this relates to interactive stories, but this is a tool for interactive artists to keep in mind.

Music. Music is a powerful tool for setting an emotional mood. It has been used successfully in traditional media and it should be explored in interactive media as well.

Scenery. The setting can have an effect on the mood and help show the emotions of certain characters. In "The Ugly Duckling" the backgrounds were dark with large looming objects. This helped to heighten the feeling of helplessness of the poor duckling. Similar techniques should be applicable to interactive media.

Staging. How a scene is staged is important in both traditional and interactive media. On the stage, for example, it is important that only one important action occurs at a time and that the layout of the actors and stage makes that action visible to the audience. Similar issues arise in interactive systems. In the Woggles [Loyall93] too much goes on at a time and it is hard to pick up on subtle emotional actions like moping. We attempted to solve this problem by creating more passive actions (e.g., sleeping) that calmed things down, but because we didn't understand the true nature of the problem at the time, we lessened, but didn't solve, the problem.

Staging isn't useful only for emotional displays. It is useful whenever the artist wants to put across some strong action. We have built a playground simulation where the user can trade baseball cards with two other children. We found that with two interactions going on at the same time, the user didn't get the full effect of either personality. To solve this problem, we "restaged" the simulation such that the other characters didn't try to interact with the user at the same time, with positive results.

4. Robustness

Interactive characters need to be robust in the sense that they must not do anything far enough out of character to break the user's suspension of disbelief. The characters we create essentially have to pass a modified version of the Turing test. They need to be capable of sustaining a consistent personality throughout some interaction with the user.

The biggest difference between our goal and the goal of passing the Turing test is that the users of interactive story systems will typically be cooperative and not try to break the suspension of disbelief. Nonetheless, even the most cooperative users will occasionally find the holes in our characters unless we take some measures to hide them.

There are two important ways to handle this problem. First, we can attempt to lower the expectations of the user so that the character is not expected to be perfect. Second, we can limit the kinds of interactions that the user has with the characters. We will look at each of these briefly.

Lowering Expectations

Technology has advanced from that used in ELIZA to the point where we can sustain some limited forms of real interaction as long as the expectations of the user aren't too high. We can lower these expectations by making the character something other than a normal, adult human. This is what Colby did with PARRY. The interactor's expectations were lowered because they thought they were interacting with a paranoid. Expectations about characters can also be lowered by making the character, for example, a child or an animal.

Expectations of certain personality types are also generally lower. For example, aggressive or self-centered personalities are expected to ignore other characters and follow their own goals. Also, shy and wise characters can often remain quiet. Being unresponsive can be acceptable because the user expects that of such personality types.

We have built a bully for the playground simulation that takes the aggressive approach. The user can say anything to Sluggo, but if he doesn't understand, Sluggo will just come back with "Hey dork, shut up!" or some other generic, but believable retort. If the user is trying to negotiate a baseball card trade and Sluggo gets confused, he can rudely break off the negotiation and not break the user's suspension of disbelief. Choosing personality traits that allow for believable unresponsiveness can make the characters easier to build and more effective than characters that should be responsive but aren't.

Another effective technique is to change expectations to areas where humans aren't particularly good at recognizing which behaviors should and should not be expected. For instance, putting the user in an unusual culture or creating other characters that are, say, aliens or woggles means that the user will be unable to recognize small holes in the characters. A similar phenomenon occurs in realistic animations of human faces, which are often disturbing to watch because viewers are so well tuned to the human face. However, less realistic representations of animals seem much more real.

Limiting Interaction

The second approach to hiding the flaws in our interactive characters is to take precautions that interactions with these characters are limited to situations that our characters can handle. Our thrust should still be to encourage as much interaction as possible, but if the characters cannot handle those interactions cleanly, the user's experience will be diminished.
One technique for limiting interaction is to craft the plot to avoid open interactions where possible. If our interactive plot is something out of "My Dinner with Andre" or "Waiting for Godot", our best will be doomed. It is very difficult to handle such situations well. Instead, we should carefully craft our plots to create as much interaction as possible while avoiding such open interactions.

By putting the user on a therapist's couch, for example, we can use an agent as simple as ELIZA. It would be unacceptable, however, if the user were to run into a therapist on the street and she acted like ELIZA.

We have built a few simulations that use this kind of technique. In one, the user is a police officer trying to diffuse a convenience store hold-up. The gunman and cashier are interactive characters but the situation naturally limits the kinds interactions that take place. The gunman can recognize a few standard commands and threats from the officer, but is able to believably ignore anything he doesn't understand. In another simulation, the user is working in an office with other people. The other people, however, are all very busy and attempts at conversations outside of a small set of important topics will be brushed aside naturally.

Another way to limit interactions is to limit the communication channels. The woggles, for example, aren't (yet) able to speak or understand natural language. The user communicates through a set of simple physical actions, which greatly simplifies the task of the author. Other examples of this technique might include interactions with animals, children, or robots -- in each case, we can believably use limited or artificial languages.

5. Summary

The current state of AI technology doesn't allow us to create every imaginable interactive story. We need to understand what the limits of the technology are and how to use what we have artistically to create believable characters in interesting stories. We have shown here two areas where we believe artistic techniques can help with this problem: the display of emotions and the design of robust characters.

We expect many more techniques will develop for creating believable characters in interactive story systems as this area of research matures. Many will come from traditional media, but many will be new to interactive media.

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