

Using Emotion Simulation to Influence User Attitudes and Behaviour

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1 Introduction

Research related to emotion in human-computer interaction (HCI) often tends to focus on how a computer can autonomously detect the emotional state of a user and then adapt itself accordingly. Another important strand of emotion-related research in HCI is the simulation of emotional expressions made by computer agents. Interface designers often include emotional expressions and statements in their interfaces through the use of textual content, speech (synthetic and recorded), and synthetic facial expressions, but little is known of how we respond *psychologically* to these expressions of emotion and what effect they have on a user's perceptions, behaviour and performance. We are currently planning a series of experiments that will investigate the influence of synthetic emotions on a user's attitudes and behaviour.

2 Psychological Effects of Emotion Simulation

Several studies have illustrated that our ability to recognise the emotional facial expressions of embodied computer agents is very similar to that of identifying human facial expressions (Bartneck 2001). But it is still largely unknown how we respond psychologically to these expressions. Are our responses to a synthetic smile similar to that of a human smile? Can we *catch* emotions from computers? How do we respond to synthetic displays of joy, happiness, sadness, frustration, and disappointment? These types of questions have been neglected in research studies to date but are of fundamental importance in understanding the potential role of emotion simulation in HCI.

Studies which have suggested that we treat computers as social actors (Reeves and Nass 1996) add strength to the possibility that we may treat synthetic emotional expressions as *real* emotional expressions. In fact, several studies suggest that this is indeed the case, including Brave et al. (2005), Liu and Picard (2005) and Bickmore and Picard (2004), who all found that a computer agent which was empathetic toward the user (through the use of facial expressions and textual content) was generally rated more positively by subjects when compared with an agent which was not empathetic toward them. Our research will focus on how *strong* responses such as these are and for what practical purposes they could potentially be used.

3 Current and Future Research

To help understand further what impact synthetic emotional expressions have on a user and the usability of a system, we plan to initially address the following questions: -

1. What impact does the type of representation (e.g. textual content, synthetic speech, multimedia video) used by a computer agent to express emotion, have upon a user's perceptions, behaviour and performance?
 - (a) Does the type of representation used have any impact upon the perceived usability of a system?
2. Can *emotional* agents influence or change a user's attitudes, beliefs, and behaviour more effectively than *unemotional* agents?

The motivation for investigating the above questions is based on studies which have suggested that users tend to like and trust emotional agents more than unemotional agents and also perceive them to be more caring (Brave et al. 2005; Bickmore and Picard 2004). People are more easily influenced and persuaded by individuals that they like and who they believe to care about them. Therefore, emotional agents which are perceived by users to be more likeable, trusting and caring may potentially be able to persuade and motivate users more effectively than unemotional agents. A computer agent's representation may also effect the strength of a user response to synthetic emotion and consequently might have an impact on an agent's ability to influence user attitudes and behaviour.

An important question that is related to this research is whether or not all emotions are of interest to HCI. For instance, why would a computer ever need to express fear, frustration, or disappointment? Perhaps frustration or disappointment might be used by a sports coaching agent as a means of motivating an individual who has not adhered to their strict fitness regime, by attempting to make them feel guilty. An expression or statement of fear might be used by a security agent to add urgency in getting the user to patch software which has vulnerable holes located within it. Therefore, emotions which are typically perceived as being more *negative* should not be ignored and thought of as harmful to HCI, but instead, should be utilised by interface designers (along with other more *positive* emotions) to produce a desired or beneficial outcome for the user. Our future experiments will concentrate on the role that all emotions have to play in HCI.

Also of particular interest, is how users respond to the inclusion of synthetic emotions in computer agents over an extended period of time. Do the effects found in short-term studies remain consistent over time? If not, in what ways do they change? Can emotional computer agents help produce long-lasting desirable changes in user attitudes and behaviour? We also intend to address these questions in future experiments.

References

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