

# Tigrito : A High-Affect Virtual Toy

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## ABSTRACT

This paper presents a short overview of Tigrito, a high-affect virtual toy where children observe and interact with emotive improvisational characters, which we built to study the sense of engagement and suspension of disbelief across different modes of interaction, and the affective relationship between children and a virtual toy.

## Keywords

Interactive, avatar, believability, autonomous, agent.

## INTRODUCTION

- Seven year old Katie laughs as the stuffed tiger on the screen sings. Then she uses the cursor to push the "Applaud" button.
- Six year old Jimmy watches open-mouthed as the on-screen tigers playfully pounce on one another.

The program that so amuses Katie and Jimmy is not a typical computer game. The children are not trying to score the most points, finish first, or any other variation of "winning," although they are playing with the computer. Both Katie and Jimmy have established a rapport with the on-screen characters, an affective relationship that matures over time and can both suffer and benefit from their actions. This affective link makes the experience emotionally rewarding, and extends beyond mere anthropomorphization; children not only believe that the characters exist, but deeply care about their virtual friends. In this paper we describe our system, affectionately called Tigrito, which allows children to observe and interact with a emotive autonomous, improvisational characters, in three ways: directly, treating him as an autonomous toy; through an avatar, represented by a second character; and in a movie mode, in which two autonomous characters play with one another.

Both the autonomous and the user-controlled characters have transient moods, influenced by the child's actions, and unique personalities expressed through the distinctive ways the characters performs actions. Rather than digitally

rendering our characters, to maintain both the child's suspension of disbelief and the illusion of realism, we chose to use video clips of a stuffed white tiger cub to embody instances of Tigrito. This way, children will feel that their everyday toys have come to life before their own eyes, and will be able to contrast their experiences with the stuffed animal and its virtual counterpart. As Chuck Jones says, "Audiences really believe in characters whose adventures and misfortunes make people laugh and even cry. The characters appear to think and make decisions and act of their own volition. It is what creates the illusion of life." [7]

## OVERVIEW

Past research has explored many different forms of interaction with autonomous characters, without giving the user the power to choose between them. The Oz Project [1] featured highly detailed models of emotion used to create a framework within which the user interacted with the autonomous characters through an avatar. Unfortunately, the interface they chose could not convey the complexity of the emotional model. The characters in the Virtual Theater's Master/Servant [3], on the other hand, improvised within a broadly-defined storyline, but lacked interactivity once the plot was set. The ALIVE Project's [7] approach let the user interact directly with agents within immersive environments but required a complex and cumbersome system to recognize the user's actions.

Our system is designed to function in each of the three modes described above. We can then examine how the user's sense of engagement varies as the style of interactivity changes. The framework for that interaction also has to be kept simple enough for children to understand the characters' mood changes. Therefore, in each mode of interaction, Tigrito is represented as an animated character whose moods are displayed on sliders. A second set of sliders represents the mood of the character Tigrito is interacting with, either the child, the child's avatar, or an autonomous character. Both the child's moods and Tigrito's are influenced by the other's actions. When the child is participating, s/he is given a dynamic list of actions to choose from. In each mode the autonomous animated tiger and his moods are visible, so that the child can understand the current situation at a glance. In Avatar Mode (Figure 1), the child directs Hobbes (the rightmost tiger) at a high level by moving his mood sliders, and at a lower level by choosing the actions he should perform, using the buttons in the lower right corner of the screen.

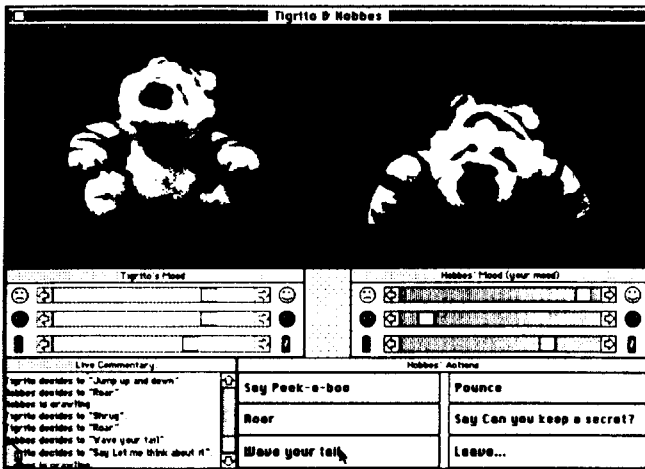


Fig. 1: Avatar Mode

Our character possesses a distinct personality which he expresses through actions based on his mood and position. The characters' moods emulate those used in the Virtual Theater's animated puppets: "[The] moods vary along three continuous dimensions: an emotional one ranging from happy to sad, a physiological dimension ranging from peppy to tired and a social dimension ranging from friendly to shy." [5] In our implementation these independent moods are called happiness, friendliness and energy. In Avatar Mode, the child can only influence Tigrito's mood by directing Hobbes to act. In turn, the child's choices for directions change as Tigrito influences Hobbes's moods.

In the First Person mode, the child interacts directly with Tigrito by using sliders to set his/her moods and choosing from the list of available actions, and only one character is on the stage. Although Tigrito's moods are displayed on the screen, the child can only change them by performing actions that Tigrito can perceive. In Movie Mode, both characters are on the stage, and the child's directions are high-level in nature, since s/he can only control the characters' moods by moving the mood sliders. The actions performed by the tigers are left entirely up to the autonomous agents.

The agents' fundamental decision loop selects actions based upon current mood values and their known effects on other agents. For example, when Hobbes performs the action "Roar," he sees from its character file that roaring causes the other character's friendliness and happiness to decrease. As a result, while Hobbes is roaring, Tigrito's moods decrease accordingly. All the detailed information about the significance of the actor's behavior is read at run-time from a character file, allowing for easy modification and addition of actions to the actor's repertoire.

#### FUTURE DIRECTIONS

Although we are still in the design stage of our study of children's sense of engagement and affective response through Tigrito's different modes of interaction, we are planning to enhance Tigrito in several directions. On the

believability front, we are exploring the possibility of having each character attribute a distinct meaning both to its own actions, and those of the other characters, mirroring human interactions where, while two individuals may recognize the same action, their interpretations of it may vary. As a testbed application, we are interested in using Tigrito as a second language learning tool for children. Until now, our characters have had the same idiosyncrasies, ethnic background and language, and we believe that Tigrito would provide a unique opportunity to study cross cultural affective responses and bi-cultural empathy.

#### CONCLUSION

Much research has been done to demonstrate that people become emotionally involved both with computers as machinery [4, 5], and with computer-simulated beings (2, 6). In systematic user testing, we hope to see whether those trends carry across the different modes of interaction. In the meantime, we have been pleased to find that, during informal sessions, the interactive characters kept their behavior coherent, believable and engaging.

There are many current and hoped-for applications for interactive characters, whether autonomous or user-controlled. Improvisational characters can make great adaptive opponents, smart avatars, story guides and companions, or pets and tutors (to name a few). We believe that such agents can provide entertaining and educational experiences that are also emotional. Our work concentrates on examining how best to structure these experiences for greatest emotional impact.

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