AffectIM: Instant Messaging System Endowed with Emotional Intelligence Based on Affect Sensing from Text

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Objectives

O **To create Instant Messaging (IM) integrated with affect recognition system capable of recognition of emotions and communicative behavior conveyed through online text messages**

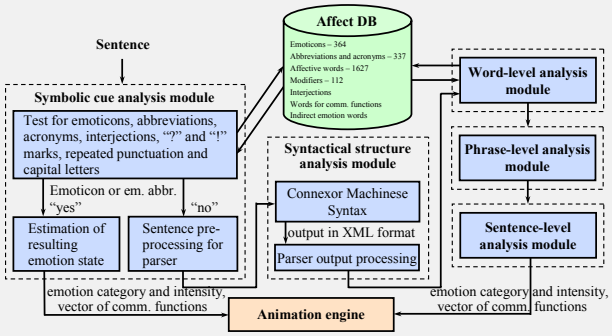
O **To provide vivid and expressive visualization of sensed information by avatar to enhance socially oriented online communication media**

Approach

In order to automatically represent a user's affect and social nonverbal behaviour in an IM system, we developed AffectIM with 2D avatars (graphical representations of users). Animations of avatar expressive patterns are driven by the output of the developed Affect Analysis Model designed to handle not only correctly written text, but also informal messages written in abbreviated or expressive manner.

Principles of Affect Analysis Model

Working flow of Affect Analysis Model



Categories defined for Affect Analysis Model:

emotional states: 'anger', 'disgust', 'fear', 'guilt', 'interest', 'joy', 'sadness', 'shame', 'surprise'

communicative functions: 'greeting', 'thanks', 'posing a question', 'congratulation', 'farewell'

Affect Database

Emotion category labels and numerical values of intensity (0.0 – 1.0) were manually assigned to affect-related entries of the Affect Database by three independent annotators

Symbolic representation	Meaning	Category	Intensity
:-)	happy	Joy	0.6
:-S	worried	Fear	0.4
(~_~)	grumpy	Anger	0.3
m(_ _)m	bowing, thanks	Thanks	-
JK	just kidding	Joy	0.3
4U	for you	-	-

Affective word	Part of speech	Category	Intensity
cheerfulness	noun	Joy	0.3
astonished	adjective	Surprise	1.0
frustrated	adjective	Anger	0.2
		Sadness	0.7
dislike	verb	Disgust	0.4
remorsefully	adverb	Guilt	0.8
		Sadness	0.5

Coefficients for intensity degree strengthening or weakening were given to modifiers

Modifier	Category	Coefficient
perfectly	adverb of affirmation	1.9
seemingly	adverb of doubt	0.6
immensely	strong intensifying adverb	1.8
slightly	weak intensifying adverb	0.2
hardly	negation	0.0

The salient features of proposed rule-based syntactical approach:

✓ analysis of nine emotions and five communicative functions on the level of individual sentences

✓ the ability to handle the evolving language of online communications

✓ foundation in Affect database including affective words, interjections, emoticons, abbreviations, acronyms, modifiers, indirect emotion words

✓ vector representation of affective features of words, phrases, clauses and sentences

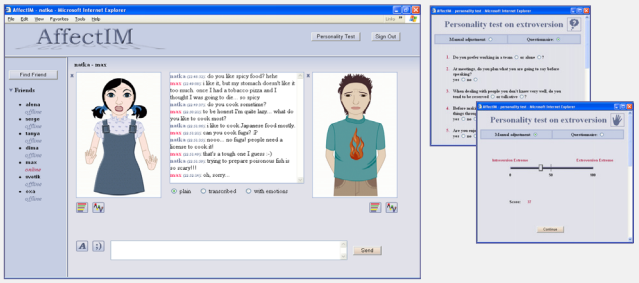
✓ analysis of negation, modality, and conditionality

✓ consideration of syntactic relations and dependences between words in a sentence and between clauses in compound, complex, or complex-compound sentences

✓ emotion intensity estimation

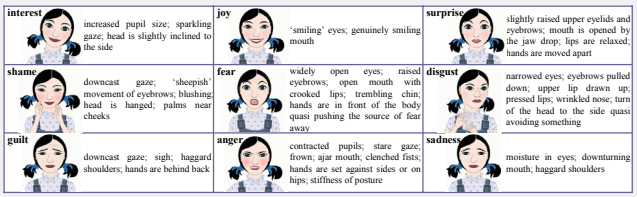
AffectIM – Emotionally Intelligent IM

In the virtual communities, "***you can't kiss anybody and nobody can punch you in the nose, but a lot can happen within those boundaries. To the millions who have been drawn into it, the richness and vitality of computer-linked cultures is attractive, even addictive.***" (Howard Rheingold, 1993)



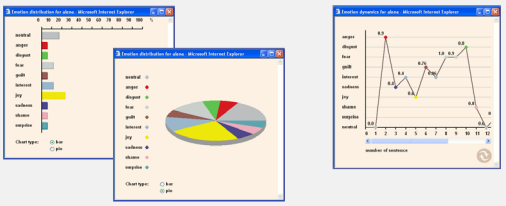
We have developed **AffectIM integrated with the Affect Analysis Model**. Designed 2D animated avatars are endowed with the ability to express emotions and play nonverbal social behaviour, on the basis of textual affect sensing and interpretation of communicative functions conveyed by online conversations. The system allows users to see the conversation flow in three modes (plain text, transcribed text, or text annotated with emotion), and provides the user of AffectIM with the possibility to add new abbreviations, acronyms, and emoticons to the Affect database. Animation engine decides the sequence of avatar animations and their duration depending on sentence length, intensity of dominant emotion, personality type of a user, and 'overall mood' of a conversation.

Emotional states and relevant expressive means



Emotion distribution and dynamics

AffectIM allows colorful visualization of emotion distribution and dynamics throughout the conversation.



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