

J-021

The Prototype system of Prompter communication with handwriting and drawing functions

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1. Introduction

There has been much research into creative thinking-support tools and communication. Past research has focused on managing or finding the direction of the thought, such as mind-mapping, brainstorming [1], on sharing ideas and thoughts, such as the KJ method [2][3], and on visualizing “thought space”, such as AII [3]. These methods and tools are focused on developing thought processes towards an existing idea instead of supporting generation of the idea itself. Therefore, we focus on supporting idea generation and inspiration for creative thinking. However, when we look into the creative thinking processes, there are several steps involved and commonly occur as following, but do not necessarily occur in the following order [4]:

1. Participant is inspired and comes up with an essential idea for the creative thinking processes.
2. Participant then links and connects all other relevant information, including personal experiences and knowledge, to the idea and then decides the approach of the creative thinking processes towards the idea.
3. Meanings are attached to those creative thinking processes.
4. The creative thinking processes of the idea are concluded and expressed to share with others.

In this research, we deal with a visual telecommunication method between two participants for inspiring ideas and supporting creative thinking processes. In the authors' previous research, a prototype of computer mediated visual “●” *Prompter Message System* (PM-System) has been introduced, researched and analyzed. The PM-System randomly encloses visual prompter image patterns, as shown in Fig.1, within the “message-creation” frame as a visual cue to the participant to inspire idea and creative thinking, which supports the step 1 of the creative thinking processes mentioned above. The participant then associates the idea with other information, including personal experiences and knowledge, as mentioned in the step 2, and creates his/her personal “message” by writing texts on the visual prompter image pattern. During the process of creating the “message”, the inspired idea and associated information combine together and transfer into visual forms, as mentioned in the step 3 of the above processes. Finally, participant finishes and shares the “message” with the opponent participant by sending the “message” to the opponent, as mentioned in the step 4 of the creative thinking process.

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Although the prototype of PM-System has shown a considerable tendency toward the inspiration of creative ideas by the participants, no significant differences were observed between the PM-System and other creative thinking based tools. In this paper, we develop a *Prompter Message Handwriting and Drawing System* (PMHD-System) that enhance participant to create messages by dynamic writing and drawing onto the message screen which allows participant to express their ideas and thoughts more easily, freely and rapidly.

2. The Concept of the Prototype “●” Prompter Message Handwriting and Drawing System

The prompter communication system was designed to promote communication using the black “●” prompter. The system was created using a combination of images, characters, drawings and writings, and through a process of interpreting the resultant images, those involved in the experiment not only receive and accept the message conversation, but also participate in the conversation.

In our previous research, we have researched and discovered an important and interesting feature: the “Fortuitous Effect.” The “Fortuitous Effect” is based on the theory of surrealism [5], which suggests that a random, fortuitous prompt, while free of conscious control, can be a source of inspiration. This “Fortuitous Effect” results from the process of randomly generating VP-patterns within the “message-creation” frame of the PMHD-System. The user cannot dictate the image pattern that appears on the “message-creation” frame; therefore, as the user progresses through the frame, this “Fortuitousness Effect” may inspire new ideas as described in the step 1 of the creative thinking processes. Another important feature of the system is that the VP-pattern is polysemous; it can refer to any other objects or feelings, either abstract or concrete. The circle shape is the most common shape, which gives the advantage that users can see it as other things or objects, and the black color, when considered in another way, is a mixture of all colors, which allows user to see it as any other color. These two features not only allow the VP-pattern to be maintained as a constant element throughout the PMHD-System, but also give it the flexibility of being transformed into a variety of alternate objects or things, such as human beings, concrete objects or even feelings, wills, things that cannot be pictured.

3. The Specs and functions of the Prototype “●” Prompter Message Handwriting and Drawing System

The Prompter message system is implemented as a client-server application, where the client is consisting of three basic components (Fig.2): A paint module to allow the user to input handwritings and drawings, then the

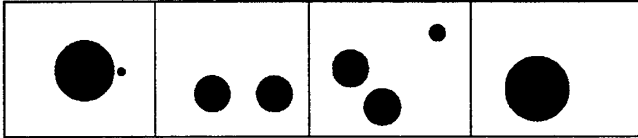


Fig. 1 Samples of VP-patterns using in the PM-System and PMHD-System

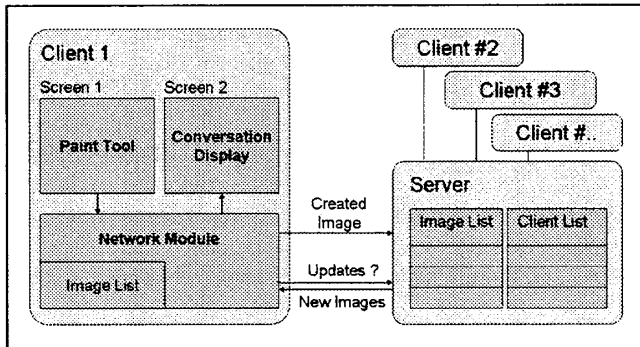


Fig. 2 Block diagram of the system

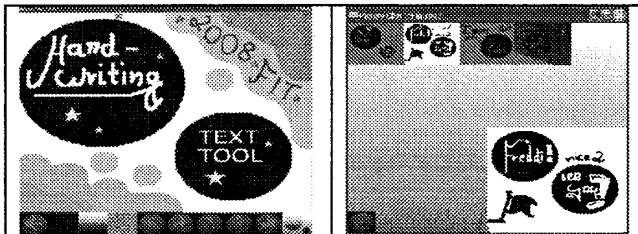


Fig. 3: Screenshots: The paint tool on the left side and the screen of the conversation display on the right side.

conversation display module to show the recent messages and finally the network module to handle the communication between the participants in the background. The paint and the conversation display modules are realized in two screens, whereas the user has the ability to switch between both of them at any time. This has the advantage that it is possible to create an image in the paint tool by following the conversation at the same time.

3.1 The paint module

The first module of the system, the paint module, can be seen in Fig.3 on the left side. It is the major part of the PM-system, where the user can be creative and combine generated VP-patterns with his own inspirations. The two main tools, which are provided by the paint module, are once a conventional text input tool for quickly writing a message and second, more important, a paint function to allow the creation of unique handwritings and drawings by using a brush tool. The created drawings might further be extended to multi-frame animations with a user-defined number of frames.

3.2 The conversation display

The second module to display the conversation between the participants is shown in Fig.3 on the right side. There, all images of the ongoing conversation are displayed animated (if available) in thumbnail size. The user can

select one of the images to be enlarged for a detailed view. Furthermore, each of the images is saved to disk, which allows the user to review the conversation later at any time. The visualization of animations is realized by continuously blending over one frame after another.

3.3 The network

The network is organized in a conventional client-server manner. Once the client is started, it connects to the server and synchronizes the conversation display by downloading the current image list. This allows every new participant to see the conversation that has been going on so far.

The network system is based on polling – this means that clients frequently send inquiries to the server to check whether novel messages have arrived from one of the participants.

In case that one member has finished creating an image message, this message is sent to the server as one image with timestamp or as a set of images in case of an animation. The frequent polling guarantees the distribution to all participants in a reasonable timeframe while the timestamp is required to show the images of the conversation in the correct order.

4. Implementation details

The system is written in C++ and uses the OpenGL API for the display. OpenGL has the advantage that it allows hardware-accelerated image processing, which is in particular advantageous for the paint tool in case of high resolution images and also for transparency and perspective effects. In our implementation of the paint module, each brush is therefore represented as a texture. The texture might either contain a spot for a simple brush tool or in case of the text input tool it contains the rendered text in a sufficient high image resolution. The rendering of the brush is done to the conventional frame-buffer, rather than using frame-buffer-objects (FBOs), which are more convenient to use in this case, as no additional copy operation from the image-buffer to the texture-memory is required. The reason is that FBO's have not been supported on the target system.

References

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