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Classification of Emotions in Emergency Call Center Conversations

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Abstract : The study of emotions expressed in emergency phone call is presented, covering both statistical analysis of emotions configurations and an attempt to automatically classify emotions. An emergency call is a situation usually accompanied by intense, authentic emotions. They influence (and may inhibit) the communication between caller and responder. In order to support responders in their responsible and psychically exhaustive work, we studied when and in which combinations emotions appeared in calls. A corpus of 45 hours of conversations (about 3300 calls) from emergency call center was collected. Each recording was manually tagged with labels of emotions valence (positive, negative or neutral), type (sadness, tiredness, anxiety, surprise, stress, anger, fury, calm, relief, compassion, satisfaction, amusement, joy) and arousal (weak, typical, varying, high) on the basis of perceptual judgment of two annotators. As we concluded, basic emotions tend to appear in specific configurations depending on the overall situational context and attitude of speaker. After performing statistical analysis we distinguished four main types of emotional behavior of callers: worry/helplessness (sadness, tiredness, compassion), alarm (anxiety, intense stress), mistake or neutral request for information (calm, surprise, sometimes with amusement) and pretension/insisting (anger, fury). The frequency of profiles was respectively: 51%, 21%, 18% and 8% of recordings. A model of presenting the complex emotional profiles on the two-dimensional (tension-insecurity) plane was introduced. In the stage of acoustic analysis, a set of prosodic parameters, as well as Mel-Frequency Cepstral Coefficients (MFCC) were used. Using these parameters, complex emotional states were modeled with machine learning techniques including Gaussian mixture models, decision trees and discriminant analysis. Results of classification with several methods will be presented and compared with the state of the art results obtained for classification of basic emotions. Future work will include optimization of the algorithm to perform in real time in order to track changes of emotions during a conversation.

Keywords : acoustic analysis, complex emotions, emotion recognition, machine learning
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