

Textual Emotion Communication with Non-verbal Symbols in Online Environments

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Abstract. Recently computer mediated communication became a popular way of interaction. Unfortunately nonverbal elements are normally absent in these online communications. This paper describes the results of a study carried out to determine the use of textual symbols/patterns to provide nonverbal cues and to express emotions in online text based environments. The focus is on the use of online textual symbols/patterns of vocalics (e.g. the use of capitals and use of punctuation “!” and “!s!” or “?” and “???”), length of response e.t.c), and those of chronemics (e.g. time to respond to an email or to a chat message) to communicate emotions in text. The study forms a basis for the development of an affect recognition model that is able to recognize emotions from written language and especially in environments where informal styles of writing are used.

Keywords: Emotions, non-verbal symbols (Vocalics & Chronemics), Textual symbols, Computer Mediated communication (CMC), social presence, affective computing, emotion recognition from text.

1 Introduction

Social interaction among people is an important part of every society .In face to face communications, people often rely on nonverbal cues such as body language, facial expressions, gestures, physical proximity, and dress to communicate meaning and establish relationships. Recently computer mediated communication became a popular way of interaction, especially among young students in the universities. Unfortunately nonverbal elements are generally missing in these online communications. According to [2] nonverbal cues provide 93% of the meaning exchanged in the interaction, 35% from tone and 58% from gestures, expressions and other physical cues. Such cues are essential for human cognition and influence different aspects of peoples’ lives. For online communications to be successful consideration of social factors such as emotions is essential [7-8];In this regard, social presence has emerged as a major design principle and a core construct in studying computer-mediated communication (CMC) [1].

Research in the field of artificial intelligence (AI) is increasingly focusing on developing systems that incorporate emotions [9]; Emotions are essential to several natural processes that are modeled in AI systems. A wide range of modalities for identifying emotions have been considered including affect in speech, facial display, posture, and physiological activity e.t.c. [9]. A great deal of social interaction happens online and in textual form (emails, facebook chats, and blogs e.t.c) thus textual information is gaining increased attention as an important modality for identifying emotions. Emotion recognition can be applied to numerous areas such as online learning environments, personality analysis and modeling e.t.c. A number of researchers in the field of affective computing have tried to develop techniques for sensing users' affective states. However, there are other interesting and challenging aspects that still need to be investigated in regard to online communication and emotions. The aspect investigated in this study is the use of textual symbols to provide nonverbal communication elements and to express emotions in online text based communications. This study is based on the assumption that online users have developed their own ways of complementing these nonverbal cues to communicate their emotions during online interactions particularly in environments where people tend to use an informal style of writing.

The objectives of the study include:

- i. Explore use and meaning of certain non verbal textual symbols/patterns used in text to communicate emotions in online environments
- ii. Investigate the informal style of communication used by online users to communicate emotions e.g. use of slang language, use of onomatopoeia
- iii. Identify the patterns/symbols frequently employed by online users to express emotions in online textual based communications
- iv. Develop a mapping of these non verbal textual symbols/patterns to particular basic emotional states

2 Features of Online Communication

The focus of this work is on emotion recognition from text and specifically on the use of non verbal codes of vocalics and chronemics in online environments to communicate emotions. In face to face communications vocalics includes tone of voice, loudness of voice, shouting, and vocal pauses [5]. According to [9] users can also communicate non-verbal vocalic cues via CMC using capital letters and repeated punctuation. Chronemics non verbal code pertains to time. Communication occurrence and duration are considered as chronemics cues that can be conveyed through computer mediated means [3]. Such cues include time stamps on e-mails or text messages, chat messages.

The communications exchanged in applications such as Facebook chats, Google chats and WhatsApp e.t.c. cover everyday topics ranging from home to school to work, as well as friendly interactions. These environments are good for emotion study, as they are likely to be rich in emotion content. A great number of students engage in such communications, hence it was easy to find examples of patterns /textual symbols

of investigation for this study from their online chat interactions. Below are sample messages exchanged by university students during their online interactions.

Sample Messages

M1: I GET MY TRANSCRIPT TODAY!!!

M2: I am going home!!!

M3: You mean you would do such a thing to me??????

M4: LEAVE ME ALONE

M5: Are you serious!!!!!!!

M6: WHAAATT!!!

M7: Yeah. That sucks. Sorry

M8: Eeww!!! That was boring

M9: Oh!!! That's cool

The above messages demonstrate the evolving language used in online communications; from the messages, students use onomatopoeia, for example, words such as Eeww, Yeah, Oh, slang language, capitalizations and exclamation marks while communicating. The repetition of these sound words is open to a variety of interpretations, or possibly misinterpretations.

3 Communicating Emotions in Online Environments

This section describes the purpose of the study, setup and findings:

3.1 Study Purpose and Setup

The study focus was on the use of online non verbal textual symbols of vocalics (e.g. the use of capitalizations and use of punctuation “!” or “!!s!” or “?” or “???” and”.....”), and online chronemics (e.g. time to respond to an email) to communicate emotions. Informal styles of writing e.g. use of slang language, onomatopoeia (repetition of sounds) were taken into consideration. The online questionnaire was administered targeting university students who have interacted and used text messaging environments such as text chats. The questionnaire was sent to 61 participants. A total of thirty(30) student respondents from the university(17 Male(57%),13 Female(43%)) took part in the study. All of them were computer literate.

3.2 Demographics and Background Information

As indicated in Table 1, the sample was dominated by young ((60 %, 21-25 years old).93% of the participants indicated they use computers for study purposes and all participants had an internet experience of more than a year. Other variables of importance included gender, and education.

Table 1. Demographic Information of Participants

Variables	Items	Percentage (%)
Gender	Male	57
	Female	43
Age	< 20	17
	21-25	60
	26-35	23
	36+	0
Education	Certificate student	0
	Degree student	77
	Masters Student	20
	Phd Student	0
Computer Usage	Work	50
	Games	47
	Study	93
	Communication	70
	Hobby	30
Internet Experience	Less than 1 Year	0
	1-5 yrs	47
	6-10 yrs	47
	More than 10 yrs	7

In order to identify the modes students frequently used while communicating: the participants were asked to rate the frequency of use of various modes of communication. The modes of focus were discussion forums, Emails, text chat, Wikis, blogs, Social book marking, News Feeds, Micro blogs, Journaling, Instant messaging. Emails, Text chats, Instant Messengers and Micro blogs were the modes frequently used as indicated in Table 2.

Table 2. Modes of Communication Frequency of use

Modes of Online communication							Maximum No of Responses
Mode	Less Often	Quite often	Often	Very often	Don't use at all		
Emails	1	5	4	20	0	20	
Text only chats	2	2	11	14	0	14	
Discussion Forums	13	4	5	2	3	13	
Wikis	7	7	5	7	3	7	
Blogs	12	1	7	6	3	12	
Micro Blogging	12	3	5	5	5	12	
News feeds	4	5	8	11	2	11	
Instant messenger	5	5	7	13	0	13	
Voice chat	9	5	7	3	5	9	
Online conferencing	8	4	1	2	10	10	
Social Book Marking	11	5	5	6	2	11	
Journaling	12	4	6	3	5	12	
Frequency of Use	13	7	11	20	10		

3.3 Online Non Verbal Symbols and Emotions

Based on the chat messages exchanged by students ,the study focused on the following textual symbols: Multiple exclamation marks (!!!!!),Multiple question marks (?????),Multiple full stops (.....),Discourse markers such as but ,Capitalization, Abbreviations or shorthand such as brb (be right back),ASAP ,Length of the response(very short, short, long, very long), Slang language “LOL”, Onomatopoeia e.g. “whizz”, “aaarr”, and the response time. 90% of respondents agreed to have felt and communicated emotions while interacting in online environments.

Figure 1 below shows the forms that students frequently used to communicate their emotions.

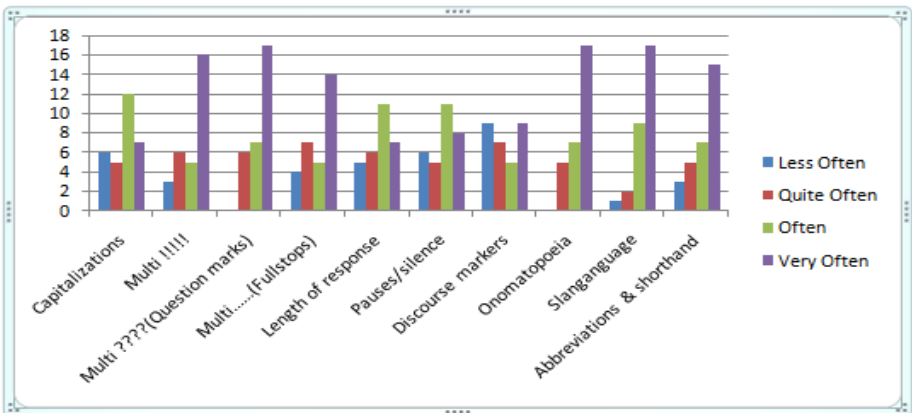


Fig. 1. Frequency of use of non verbal textual symbols

Slang language, Exclamation marks and onomatopoeia were the most frequently employed patterns of communication by students to express emotions. 53% indicated

they very oftenly use Exclamation marks!!! to communicate their emotions. Other forms that were frequently used included: repetition of!!!!!! And abbreviations

3.4 Mapping Non Verbal Textual Symbols and Emotions

The study identified a mapping of the identified symbols to the six (basic) emotions as described by Ekman (1999) happiness, sadness, anger, fear, surprise and disgust. The figure below illustrates how the respondents mapped various symbols/patterns to basic emotion states.

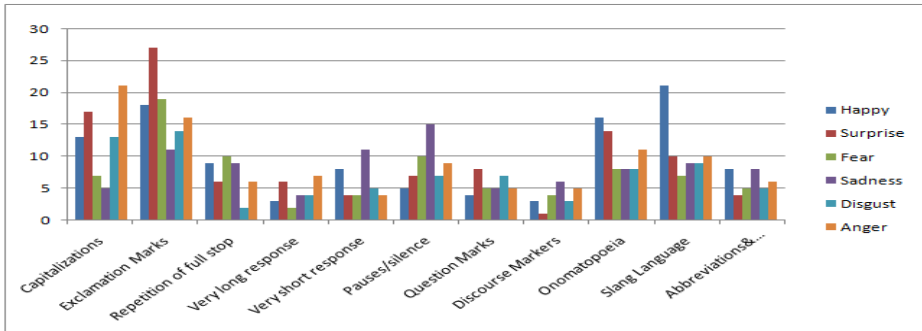


Fig. 2. Mapping between non Verbal symbols and Emotions

Slang language, exclamations and onomatopoeia were the forms mostly associated with the happy emotion with 70% of the participants mapping Slang Language with the happy emotion.60% also mapped exclamation marks to Happy. 53% of the participants mapped onomatopoeia with happy emotion. Pauses, short and very short response were the forms mostly mapped with the sad emotion with 50%, 37%, and 37% respectively. Exclamation marks, pauses /silence were the forms mostly associated with fear with 63% and 33%respectively. 70% participants mapped Capitalization with anger. 90% participants associated exclamation marks with surprise.57% of the participants also associated capitalization with Surprise. Disgust inclined towards anger with capitalizations and exclamations being more used by participants to indicate it.

4 Conclusion and Future Work

The study described in this paper indicates a mapping between various textual symbols and basic emotions. The study forms a basis for the development of an affect recognition model, as practical technique to augment social presence in computer-mediated communications.

Affect models can be applied to several areas such e-learning systems, personal modeling and consumer analysis e.t.c. Most applications of automatic emotion recognition deal with real world text. Such text often contains noise, such as misspellings, onomatopoeic elements and slang. Online communication is rapidly changing and

people employing so many cues/patterns to communicate their feelings/emotions in online environments and hence deeper research is needed to investigate online communication of emotions in text based environments.

For training machine learning systems and for the evaluation of any automatic learning system, it is pre-requisite to have an annotated data. Most of existing corpora are not appropriate for training systems to recognize emotions in environments where informal styles of communication are used. The described study forms a basis for the development of a corpus of text that can be used in emotion recognition research taking into consideration the evolving nature of language in online conversations.

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