Textual vs. Graphical Interaction in an Interactive Fiction Game

Manish Mehta[1], Andrea Corradini[2], Santiago Ontañón[3], and Peter Juel Henrichsen[4]

[1]Georgia Institute of Technology, Cognitive Computing Lab, Atlanta, GA 30332-0760, USA
mehtama1@cc.gatech.edu
[2]University of Southern Denmark, IFKI, 6000 Kolding, Denmark
andrea@sitkom.sdu.dk
[3]Spanish National Research Council, Artificial Intelligence Research Institute (IIIA-CSIC),
08193 Bellaterra, Spain
santi@iiia.csic.es
[4]Copenhagen Business School, ISV, 2000 Frederiksberg, Denmark
pjh.isv@cbs.dk

Abstract. In this paper, we present a preliminary evaluation of a text-based and graphical version of an interactive fiction game that we created to look at how the user experience varies across the different mediums and modalities.

1 Context Overview

Interactive fiction (IF) is a story-based genre of games where the user is given a more active role than, for example, a mere reader who turns on the pages of the novel while reading the story. These games started primarily as text-based and only later shifted to a more graphical representation with advances in graphical technology. Even though a graphical medium looks more attractive and appealing, this can also quickly become a bottleneck since within a short period of time most graphical games become outdated. Text-based versions do not suffer from such an issue. Each medium presents its own advantages and disadvantages in terms of creating a story-based game. The same case applies to the use of a choice-based menu or a natural language-based input interface. Each input modality has its own benefits and drawbacks. The use of medium and modality in creating story-based games has been long debated but several interesting questions have not been addressed empirically. For instance, there has been little investigation in finding how the user experience changes for IF games with a) text-based versus graphical as output representation medium and b) choice-based menu versus natural language as input modality. In this paper, we have focused on this latter question by presenting the user with the same game using text-based and graphical interfaces with different input modalities. We looked at both media and tried to see qualitatively the issues and benefits that they offer from a user experience perspective.

We developed a subset of the *Anchorhead* interactive story game created by

Michael S. Gentry [1]. Notably, we focused on a subpart of the story as identified in [4]. Graphical as well as text descriptions of the current scenario are presented to the player, who then enters commands in textual format, e.g. "*enter the mansion*" or "*take the key*". While designing the two different versions of the game, we have kept their content equivalent in order for them to be compared in this study. The game plot is the same for both interfaces. The interaction approaches are also equivalent, since the set of commands that have an effect on the game and can be recognized by the natural processing modules is the same as the set of commands that can be entered with the menu-based interface. Commands recognized by the natural language components but without counterpart in the menu-based interface do not have any effect on the game.

We created two versions of the game. One version is a text-based interface where the user selects actions among a set of options. The other version is more elaborated since it presents the game through a graphical interface and the user can enter commands through typing English sentences. To evaluate our approach we developed a generic interactive stories architecture and plugged the two different interfaces to it.

2 Experiments

We conducted two separate sets of experiments. The objective of the first experiment was to look at the question of input modality with respect to its effect on player experience. The objective of the second experiment was to understand the player experience-based on the choice of medium. For both experiments, each player was provided with an explanation on *Anchorhead* and asked to sign a consent form before starting the game. The player filled a background questionnaire to obtain subjective information such as previous gaming experience or preferences to specific types of games. During each experiment, a researcher monitored the game session and produced a log with observations related to the player actions and reactions. On an average, a complete player interaction lasted for about 45 minutes each.

2.1 Experiment 1: Language Understanding vs. Choice-based Menu

For the first set of experiments, we invited 30 people. The first 15 people were asked to play the text-based version with a choice-based interface and the other 15 were asked to play the graphical version with a natural language interface.

We transcribed the player responses from the interviews and observed players' actions during the game episodes. As our focus was to understand the qualitative differences for the user experience when the input modality is varied, we discuss the results from the qualitative analysis. We analyzed the data using a qualitative analysis method known as Grounded Theory [6]. The results from this analysis reveal that:

Language modality is a more natural way to interact. Users felt that using language was a more natural way of interacting with the system, giving them a feeling of being more immersed in the experience. Users commented that the language interface made the experience more interesting and expressive. The choice-based

menu, on the other hand, was considered more restrictive. An open-ended natural language interface made the players more engaged in the game. Users reported that the characters and the overall game looked more alive using the language-based version. This latter interface also provided the player with an illusion that it could handle a larger range of input commands. At the same time, when input was misrecognized, this illusion resulted in a break of the playing experience.

Open-ended language interface makes it difficult to figure out appropriate actions. The open-ended nature of the language interface, made it difficult for some users to figure out appropriate actions. In the choice-based interface, users knew exactly what could be done at any time since they were provided with list of choices. In our previous work [5], we have reported on a Drama Management (DM) module integrated with our architecture that guides the user through his experience in order to deal with this issue. When the DM detects that the user is lost (i.e. when he has not typed in for a certain long time or is not able to provide the right set of inputs to the system), the DM itself provides guidance given the current context and situation.

Open-ended language interface creates false expectations. Some players were frustrated when they tried and failed to interact freely with other game characters. The open-ended natural language interface creates a false illusion and sets up higher expectations in user's mind on the system's capabilities. When the input is not recognized and/or is not properly handled with, the interaction flow breaks down, resulting in a frustrating user experience. The key issue here is how to appropriately handle out of domain topics. One possible way to deal with the issue is to increase the range of conversational topics with viable approaches used e.g. for chatter-bots [2] or resort to freely available web resources as proposed in [3].

2.2 Experiment 2: Text-based vs. Graphical Medium

For the second set of experiments, we run a preliminary evaluation with 6 players. They were divided into two groups. Players in first group were asked to play first the text-based version and then the graphical version. Players in the second version had to play in the opposite order. The specific scores that players assigned to the different parts of the game are summarized in Table 1. Quantitative results from the experiment indicate that the in terms of overall rating, players found the graphical medium more attractive (a 17.17% increase). A qualitative evaluation shows that:

Visual Cues help the user navigate more. Graphical adventures provide the users with a visual reference of the environment, their location and possible movements in the game. The graphical version of the game offers users the possibility to explore the system visually and see the consequences of their actions. In the text-based game, users felt that everything was left to their imagination.

Text-based environment provides an opportunity to players to flex their imagination. Some users felt that text-based adventure stimulates their imagination much more than graphics. A graphical game presents all the possibilities pictorially leaving fewer things to their imagination. Presenting the output in textual format forces the user to resort to his imaginative skills.

Visual representation of the graphical version is more appealing. The graphical version of the game aroused a stronger sympathetic response, a sort of 'coolness'

effect generally associated with a more visually appealing game experience. Users judged the text version and its simple representation as less attractive compared to the graphical version which biased them towards preferring the graphical version.

Table 1. Participants' overall game rating, on a 5-point Likert scale (0-4), with corresponding weighted rating average for both the text-based IF interface and the graphical IF interface.

Player	Text IF		Graphical IF	
	Rating(R)	*Confidence (C)*	*Rating(R)*	*Confidence (C)*
P1	2	3	2	3
P2	2	3	4	4
P3	3	2	3	3
P4	3	3	2	3
P5	2	3	2	3
P6	3	3	4	3
Weighted Average	$\Sigma_i (R_i * C_i) / \Sigma_i C_i$ 2.47		$\Sigma_i (R_i * C_i) / \Sigma_i C_i$ 2.89	

3 Conclusions

We presented the qualitative results from a pilot study to look at the choice of output medium and input modality in terms of user experience. Despite the limited statistical validity of the experimental corpus, the results point out some interesting findings.

The large majority of users find natural language a more comfortable, and familiar way to interact. Natural language might produce false expectations and should be coupled with hinting mechanisms to proceed in the game. Concerning the medium, players usually prefer the graphical interfaces because it generates visual cues that help them navigate the game and is also more appealing. However, players agreed that the text interface stimulates their imagination more. In future settings, we plan to keep modality and medium completely separated from each other.

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