

# Subjective Avatars

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## 1. ABSTRACT

**Subjective avatars, employed in story worlds, have autonomous emotional reactions to events in the world and keep track of story context. The emotional state and story context are used to provide subjective descriptions of sensory information. The purpose of such description is to help a user gain a deeper understanding of the role they are playing in the story world.**

### 1.1 Keywords

avatars, believable agents, interactive drama

## 2. INTRODUCTION

The goal of the Oz project [1] at CMU is to build dramatically interesting virtual worlds inhabited by believable agents - autonomous characters exhibiting rich personalities, emotions and social interactions. In many of these worlds, the player is herself a character in the story, experiencing the world from a first person perspective. Typically, the player's representation within the world - her avatar - is passive. The avatar performs actions as fully specified by the player, and reports events (reporting events can mean rendering a 3D scene or generating descriptive text) in a pseudo-objective manner (*pseudo*-objective because any description encodes the bias of the world author). This paper describes an alternative: a subjective avatar with autonomous interpretations of the world.

## 3. WHY SUBJECTIVE AVATARS?

I want the user to step into the shoes of a character, experiencing a story from this new perspective. In this manner the user gains an empathic understanding of a character by *being* this character. In non-interactive drama

(movies, theater), an audience is able to gain insights into the subjective experience of characters precisely because the experience is non-interactive; the characters in the drama make decisions different than those that audience members might make. In an interactive story, how will a user gain insight into the character she is playing when she is controlling this character's actions? If she were to immediately begin acting out of character, she will derail the story, effectively preventing any insight. With a subjective avatar, the hope is that if the user's avatar filters and interprets the world in a manner consistent with the character, the user will begin to feel like her character, gaining a deeper understanding of the message the author wants to convey.

## 4. FASTFOOD WORLD

I'm currently experimenting with subjective avatars within the Oz text-based system. The specific world I've built within this framework is Fastfood World, a negative job scenario set in a fastfood restaurant. In this world, the user plays a young worker in his early 20's stuck in a dead-end fastfood job. The worker's nemesis is the manager, Barry, who uses every opportunity to dominate the worker.

### 4.1 The Framework

Fastfood World is implemented in the Oz text system, a framework for building text-based drama worlds. This framework includes a version of Hap [2], a reactive planning language for building characters, and Em [3] an emotional state modeling system. The subjective avatar makes use of Hap and Em to maintain it's subjective state.

## 5. SUBJECTIVE STATE

In order for the avatar to provide a subjective interpretation for the player, it responds to activity in the world by maintaining subjective state. Currently, the avatar's subjective state consists of emotional state (emotional responses to events) and story context.

### 5.1 Emotional State

To maintain emotional state, I make use of Em [3], the Oz model of emotion. In Em, emotions are generated primarily in response to goal processing events. Em generates emotions as goals are created, as beliefs change about the likelihood of goals succeeding or failing, and as goals actually succeed or fail. At any given moment an agent's

emotional state contains several emotions with non-zero values. Over time, Em decays emotions.

In order for the avatar to have goal processing emotions, it must be processing some goals. Since the avatar doesn't directly take action on its own, its goals are all passive. Passive goals wait for some event to occur in the world in order to succeed or fail.

## 5.2 Story Context

In addition to emotion processing, the avatar keeps track of where it is in the story. This is done so as to organize the avatar's goals and simplify the writing of behaviors. At any given moment, the avatar is pursuing some set of goals. The behaviors associated with these goals are watching for certain events or sequences of event to happen in the world. At different points in the story experience, the same event may cause different reactions in the avatar (or no reaction). Explicitly maintaining a story context pushes the context information into the tree of active goals instead of requiring this information to be included in the precondition of every behavior.

## 6. NARRATIVE EFFECTS

Once the avatar is maintaining a subjective state, it must express this state in such a way as to effect the user's experience. The primary effect I've experimented with is manipulating sensory descriptions. Sensory manipulations are implemented as a set of Hap behaviors which render descriptions of events as a function of the subjective state.

### 6.1 Example Sensory Descriptions

The default Oz avatar produces factual descriptions of the world. The following is a short trace of the default avatar in Fastfood World.

```
PLAYER> wait
... <a turn deleted> ...
You wait.
You hear the hot oil sizzling in the fryer.
Barry is speaking to you.
Barry's voice says "Wait a minute there, buster"
PLAYER> look at hamburgers
You look at the hamburgers.
The three hamburgers are on the food tray.
You hear the hot oil sizzling in the fryer.
Barry goes to the counter area.
Barry is no longer in the window area.
```

In contrast, consider the same short trace produced by the subjective avatar.

```
PLAYER> wait
... <a turn deleted> ...
You wait.
With a vindictive gleam in his eye, Barry snaps
"Wait a minute there, buster"
PLAYER> look at hamburgers
You look at the hamburgers.
The faceless crowd of hamburgers sits on the food
tray.
As if pop rocks had been poured directly on your
brain, the hideous sizzle of hot grease emanates
from the fryer.
```

```
Barry marches toward you from the drive-up window
station.
```

In this trace, several effects are present. The sizzle of hot grease is missing in the first turn. A narrative rule has eliminated this background noise as uninteresting. In the second turn, the noise is back in a more colorful form. This is due to a burst of fear generated as a result of Barry entering the same space as the player. A narrative rule has used the background sound of the sizzling grease as a way to express this fear.

In the first turn, the description of Barry speaking has been changed. This is because the avatar's fear level has increased as a result of inferring an increase in the likelihood of failure of the avoid-being-chewed-out goal. This inference occurred as a result of hearing Barry speak to the player.

In the second turn, the description of the hamburgers has changed. This is due to a rule that renders any group describing more than two similar objects as "a faceless mass" if the player is in a bad enough mood. Since the matching criterion is fairly general (any description of a multiple number of objects), I hope that such a narrative effect can become a repeated device, a way of communicating a sense of depressing conformity by repeating a key phrase in a variety of contexts.

Finally, Barry's movement into the counter area has been changed by a narrative rule that watches for Barry's movements and describes them as a function of emotional state.

## 7. CONCLUSION

A subjective avatar is like an inverse user model. A user model watches a user's actions so as to learn a model of the user. A subjective avatar, on the other hand, has an author given model of a character. The avatar actively manipulates a user's experience so as to try and make the user feel the same way as a character. The avatar thus becomes an additional expressive resource available to dramatic world authors.

## 8. References

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