# InterFace Portraits: Communicative-Expressive Interaction with a Character's Mind

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## ABSTRACT
In this paper, I introduce the notion of *communicative-expressive interaction* with a character's mind, within an interactive fiction video. It is an interaction model that allows a participant continuous interaction with a story as a way of increasing the participant's agency and immersion and consequently both the sense of engagement and the meaning of the interactive experience in its relation to the story. I describe a work-in-progress system called the *InterFace Portrait Storyteller*, in which participants use familiar gestures performed on a touch screen to explore the character's mind, which is constructed as a diegetic space. I also describe two interactive video installations, "One Measure of Happiness" and "Have I Lost My Plot?" within which the system interacts with either narrative or non-narrative approaches to the representation of diegtic space.

## Categories and Subject Descriptors
J.5 [**Computer Applications**]: Arts and Humanities – *Fine Arts.* D.2.11 [**Software Engineering**]: Software Architectures – *Data Abstractions.*

## General Terms
Algorithms, Design, Experimentation, Theory.

## Keywords
Narrative, fiction, non-narrative, diegesis, interactive video, videogames, interactive storytelling, mind models, intimacy, communicative interaction, expressive interaction, gestures, touch-screen, Lingo

## 1. INTERACTIVE FICTION VIDEO AS INTERACTIVE EXPERIENCE
The creation of Interactive Fiction Videos can be approached from several directions. One place to start is by examining the structure of the story and how it should be adjusted for interactivity (this is, for example, the approach in Brooks [3]). Another place to start is by examining the interactive experience first, identifying what makes an interactive experience appealing and meaningful, and then to create a story that fits.

This paper is about my own change of approach, from "storytelling first" to "interactive experience first" - a change that occurred while I was working with my colleagues on authoring our first interactive narrative video, "One Measure of Happiness".


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### 1.1 One Measure of Happiness
#### *1.1.1 Project history*
"One Measure of Happiness" was created as graduate student research collaboration at Tel Aviv University's department of film and TV which, under the leadership of the former head of department, Dr. Nitzan Ben-Shaul, had just started developing a course in digital and interactive cinema. In the beginning we were three: Udi Ben Arie and myself were students, and Amnon Dekel was our supervisor. After several months of discussions, we developed a project definition, which was to create an interactive narrative video based on a variable but ultimately coherent narrative structure, through interaction with a simulated character, based on familiar gestures performed on a touch screen. We were soon joined by Mirit Tal, a programmer, and Maya Lotan, an industrial engineer, who had volunteered to help us define and create our algorithms; and by Galit Reuchman and Nelle Schaefer as scriptwriters. We then recruited a production team and actors and set about to produce the work. In September 2003 we presented and published our results at INTERACT'03 [6].

#### *1.1.2 Project Description*


**Figure 1. Actress Shira Binetsky in "One Measure of Happiness"**

"One Measure of Happiness" is presented on a touch screen with two composite layers (see Figure 1). In the foreground layer we see a Close-Up shot of the protagonist, a young woman, whose face we can touch. The background layer contains video representing the protagonist's thoughts and memories.

Viewers are encouraged to touch the protagonist's face by some of the looks that the actress exhibits as well as by some of the words she utters. The way viewers touch - the location, manner and duration - will encourage or frustrate the will of the protagonist to share her story with the viewer, as well as influence her own interpretation of unfolding story events and their overall meaning.

The overall architecture of the work (executed in Director) is comprised of the following components: a. A protagonist model; b. A touch-based interaction manager; c. A story manager.

#### *1.1.1.1 The Protagonist Model*

The simulated protagonist has interdependent sensation, perception, emotion, cognition and memory modules.

The *sensation* module registers the participant's touch data. The *perception* module interprets these as meaningful touch-events such as poking, stroking, touching and scratching. The perception module also detects where the touch-event had occurred on 21 distinct areas of the protagonist's face. The *emotion* module maintains the protagonist's mood, which can change as a result of the participant's actions or by memories invoked by the story manager. Mood swings decay over time towards equilibrium. The emotion module also maintains the protagonist's attitude towards the participant as it evolves throughout the interaction process, based on the accumulation and frequency of the participant's actions and their appropriateness relative to the protagonist's mood. The protagonist's *cognition* module evaluates the participant's actions and decides how to react. Reactions are determined within the context of the protagonist's mood and attitude and result in the clips selected to express the protagonist's reactions, as well as in changes to her mood and attitude and in connotations elicited by the touch events and conveyed to the story manager, which incorporates them into the selection processes for memory scenes, which is the responsibility of the *story manager*.

#### *1.1.1.2 The Interaction Manager*

The interaction manager is intended to establish an intuitive grammar for the dialogue between the participant and the protagonist and to encourage the participant to influence the story continuously. The interaction manager keeps track of the frequency of the participant's activity and, based on input from the attitude component of the protagonist's emotion module, determines the current level of intimacy between the participant and the protagonist. An appropriately high level of frequency drives the story forward and encourages the protagonist to tell her story. A low level of frequency causes the protagonist to withdraw. The intimacy level factors into the selection processes for memory scenes, divulging to the participant story events that contain deeper knowledge of the protagonist as the intimacy level increases.

#### *1.1.1.3 The Story Manager*

The story manager is in charge of presenting the memories of the protagonist and shaping them into one of many coherent stories possible. To balance between diversity and coherence, the story manager contains a semi-rigid narrative structure guiding its selection processes. The story manager selects the memory scenes according to phases, which include: an introduction; an exposition of the main characters, the story world and the protagonist's basic conflict; the body, which includes the various events in the protagonist's memory that shed light on her conflict; and the resolution phase, which contains the various ending scenes.

Progression from one phase to the next depends on the level of intimacy the participant has established with the protagonist and on reaching a threshold of story knowledge presented in the previous phase. Within the phases there is a certain degree of freedom. In the exposition phase, for instance, several aspects need to be presented, but in no particular order.

The body phase contains the greater bulk of memory scenes. Within this phase, scenes are grouped into sequences, which are causally related plot lines. Plot lines may differ in terms of either the events that unfold, or in terms of their narration. The same events may be presented differently, depending on the protagonist's mood. Several plot lines may be cross-edited together, but the story manager takes care of limiting the amount of parallel action in order to preserve coherence.

Throughout the story, scenes are selected not just according to the narrative structure, but also according to associative links between scenes, connotative links between the participant's actions and scenes and the protagonist's dynamic mood swings. These mechanisms create enough diversity to make every re-enactment of the story unique. Furthermore, they guarantee continuous narrative flow even when the participant is less active (but not when the participant is not active at all).

### *1.1.2 Results and Conclusions*

Several dozen people experienced "One Measure of Happiness" at several formal and informal occasions, with mixed success. Our hope was to create both an engaging and believable character and a coherent cinematic story in an engaging interactive experience. In most cases, participants reported a sense of engagement with the character, and some even reported that they felt they were developing an intimate relationship with her, which something we'd aspired to achieve. However, nobody had much to say about the story. We did not succeed in creating a coherent narrative. Moreover, none of the participants felt they had any influence on how the story was shaping, which meant that the relationship we sought to establish between the interaction process and the story's meaning was not established.

We traced some of the output logs of our system, and concluded that the story manager did present the scenes of the story in a coherent order, and did present variations in the story according to the mood swings of the character, which were a result of participants' gesture patterns. Yet, participants were unable to gauge that. We identified two possible sources for this phenomenon:

a. It could be a problem of cognitive load as a result of split attention, a problem that, according to Ben Shaul [1b], occurs in several interactive moving audio-visual texts. Participants were

unable to pay attention to both layers of video, were drawn into their interaction with the character and lost the plot (incidentally, some viewers who stood besides the participants and did not interact, did pay attention to the story and were able to make sense of it).

b. It could be a problem with the relationship between the structure of the story and the rhythm of the interaction. Participants typically performed a gesture every few seconds, whereas the scenes were replaced only when they were played through, which was every 30 seconds to 2 minutes.

In the conclusion of this episode, we emerged with what seems to be an effective and engaging interaction model, but without a story. We graduated from Tel Aviv University and went our own separate ways.

## 1.2 Starting Over

I continued to work on the system, which by now acquired its own proper name, the *InterFace Portrait Storyteller*. Only it hadn't actually been able to handle storytelling. It was necessary to backtrack and re-examine the original goals of the project, in light of the feedback received on "One Measure of Happiness". I decided not to try to patch up the existing story, but rather to start from scratch, with a new story and a new installation, which as of the time of writing is still a work in progress.

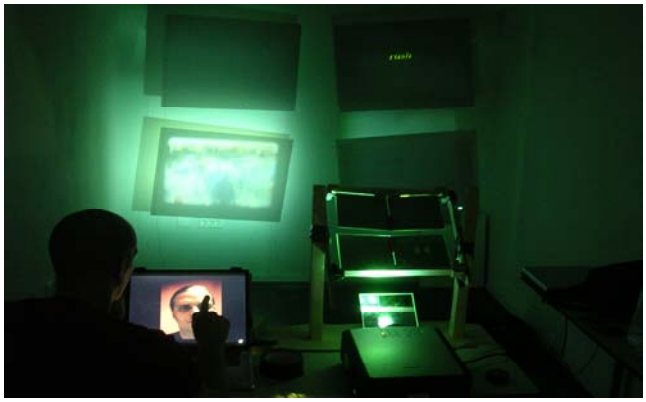

**Figure 2. Installation space for *Have I Lost My Plot?***

### *1.2.1 Interactive Experience, Space and Time*

Of the two problems we identified in "One Measure of Happiness", the problem of split attention seemed relatively simple. Since we didn't conduct any systematic testing of what exactly it was that made participants ignore the story, I assumed the following:

a. Spatially, having both layers of video on the same screen (see Figure 1) was probably confusing in terms of interface design, not in the least because participants expected to be able to interact through touch with both layers. I concluded to separate them spatially (see Figure 2). The touch screen will only display the interactive InterFace, while memories will be projected on some displays hanging in the installation space, creating a spatial metaphor for the character's mind.

b. Temporally, there was probably too much going on simultaneously. I decided to introduce memory materials more sparsely: nothing in the beginning, to allow the participant to get accustomed to the InterFace; and then, gradually, an increase in the frequency of memories, so that the feeling that they, too, are a consequence of the interaction process, can be established.

But that was the simple problem. The more complicated problem remained that of the story's structure. This was the shift in approach from "Storytelling first" to "interactive experience first". It became evident that instead of coming up with the right interaction model for storytelling, it was necessary to come up with a storytelling structure that fits the interaction model. But before I describe the solution I came up with, I shall first have to say a few things about the interactive experience that is communicative-expressive interaction.

# 2. COMMUNICATIVE-EXPRESSIVE INTERACTION

It was our understanding already in our work on "One Measure of Happiness", that in order for an interactive fiction video to be engaging, it had to have an interaction model that provides the participant with an opportunity to interact continuously and meaningfully with the diegesis – the fitction world - in order for the participant to feel immersed as an agent in the fictional world. The key notion here, as was previously suggested by Mateas [8], in his treatment of Janet Murray's book "Hamlet on the Holodeck", is that of (user) agency – "the feeling of empowerment that comes from being able to take actions in the world whose effects relate to the player's intention". Communicative-expressive interaction is all about agency; and it is not just about providing an adequate level of agency, but also about structuring a specific type of agency.

The expressive aspect of this approach stems from the participant's ability to employ a nuanced range of gestures in the interactive process, shifting the manner of interaction from a cognitive mode of explicit control over the diegesis or its presentation, to a more affective mode of communication. In this mode, the participant is no longer a director, a God, or a viewer with a fancy remote control, but an actor within the diegesis, in a dialogue with the character.

In a communicative-expressive interaction model, the participant is afforded continuous interaction. From looking at videogames, we observed that continuous interaction was one of the key elements that contributed to the sense of engagement. Videogames, however, don't typically include developed characters and themes such as are found in good cinematic stories. With the right story structure, however, it should perhaps be possible to have the best of both worlds – a continuous and engaging interactive experience, as well as developed characters and themes, and a relationship between the two that makes the entire experience meaningful. It may be possible to create an interactive story experience in which the participants' manner of interaction itself has meaningful consequences within a psychologically well-developed diegesis. To achieve that, a suitable organization of the diegetic materials needs to be developed.

### *2.1.1 Interactive Experience and the Representation of the Diegesis*

As noted earlier, the narrative structure we used in "one Measure of Happiness" was too coarse to adequately respond to the rhythm of the participants' interaction. I believe this to be a fundamental

problem of narrative organization of video materials, as long as these are organized at the scene level.

A cinematic narrative scene requires time, as well as a complicated visual grammar that joins shots of particular size and composition together. In order to represent the same diegetic events in various ways, there would be a need to create an algorithm that is able to join these shots together in real time, according to the cinematic grammar. This is perhaps possible in principle, and in another occasion I was part of an effort to create such a system based on 3D animation [7]. 3D animation is particularly adept in this case, because you can have your algorithms control the camera placement and the editing to create any shot size and composition that is required. To reproduce the same in video, you would need an enormous bank of shots, which is impractical.

But this isn't the only problem with cinematic narrative. Some researchers suggest that interactivity inherently contradicts narrative (e.g. [4]); while others maintain that narrative is simply not the only form and certainly not the preferred form of representing memory (or history, myths, psychology or science, for that matter (e.g. [5]).

I tend to agree. In fact, narrative is not even the only way to organize cinema. According to Bordwell [2], films can also organize their representation of the diegesis associatively, categorically, abstractly or rhetorically. For that reason, I decided to replace the narrative-oriented story manager component of the *InterFace Storyteller* system with a non-narrative approach to representing the diegesis, and to create a new interactive video installation, called, accordingly, "Have I Lost My Plot?"

## 3. THE NEW INTERFACE PORTRAIT STORYTELLER SYSTEM

The new story manager now selects the memories from a database according to various strategies, depending on the accumulated nature of the interactive process.

The database contains a list of scenes, each of them containing one or more video or still images and zero or more audio files. For each scene, there are several groups of keywords for content, emotions, form (such as close up, medium shot, slow or fast panning, tilting movement etc.), function (establishing shot, reaction shot etc.), and location and time. Content keywords are also weighted, to indicate what each scene is chiefly about. For every scene, there is also indication for the overall mood at the beginning and end of each scene, as well as for psychological depth. Another set of meta-data establishes ordinal relations between scenes, by indicating which scenes may need to be preceded by earlier scenes, in terms of story information.

Progression from one scene to the next may depend on the level of intimacy the participant has established with the protagonist and on reaching a threshold of story knowledge presented in previous scenes. The more intimacy reached in the relationship, the more intimate knowledge of the protagonist is shown.

Depending on either emotional intensity within the protagonist or aesthetic preferences, different representational strategies are selected. When the protagonist's mood is in equilibrium, scenes may be selected according to a causational –formal strategy, approximating that of narrative cinema. Information is presented gradually, scenes are grouped into plotlines and spatial and temporal relations are maintained. Another possible strategy of representation is more associational and emotion-driven. This strategy is selected when the protagonist's mood is intensified. Optionally, a formal-abstract strategy is selected when the participant performs stylized gestures that the protagonist prefers.

The participant may be able to infer these indirect influences of her gestures on the organization and development of the memory materials, because this time, the scenes are short and sparse and thus more responsive to the rhythm of interaction.

With this new design, I hope to finally produce a deeply meaningful and engaging interactive story experience.

## 4. ACKNOWLEDGMENTS

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