Towards the Design of Human-Centred e-Tourism Systems

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Abstract

Consumer research into Internet usage has typically focussed on areas such as information search behaviour and the technologies that ensure smooth webpage navigation and security of transactions. Little attempt has been made to identify and interpret consumers' emotional responses to websites, despite the extensive marketing literature into emotions and their impact on consumer behaviour (Machleit and Eroglu, 2000). This paper therefore poses the question: What elements and parts of web pages generate positive and/or negative emotional responses from the viewers? We offer the conceptual foundation for a proposed large-scale research and software development project. The setting for the proposed research is the tourism industry.

Introduction

This is a conceptual paper that proposes the application of a highly advanced technological tool to evaluate the impact and therefore effectiveness of tourism destination websites in Australia. Put briefly, we propose the application of webcam technology to measure the level of emotional response that respondents exhibit while browsing destination websites. The conceptual model combines two independent fields: eyetracking and the measurement of emotional responses to websites. This opens new routes for website designers to devise Internet pages that generate a desired positive emotional response from the viewers. Although this study is set in the tourism field, it has the potential to contribute to non-tourism sectors as well.

Exploration of the managerial and marketing dimensions of tourists' Internet behaviour is still in its infancy (Ha and Perks, 2005; Kim, Lee and Choi, 2003). This situation, combined with the increasing reliance on the Internet as a promotional and distributional tool, means that little research has been undertaken into the link between emotions and tourist attitudes and behaviours (e.g. Douglas and Millis, 2006; Kim *et al.*, 2003). Yet studies in the marketing field provide powerful support for the view that consumers, who respond in a positive emotional way to commercial websites, are more likely to change their attitudes and purchasing intentions. Our aim is to design and develop techniques to evaluate the affect of non-verbal affective (emotional) behaviour of travellers (or prospective travellers) in selecting holiday destinations using e-tourism websites. Direct techniques like facial expressions and eyetracking will be used for measuring and determining the change in terms of the emotional response to specific websites.

Tourism and ICT

The use of the Internet has become widely accepted in our society and the volume of purchases over the Internet is today growing at a faster pace than traditional forms of retailing (Kim *et al.*, 2003; Ha and Perks, 2005). The travel industry is particularly benefiting from this trend. The US Travel Industry Association (TIA) estimated in their 2004 report that out of the

98.3 million travellers on-line some 60% were using the Internet for their travel plans that year (Ha and Perks, 2005; Kim *et al.*, 2003; Douglas and Mills, 2006). Businesses are also gaining from these technological developments as the Internet is increasingly being utilised across a wide range of industries, 'to enable and/or to enhance marketplace exchanges in a variety of service settings, and to create new or improved benefits to customers and providers alike' (Walker, Craig-Lees, Hecker and Francis 2002, p. 91).

The traditional focus of ICT research and development is to streamline the functional role(s) played by the Internet in the buying process (safe information search, secure financial transactions and convenient 24/7 access to services). The typical benefits cited from ICT adoption in the tourism industry are customer convenience and the facilitation of multiple transactions (information search, booking, payment, customer feedback); enhanced control by management of information provided for customers; faster responses to customer enquiries and problems; greater efficiencies; cost savings and 24/7 'presence'/port for contact and the opportunity to differentiate (based on Walker *et al* 2002). In other words, much of past research has been focussed on the cognitive aspects of Internet use and homepage design (Kim *et al* 2003). However, a new school of thought argues that it is the emotional experiences of using homepages that guide consumer buying decisions since 'emotions were found to influence both users' memories of the products and their decision processes when they purchased products' (Kim *et al* 2003, p 900).

The argument for researching consumers' emotional responses to tourism websites is further enhanced by the fact that tourism as a product offers highly involved, intangible experiences to customers who seek for the opportunity to 'immerse themselves in thrilling, absorbing experiences' (Gilmore and Pine II 2002, p. 4). Furthermore, tourism and leisure experiences are also pursued for the purpose of achieving stimuli and emotional experiences; hence tourism is a highly hedonic product with which consumers can form emotional attachments to destinations or vacation activities. Consumers also 'like to think and talk about their tourist experiences' (Decrop and Snelders 2004, p. 1008) and tourism websites provide the opportunity for consumers to extend the travel experience before and after actual travel (i.e. leading to the emotional use of destination websites). Traditionally the tourism industry has linked romantic notions to secluded/intimate locations but lately a more wide range of emotions have been linked to locations and activities undertaken whilst on vacation (Bigne and Andreau 2004; Trauer and Ryan 2004). In other words, tourism is an intangible product that creates holiday memories, and this 'implies that place attributes possess importance only in the way that people use a place and subsequently evoke place to relive a happy memory' (Trauer and Ryan, 2004, p. 481).

Much of the research into tourism and emotions examines customer satisfaction through emotional responses from the consumers although Gilmore and Pine II (2002) also recognise that a virtual place can also generate an emotional response from its visitors. Destination marketing organisations aim to enhance their website brands and the Internet savvy consumers now expect websites to offer cognitive messages as well as positive tourist experiences. In other words, 'a good website… delivers relevant and well-organised information in an engaging manner' (Ha and Perks 2005, p. 440). Furthermore, Bigne and Andreau (2004) argue that the recognition of these on-line experiences as a distinct product offering is the key to future economic growth when 75% of consumers are lured back to their favourite websites after a positive experience (see also, Ha and Perks, 2005). The transition of the Internet into a central marketing and distribution system provides opportunity for a more critical evaluation of the interface between the user and the Internet. Whilst previous research

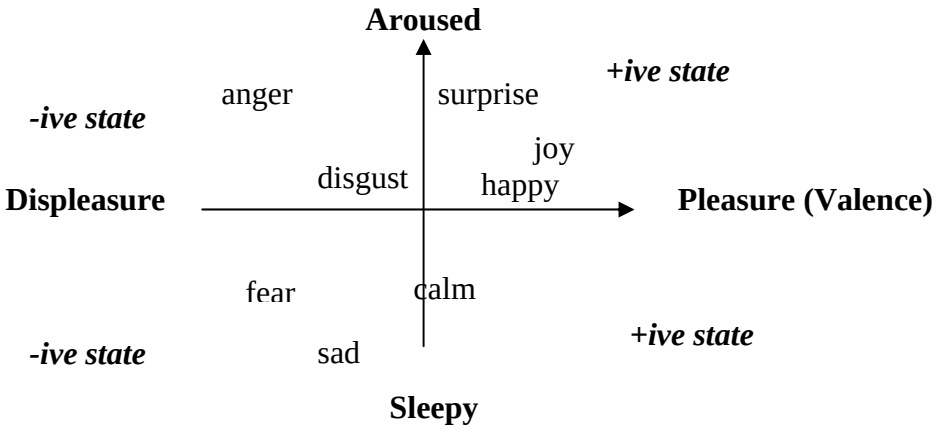
has established the operational effectiveness of the Internet this research initiates investigation of the consumer response.

The Emotional Impact of Tourism Websites

Emotions are typically defined as a two-dimensional construct encompassing both pleasure and arousal. Pleasure refers to the degree an individual feels happy, joyful or generally in a positive mood when encountering a situation. Arousal explains the extent to which a person feels active and stimulated (Binge, Andreu and Gnoth 2004). Figure 1 depicts the positioning of emotions as a function of these two dimensions.

There are many situations involving the use of computer, the Internet and mobile communication devices in which emotions of the user play an important role. Education (distance learning/e-learning), travel and tourism, health care, selling, entertainment or Internet based information retrieval are instances of such situations (Khosla, Lai and Goonesekera, 2004; Khosla and Lai, 2005; Gountas and Gountas, 2004; Edwardson, 2000; Fox and Spector, 2000). Facial expressions are a critical physiological indicator of human emotions (Cohn, 2006; Picard, 1997; Bartneck, Reichenbach and Breemen; 2004). The existing work on analysing human emotions has primarily centred on embodiment of emotional or affective characteristics like happiness, anger, fear, etc. in robots or software agents (Cohn, 2006; Bartneck, Reichenbach and Breemen; 2004; Breazeal, 1999; Picard and Klein, 2002). Some work has also been conducted in the recognition of user emotions in highly controlled environments (Black and Yacoob, 1995). In these controlled environments users have to mimic prototypical emotional expressions like happy and angry which are then recognized by the computer or an emotional software agent.

Figure 1: Affect Space Model



Based on Lang (1996)

Intriguingly, little research has been undertaken in the area of integrating and processing emotions for providing e-decision support and information personalisation in e-tourism and e-learning systems respectively. It is only recently that researchers have started to focus on processing emotions (Khosla and La I 2005; Khosla, Lai and Goonesekera, 2004; Kapoor, *et al*., 2003; Tian, *et al*, 2001). Further, the emotions manifested by individuals during an interaction with computers are characterised more by subtle variations or transient changes in facial/emotional expressions (rather than as prototypical emotional expressions (Kapoor, *et al*., 2003).

Psychologists point out that while facial expression alone may not be an accurate indicator of the emotional or affective state of a person, changes in facial expressions may indicate a change in emotional state (Lang, 1995). Thus transient facial expressions (during interaction with an Internet website) may be indicative of transitions of the internal emotional state. Some preliminary work has been undertaken in using intelligent technologies for developing a functional relationship between facial expressions and transition in emotional states (e.g., positive (happy, joy), negative (angry, disgust, sad, bored) and neutral (calm)) and its implications for behaviour profiling and web information personalisation (Khosla, Lai and Goonesekera, 2004; Khosla and Lai, 2005).

The authors' aim is to design and develop techniques to measure the affect of non-verbal response behaviour of prospective travellers when considering holiday destinations using e-tourism websites. The proposed research method involves monitoring the facial responses of respondents while viewing particular e-tourism websites and converting those responses into affective information that has managerial applications for destination marketing organisations. This affective information is derived from interpretation of user's facial expressions in terms of changes in emotional states in terms of negative, positive and neutral forms. The emotional states are based on affect space model (shown in simplified form in Figure 1), which involves two dimensions, namely, Valence (measured on a scale of pleasure - happy (+) to displeasure (-)) and Arousal (on scale of excited (+) to sleepy (-)). Emotional states such as happy, bored, etc. are placed in one of the four quadrants in the affect space. The valence scale will assist in modelling subtle changes in emotional states as the user navigates from one e-tourism web page (consisting holiday destination images and facts) to another. Web page navigation behaviour includes the navigation time per page, and tracking of the gaze of the user looking at the screen. The navigation behaviour along with transient changes in emotional states will be used to determine how interesting or uninteresting web pages are and thereby facilitate online adaptation and personalisation. Since we have chosen travel and tourism as the proof of application context for this research, interesting and uninteresting information along with tourism content information will be used to develop and store user profiles. User profiles will be used in making suggestions for targeting similar users in the future. The e-tourism web page content management component in will store travel and tourism related content information in databases.

The facial expressions analysis component and its mapping to various affective states (positive, negative or neutral) has been completed, with some preliminary results reported in Khosla and Lai (2005). At present we are working with the gaze tracking component in order to study the navigation behaviour of a traveller on e-tourism web page consisting of several holiday destination images. We intend to use the results of the affective information component and the navigation behaviour component to personalise the search for holiday destination information for a prospective traveller.

The benefits of this research that will accrue to destination marketing organisations include a) providing an unobtrusive mode of a prospective traveller's affective state analysis using facial expression analysis techniques; b) providing an innovative and novel method of profiling travellers based on their emotional/affective state and navigation behaviour based on gaze tracking techniques utilizing ICTs; c) providing a means to benchmark the effectiveness of e-tourism webpage design based on their emotional or affective appeal; d) providing an innovative means for personalising holiday destination recommender systems; e) segmenting travellers into different clusters based on their affective and navigation feedback; f) making a significant advancement in knowledge of human-centred context-aware e-tourism; and g) enabling the Australian industry to build on its expertise and experience in making e-tourism websites more user-centred leading to social, economic and commercial benefits.

Conclusions

The growth in the provision and use of tourism websites provides both enormous opportunities and challenges for researchers. Whilst the operational characteristics of websites have been well researched there has been little attention to the receptor attitudes. The conceptual framework proposed here guides a new software product development process. The end product will allow for the observation of website browsing behaviour of potential tourists and record their gaze as well as changes in facial expressions to infer any changes in their emotional state. Therefore, changes in the emotional states can be linked to aspects of the website the tourist was viewing. This enables the measurement of website effectiveness through identification of the website design features that generated the recorded emotional responses. As website usage becomes more embedded in our everyday lives closer scrutiny of website effectiveness will be necessary. This research provides an initial approach to measuring this effectiveness. By utilizing such technology the tourism website designers can enhance the destination as well as the destination website brands to fully incorporate the desired brand personality features. Just as critically, the research will allow managers to evaluate the effectiveness of, and thus make adjustments to, website architecture and design.

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