Storytelling & Conversation to Improve the Fun Factor in Software Applications

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ABSTRACT

This paper describes a programmable factor of user fun and satisfaction for information systems, so-called 'serious' applications. Fun and enjoyment is attained through a user-centered view of the information presentation, especially through a programmable narrative approach to storytelling and conversational user access to information. In addition to the approach itself, we describe projects that implement the approach.

Keywords

User-centered design, digital storytelling, conversation modeling, morphological story engine.

INTRODUCTION

Creating fun and enjoyment within a software application has just recently become a desirable objective in software engineering for so-called serious applications. One main reason for this is perhaps the absence of an explicit definition of *fun*. For certain, fun can be defined as a positive human feeling – maybe the term 'lust gains' applies most to fun. When examining philosophical lexicons, the term 'lust' is defined as a pleasant feeling - in contrast to feelings of sorrow – or as a feeling of satisfaction.

When examining satisfaction to reach fun and enjoyment in the use of applications, it is not easy to determine what directs a user to satisfaction. For example, the command line interfaces are not considered to be satisfying for the user in the sense that a lot of users do not like to use them. If the command line is the only interactive access to a very suspenseful and exciting adventure game the users still find the game enjoyable – without regard to the minimal interface. There are additional examples from the WIMP interfaces (desktop metaphors using windows, icons, menus and pointing) that show that the fun and joy using the application is dependent on the structure of the application behind the surface of the user interface. This should not distract from the fact that the interface should be designed in a way that it is satisfactory to use. But it is obvious that the interface of a senseless application won't be fun at all – it doesn't imply a satisfying application. In this sense we find that satisfaction in the application is split into the short-period satisfaction that is addressed by the user interface, as well as the medium-period satisfaction that is addressed by the sense and the structure of an application.

We try to attain satisfaction by the usage of structures that are used by the people for short-and medium-period satisfaction. Interpersonally there is an increase of satisfaction when people are working together and communicate about their work. Medium-period satisfaction is determined by the type of application and the user's interest in the problem that is solved with the application.

In the following paragraphs, we describe the general structure of the approach and describe its usage via project examples in regard to the factor of satisfaction with the applications.

CONVERSATION AND NARRATION AS HUMAN-CENTERED STRUCTURING OF INFORMATION

For short-period satisfaction with the application, we suggest a human-centered user interface. Human-centered means that for every task to be performed with the application, there is a task-optimized interface. For this reason, several interfaces use several distinct media and modalities – depending on the task and on the intellectual difficulty of problem solving, the applications utilize different interface approaches.

The tasks and problems in the area of digital storytelling lie in the interactive and interesting presentation of information; therefore, in general, most storytelling applications are information systems. People are very familiar with the process of presenting information. To benefit from their knowledge, one should use an interaction metaphor that people are used to and that is basically oriented to interpersonal communication. This metaphor can be conversation - for the organization of discourses between computer and user, as well as for the usage of conversational structures to present propositional content.

Medium-period satisfaction is determined by the meaning and sense of the application and eludes in this context a universal definition.

In fact, even in this case, it is able to define structures that organize content in conjunctions that are found enjoyable by people – like interactive narrated stories. Stories have been used by people throughout history as a possibility to organize content in a way that is comprehensible and enjoyable. In fact the usage of a story to provide information gives the user an easy structure to remember information – much easier than a simple database interface that forces the user to built his own information structure among the queried data.

For the reasons detailed in the paragraphs above, the author propagates a generic conversational-interactive opportunity for the automated telling of stories with the computer. The approach can be applied in several application fields; for example, its structures are used for an augmented reality cultural heritage system (mobile AR information system in an urban environment enabling history as an immersive experience project; Geist [10]).

CONVERSATION MODELLING IN USER INTERFACES

Conversations used as a metaphor in user interfaces are simulating a human-like means of communication between system and user. Here we should explain what "humanlike" means in this case. The term human-like varies. In the case of communication, it means the simulation of natural conversation between at least two individuals (humans). The interchange is not necessarily done by words and sentences. It can be done using every kind of media. A conversation is determined by the following factors:

- A conversation is happening between at least two communication partners / participants. A communication partner is a man-perceptible unit.
- A conversation is happening within an information context that every participant is used to. Often, the context is not explicitly told, but the conversation refers to the context information.
- Conversation means alternating talk, listen and understanding.
- Conversations have a content-related, but also a social and emotional component.
- Conversations, as well as their sub-parts, have a chronological order; they have a start, a duration and an end in time. Conversations are therefore continuous within a time interval.

Approaches to model conversations are done by researchers of artificial intelligence - but as explained by Harris [6] - particularly in regard to generation and understanding of natural language and speech. As presented by Crangle et al. [5], the AI community comes from speech and adds aspects of conversation like behavior. This bottom-up approach of modeling is mostly quoted neither symbolically nor explicitly – this complicates the control of a conversational user interface.

Cassel et al. [4] is demanding the usage of multimodal components within a conversation and suggests the separation into propositional- and discourse-related components. The approach of our work also involves separating the components in these two categories, but in contrast to Cassel, we also demand a symbolic and explicit model of conversations between human and computer. We model the following aspects as the basis of a conversation

- Social and emotional aspects like hierarchies and relationships.
- Story: dramaturgical content sequences, asynchronous data.
- Immersion: Possibility of disturbance, e.g. in case of assistance or interactive movies.
- Focus: The actual focus of the user – is the user looking to the avatar or to the windshield of a car while driving.
- Meta information on content (propositional): Is the content to deliver a question, an answer or just a simple statement, what are the relations between the single content units, who is delivering the content (user or system?). Another aspect is the urgency/priority and importance, as well as an emotional rating of the content – is it positive or negative news to the user.
- Navigational aspects like opening, changing or closing of discourses, getting or giving turns.

The conversational aspects are obviously abstract and symbolic with a minimized relation to the type of content, but with a maximized knowledge of the general behavior of humans or humanlike conversation participants. Thus far, the aspects are without a modal relation - the modal characteristics are added in specialized input and output modules as described by the author in [1]. On the basis of special rules running on this knowledge base, conversations, as well as their processing, are modeled.

The rules themselves are simplified and stated in the following groups:
- Processing of conversational aspects
  o Story management: Management of the content that is provided to be presented by the conversation participants.
  o Discourse management: The state of the different discourses that one conversation participant is involved in.
  o Turn management: Conversation participants can explicitly demand the turn or in fact take the turn or implicitly get the turn by activity (for example users can take the turn implicitly).
  o Context management: Attention, background noise level, user preferences, etc.
- Generation of conversational aspects and behavior
  o Turn taking: Demand the turn, offer the turn, give the turn, take the turn.
  o Discourse: Opening, changing, closing, reopening the discourses.
  o Asynchronous behavior: Querying, answering, disturbing.
  o Linear behavior: processing of coherent content.

The medium-period enjoyment is attained by the modeling and narration of an interactive story, see next section.

INTERACTIVE STORYTELLING FOR INFORMATION PROVIDING

According to Laurel et al. [7], a story is characterized by the following properties:

A story offers a context. Within the context, it offers activities and plots played by characters/actors. The narration and

experience of the story creates a manipulation of space and time that causes cognitive processes within the mind of the reader/audience.

For sure, the enjoyment of the audience is one major cognitive factor.

Nonlinear stories feature the possibility of the story's audience influencing the story. Audience interactions are of vital relevance for the process of narration. The following factors described by Mateas [8] indicate the possibilities to manage the audience influence:

- Locality of Control: The control of audience interactions can be local (for example, via actors) or global (like a chess program).
- Granularity of control: From very subtle control (like hypermedia, every interaction possibility predefined) to a course control (for example an evaluation function that maps a couple of user interactions to a story manipulation).
- Generation of stories: From a completely predefined story (e.g. with only scene navigational interaction (change of viewpoints)) to the generation of new plots and an open story end.

We define nonlinear storytelling as the telling of a story with an audience-impact on the storyline, but not on the story goal (the outcome of the story, the end of the story).

Of course, these factors don't provide a patent on story structuring. Russian formalist Propp [9] goes a step further and gives a detailed semiotic description of story structure, completely independent from the content of the story. He described the structure with morphological functions, relating to the several subsequences in a story and the actors of a story.

Propp explored two typical structures of Russian fairy tails, described in Figure 1; the dark block describing the *hero struggles with the villain* structure, the light block describing *the hero solves the difficult task* structure. The alphabetical characters within both blocks indicate the semiotic equivalent parts.
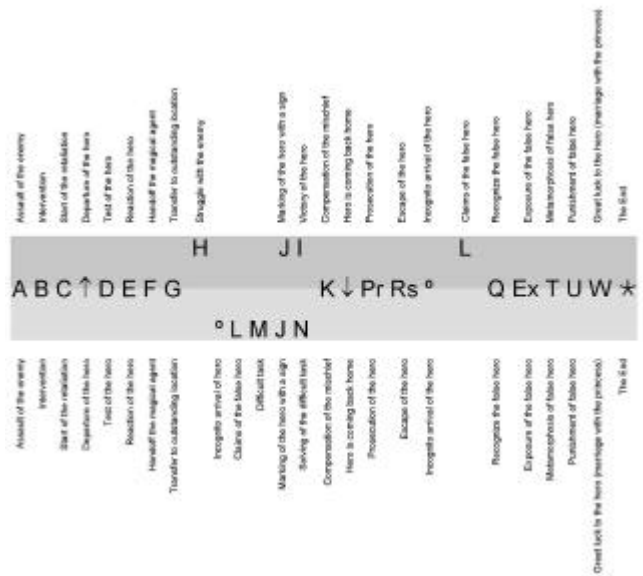
Figure 1: The two general story structures of Russian fairy tales by Propp

Propp showed that this structure in fact can be manipulated to narrate variants of the appropriate described story. As shown by the author [3], it is possible to get a structure of interactive stories by the morphological rating of several narrative sequences and dramaturgical classification (so-called dramatis personae) of the story's characters. This way it is possible to narrate variants of a story if the story is based on any morphological story model. The advantage of this model is the defined end of the story – the audience will always get to the end of the story within the scope of author-defined conditions. By expanding the original story model to administrative structures for context management, a coherent and conclusive story is warranted.

The resulting story engine performs the story on two abstract levels:

- By processing the collection of playable function sequences, a real time user adapted storyline is generated. Collection is done in regard to several factors like the morphology, actual user interaction, the overall playable scenes, the scenes already played out, possible nested storylines (so called moves), author-given constraints (e.g. limited playtime)

- By mapping the functions on real scenes, the story is narrated.

As the story model is based on a morphological approach, it can be changed easily by changing the underlying morphology.

PROJECTS

By mapping the story structures via the story engine to scenes and dramatic characters with those characters performing a conversational interaction with the user/audience, it is possible to achieve a short and middle-term cycle of enjoyment.

On the basis of an integrated API (as described by the author [2]), the conversational modeling (conversation engine) and the story modeling (story engine) is usable for miscellaneous applications.

A very ambitious project is Geist, see Kretschmer et al. [10]. 'Geist' is the German word for 'ghost', a metaphor for the spirit of history;
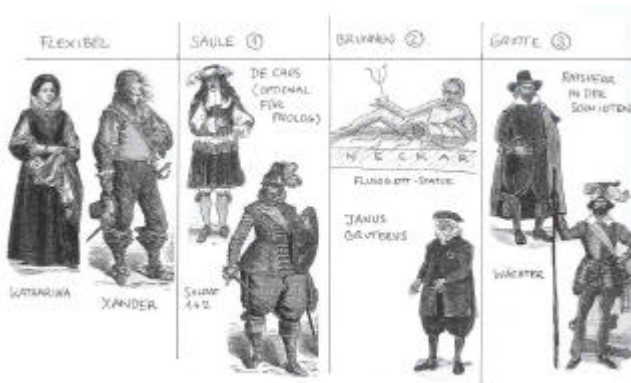
Figure 2: Dramatic characters of Geist (Artwork by U. Lohde)

Geist shows explicitly the correlation of humanlike communication/interaction story structures and the user's enjoyment and fun with the application. Within the Geist System, the history of an arbitrary city – within Geist the city of Heidelberg and the Thirty Years' War – is shown in a way that the audience receives an immersive, dramatically and action-rich experience with a high factor of fun and enjoyment.

The historical data are served via an interactive story that includes:
- the environment - buildings, parks, gates, fountains, etc.
- the historical image of the environment - buildings in their historical form, potentially artifacts of the past that do not exist in the current time.
- Different dramatic characters of the historical age. Figure 2 shows actors used to perform the dramatic characters.
- The user - involved as a dramatic entity of the story.

The user is utilizing interfaces that offer an acoustic, graphic and haptic access to the story - via augmented reality seamlessly integrated into his own reality – to see with his own eyes, touch with his own hands, talk with his own mouth - to interact with the historical characters and manipulate the storyline. Conversational interaction is used to permit a humanlike communication with the actors. The suspense of the story is generated by the morphological story model.

The user is experiencing the Thirty Years' War first-hand and is interactively involved in the fate of the virtual characters.

CONCLUSION

This paper describes the impact of human like structures as a short- and medium-period factor of user satisfaction in the usage of software applications. The author demands a orientation of the user interface towards human needs to gain a short-period cycle of user satisfaction. This is achieved in regard to assistance and delegation with a conversational interaction metaphor that is described as an explicit and symbolic top-down approach. For the medium-period satisfaction of the user, the author demands the usage of humanlike information structures like stories to access information in a way that is easy understandable for the user. The author suggests a morphological story engine as it is basically described by Propp. This way the fun factor can be included in several 'serious' applications.

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