

Affect Detection and Metaphor in E-Drama¹

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Abstract. We report work in progress on adding affect-detection to an existing e-drama program, a system for dramatic improvisation in simple virtual scenarios. The system allows a human director to monitor improvisations and make interventions. To partially automate directors' functions, and to allow for automated affective bit-part characters, we have implemented a prototype affect-detection module. It is aimed at detecting affective aspects (emotions, moods, rudeness, value judgments, etc.) within users' speech. The detection is necessarily shallow, but the work accompanies basic research into how affect is conveyed linguistically, with a special focus on metaphor.

Introduction and Relationship to Other Work

Improvised drama and role-play are widely used in education, counselling and conflict resolution. Researchers have explored frameworks leading to e-drama systems in which virtual characters (avatars) interact under the control of human actors. The springboard for our research is an existing system (*edrama*) created by Hi8us Midlands Ltd. This has been used in schools for creative writing, careers advice and teaching in a range of subject areas. Hi8us' experience suggests that e-drama helps school children lose their usual inhibitions, because they are not physically present on a stage and are anonymous. In the *edrama* system, the characters are completely human-controlled, their speeches are textual, and their visual forms are static cartoon figures. There is generally also a human director, who can intervene by sending messages to actors and introducing bit-part characters. However, this places a heavy burden on human directors. One of our main research aims is to partially automate the directorial functions. Affect detection is an important element of directorial monitoring. Accordingly, we have developed a prototype affect-detection module. It has not yet been used explicitly for directorial monitoring, but is instead being used to control a simple automated bit-part character, EmEliza. This automatically identifies affective aspects of the other characters' speeches, makes certain types of inference, and makes appropriate responses to help stimulate the improvisation. Within affect we include: basic emotions such as anger; more complex emotions such as embarrassment; meta-emotions such as desiring to overcome anxiety; states such as mood and hostility; and value judgments (of goodness, etc.).

Much research has been done on creating affective virtual characters in interactive systems. Emotion theories, particularly that of Ortony et al. [5] (OCC), have been used widely. Prendinger and Ishizuka [6] used the OCC model in part to reason about emotions. Mehdi et al. [9] used OCC in their approach to the generation of emotional behaviour. Gratch and Marsella [10] presented an integrated model of appraisal and coping, partly to reason about emotions. However, few e-drama (or related) systems can detect affect comprehensively

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in open-ended utterances. Although Façade [4] included shallow processing for open-ended utterances, the detection of major emotions, rudeness and value judgements is not mentioned. Zhe and Boucouvalas [8] demonstrated emotion extraction using a tagger and a chunker to detect emotional words and to analyse emotions of the speaker. Unfortunately the detection focuses only on emotional adjectives, and does not address deep issues such as figurative expression of emotion. Also, the focus purely on first-person emotions is narrow. Our work is distinctive in several aspects. Our interest is not just in (a) the first-person case: the affective states that a virtual character X implies that it *has* (or *had* or *will have*, etc.), but also in (b) affect that X implies it *lacks*, (c) affect that X implies that *other* characters have or lack, and (d) *questions, commands, injunctions*, etc. concerning affect. We aim to make any relatively shallow detection that we manage to achieve in practical software responsive to general theories and empirical observations of the variety of ways in which affect can be conveyed in textual language [2], and in particular to the important case of *metaphorical* conveyance of affect [2,3]. Our system is in part aimed at providing guidance and inspiration to the theoretical study of affective language, as well as being an end in itself.

1. A Preliminary Approach to Affect Detection and Responding

Different dimensions of emotion are widely used in different emotion theories. Currently, we use an *evaluation* dimension (positive and negative), *affect labels* and *intensity*. Affect labels with intensity are used when strong text clues are detected, while the evaluation dimension with intensity is used when only fuzzy text clues implying affect are detected. At present, our implemented affect detection is based on textual pattern-matching rules that look for simple grammatical patterns or templates. This approach possesses the robustness and flexibility to accept ungrammatical fragmented sentences and to deal with varied positioning within speeches, but lacks other types of generality and can be fooled when the phrases are embedded as subcomponents in grammatical structures.

The language in the speeches created in e-drama sessions, especially by excited children, has many aspects that, when combined, challenge existing language-analysis tools. These include: misspellings, ungrammaticality, abbreviations, slang, use of upper case and special punctuation for affective emphasis, repetition for emphasis, open-ended onomatopoeic elements and occasional intrusion of wording from other languages. These characteristics of the language make the genre similar to that of Internet chat.

The transcripts analysed to inspire our initial knowledge base and pattern-matching rules for our implemented affect detection were produced from earlier Hi8us *edrama* improvisations based on a school bullying scenario. The actors were school children aged from 8 to 12. We are generalizing our current methods beyond the school-bullying scenario, for instance by drawing from the embarrassing-illnesses TV documentaries produced by Maverick TV Ltd (one of our partners).

To go beyond the limitations of the currently implemented text matching, we are exploring the use of the Plink parser in the GATE framework. In addition we will include an electronic thesaurus (e.g. WordNet) and existing dictionaries of affective items. The current dialogue management strategies are also quite simple and need to take more account of the intensity and frequency of each character's speeches. Ultimately we will work towards automated characters that are given goals for how they are meant to provoke other characters, and reason about how to achieve this.

2. Metaphorical Expression of Affect

The *explicit* metaphorical description of emotional states is common in ordinary discourse and has been extensively studied [2,3]. Examples of such description are “He nearly exploded” to indicate anger, and “Joy ran through me.” Also, emotion, value judgments and other forms of affect are often conveyed *implicitly* via metaphor, as in “His room is a cess-pit”, where affect associated with a source item (cess-pit) gets carried over to the corresponding target item (the room). In this work we are studying such language both theoretically and practically through the e-drama system itself and by further development of an independent metaphor processing system called ATT-Meta [1].

Physical size is metaphorically used in descriptions of negatively-valued types of people, as in “you are a big bully” (or similarly “you’re a big idiot”) and “you’re just a little bully.” The bigness can be literal but typically indicates the extent or intensity. Size adjectives may also be used to convey the speaker’s attitude towards the object. “The big bully” expresses the speaker’s strong disapproval [7] and “little bully” can express contempt, although “little” can also convey sympathy. These and other examples are not only practically important but also theoretically and implementationally challenging.

In the affective-computing domain there has been a considerable amount of attention to developing scientific models of human affective states. Such modelling is often important, but in studying how people understand mundane affective language and how they pitch their own affective utterances, what may be much more important is people’s own *common-sense* views of how affect works in people, irrespective of scientific reality. This is one reason metaphor comes in, given the strong involvement of metaphor in many common-sense views of the mind.

3. User Testing

User testing with groups of secondary school students at several Birmingham schools will take place in autumn 2005, with a view to determining the effect of including automated affect detection. At the time of writing we are embarking on a pilot version of the user testing at Swanshurst School in Birmingham.

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