A Virtual Emotional Freedom Therapy Practitioner (Demonstration)

Hedieh Ranjbartabar
Computing Department, Macquarie University
NSW 2109, Australia
+61(0)2 9850 6344
hedieh.ranjbartabar@students.mq.edu.au

Deborah Richards
Computing Department, Macquarie University
NSW 2109, Australia
+61(0)2 9850 9567
deborah.richards@mq.edu.au

ABSTRACT

The role of virtual humans in a range of health scenarios, including therapy and counselling, are being explored. To help people in managing their emotional health this research project novelly investigates the value of a virtual practitioner to deliver the Emotional Freedom Technique (EFT). EFT, also known as Tapping Method, is a kind of psychological acupressure technique to optimize emotional and physical health. Significantly, we compare two different types of virtual EFT therapists, one that seeks to exhibit empathetic behaviour with another that delivers the therapy in a neutral manner. An initial online semi-interactive study with 37 participants reported benefits for both therapists from baseline emotion, and these improvements increased with a subsequent session, the empathic agent delivered slight but non-significant improvements but did not achieve a higher level of rapport with the human.

Keywords

Intelligent virtual agents; empathic agents; virtual humans; emotional freedom technique.

1. INTRODUCTION

The effectiveness of intelligent virtual agents (IVAs) that act as Virtual Humans (VHs) in a wide range of health and wellbeing roles is being explored. These VHs require social ability, communication skills and appropriate verbal and non-verbal behaviours. Interest is particularly growing in examining the viability and benefits of building long-term relationships with VHs. Rapport has been found to play an important role in establishing and maintaining human relationships [14]. Empathic behaviours are also being used to build a socio-emotional bond between the human and agent [10]. Questions are being raised concerning the extent to which VHs need to be believable or the same as humans (e.g. [3]), particularly when researchers are identifying that VHs might be preferable, such as in anonymous or non-judgmental contexts [5], and provide numerous benefits over their counterparts such as being more available and less variable – while also able to tailor responses according to the situation [8]. Via this demonstration we question whether empathic dialogue, and the associated effort, is always preferable.

The overarching aim of the demonstration was to determine whether an empathic or neutral agent delivered more emotional benefit. In the study reported in this paper, we explore the relative benefits of a virtual therapist that uses empathic behaviours, primarily exhibited via verbal communication, over the same therapist who uses neutral behaviours.

2. SCENARIO & TECHNOLOGY USED

Callahan [2] developed a method of tapping on acupressure points (acupoints) for treating mental problems called Thought Field Therapy (TFT) in the 1980s. Gary Craig developed EFT in the mid-1990s as a consequence of his study of TFT. Craig modified and improved Callahan's methodology to a simplified version. EFT is easy to learn and effective [9].

We chose to use EFT because, while it is often guided by an Emotional Freedom Practitioner, the method primarily involves individuals performing the therapy on themselves, as in the case of meditation, but additionally has a physical element also performed by the patient on themselves. Though there is use of acupuncture to treat psychological disorders and claims by energy therapy researchers that acupoint tapping creates unexpectedly strong and rapid clinical outcomes [4], EFT is not recognized as an evidence-based medical therapy. However, our aim was not to treat physical or mental health conditions, but to provide therapy that could be used by anyone to manage their own stresses and provide a testbed for exploring whether tailored empathic dialogue delivered significant benefits to justify the additional complexity and effort required to build an empathic VH.

The EFT process involves first identifying a specific problem to focus on while tapping, eg fear of flashbacks following a recent trauma. Next is to score the level of trouble on a scale of 0-10. After that saying out loud the 'set-up' statement, eg 'Even though I have this fear of the flashbacks I deeply and completely accept myself'. This statement is repeated three times, while tapping on the Karate Chop Point following by tapping gently on a number of meridian points of the head, face and body. Reassessing the level of disturbance and if necessary repeating the whole process [11].

Our virtual EFT practitioner, known as EFFIE the Emotional Freedom FrIEnd, is based on Virtual Human Toolkit components [6]. As seen in Figure 1 for the system to deliver credible and effective communication in real time, we developed a dialogue engine written in C#. Communication between components is done by message passing, which is implemented in ActiveMQ [12]. The dialogue engine sends BML (Behavior Markup Language) message to NVBG (NonVerbal-Behavior-Generator) module containing the line the character will say and for which nonverbal behavior needs to be generated. BML [7] is an XML description language used for controlling the verbal and nonverbal behavior of humanoid embodied conversational agents. The output of NVBG is also BML which are transformed into synchronized sequences of animations by Smartbody character animation system which is a BML realization engine [13].
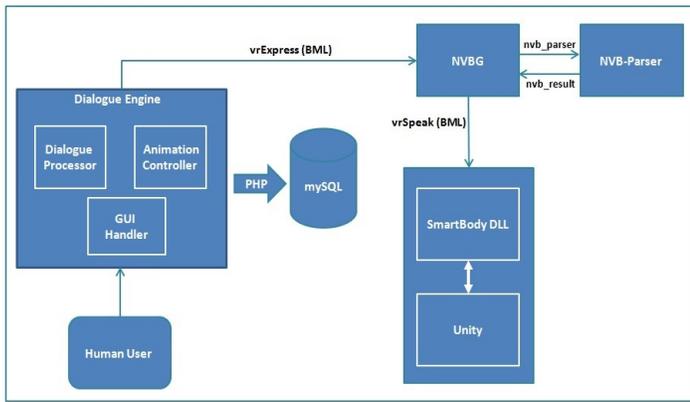
Figure 1: Architecture for virtual EFT practitioner: EFFIE.

We chose to add and execute pre-recorded voice snippets for Effie dialogues rather than use CSLU Toolkit's speech synthesizer to minimize the possible negative influence of an automated voice for the therapy session. For each continuous speech there exist 4 files, a wav file for the audio, an XML file for non verbal behaviour such as smiling or nodding, a BML file for lip synchronising and a text file containing the sentence(s). To create the BML file we used CSLUPhonemeScheduler tool from CSLU Toolkit. The BML files generated by this tool has viseme schedule with detailed timing information for lip-synching and word boundary timing information for synchronization of nonverbal behavior as specified through BML.

The dialogue engine consists of three main parts, a dialogue processor, an animation controller and a GUI handler. These three parts runs simultaneously to achieve synchronizing between dialogues, user interaction and animations. The dialogue processor sends the BML messages to NVBG and is responsible for turn taking. The user interacts with the system through the GUI handler. For each tapping animation there is an animation clip and an animation state. All tapping animation clips are maintained by an animator controller. The controller manages the animation states. Figure 2 shows Mecanim's Animation State Machine created for Effie. Animation Controller uses the state machine parameters to trigger desired animation and simulate the dynamic reasoning process of a real EFT therapist. The information provided by the user during the EFT session is sent to the mySQL database via a PHP command.

Two dialogues (empathic, neutral) were developed and contained two parts (welcome and intro to EFT round 1; followup and intro to round 2). Empathic dialogue sought to be more caring and was tailored to the emotional responses of the user (see video comp.mq.edu.au/~richards/AAMAS16-Demo/EffieVideo.wmv).
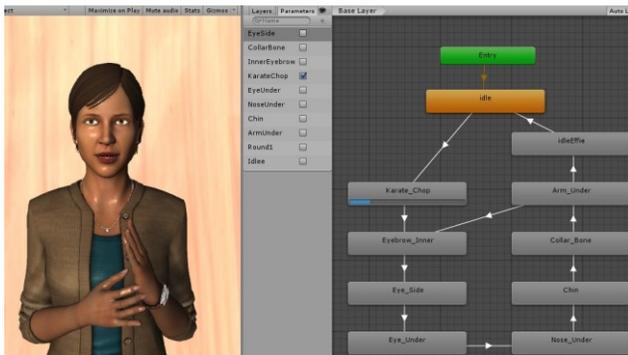
Figure 2: Mecanim's Animation State Machine for Effie.

3. EVALUATION

To explore the research questions of this study, we designed a quasi-experiment consisting of one between-subjects factors (empathic/neutral virtual therapist) and one within-subjects factor (time). A between-subjects design for agent-type was chosen to expose participants to both types, which would allow them to observe any differences and allow us to gather more data, including their preferences, with less participants. Qualtrics randomly assigned participants to groups that received the two types of agent in different orders. Different orders were designed to counterbalance and measure potential order effects. Group 1 interacted with the empathic ECA followed by the neutral ECA. Group 2 interacted with the neutral ECA followed by the empathic ECA. The independent variables (time and agent) were manipulated to measure the effect on the dependent variables: emotional score and sense of rapport.

To run the application written with the Virtual Human Toolkit three 3rd party software tools are required: .NET Framework, DirectX Redistributable and ActiveMQ. These three tools need to be installed on the users' machines and would require downloading of a 400+MB zip file, which unzipped to over 600MB. We did not believe that it was ethical or practical to ask volunteers to download and install the application. To avoid dealing with installing the 3rd party software by the user, we decided to record multiple video simulations (covering the main combinations of responses) of our character with the two scenarios, empathetic virtual therapist and neutral virtual therapist. In response to the users selection we played the corresponding video; providing a semi-interactive session.

A total number of 37 people (22 females, 15 males; mean age=23, SD=4.9) took part in the study. Group 1 (empathic-neutral) had 17 participants and Group 2 (neutral-empathic) had 20 participants. Participants in both groups achieved emotional benefits during the two sessions, with 50% and 46% overall reduction in their negative feeling towards their problem in group 1 and group 2, respectively. Although the achievement for group 1 is higher than group 2, the difference is not significant. This difference may be due to the semi-interactive use of multiple videos which meant we were unable to fully tailor empathic Effie's responses to the individual. Furthermore, the video did not allow participants to experience some aspects of the empathic dialogue, in particular the "empathy for the user" cues where Effie responded to the questions about how the participants day was going or whether their scores were improving or getting worse. This belief is evident in responses to the question "Effie was not empathic towards me" where both versions of Effie were found to be similarly moderately empathic even though empathetic cues derived from the literature [1] were only included in the empathic agent implementation. In summary, EFFIE was able to deliver emotional benefits to participants, however a short empathetic conversation before treatment involving greeting, social dialogue and sharing knowledge does not necessarily deliver better therapeutic benefits than a session that just focuses on EFT.

Initial analysis of results from an onsite study where 26 participants engaged with the character through real-time interaction indicate similar findings and through discussion with an EFT practitioner, it appears that the empathic dialogue does not deliver significant benefits and that differences are only likely if much more tailoring of dialogue and the treatment (i.e. adapting the animations and tapping points) are provided. Thus, as future work we plan to increase EFFIE's functionality, amend dialogues and use camera input to generate appropriate nonverbal behavior in real time based on EFFIE's perceptions.

4. REFERENCES

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