Poster: Context-driven Mood Mining

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In the era of smartphones, there is almost an app for everything. Despite that smartphones are mostly unable to infer user's mood. Mood inference can be useful for many applications, in particular for monitoring mental wellness. *We propose mood inference from spontaneous speech during a phone conversation.*

Mood and emotion are often used interchangeably, but these are different in several aspects. Emotion is transient but mood is typically less intensely felt by an individual and tends to last longer than emotion. Due to its long-lasting and private nature, mood reflects the underlying feelings of people, which eventually influences their response to emotional and social stimuli, decision making, and so on. *We are, therefore, not limited to inferring emotions; analysing emotional response we further aim to infer mood.*

Conventionally, mood is described as having either a positive or negative valence. Mood influences the expression of emotions. In positive mood, people tend to respond to emotion-eliciting probes normally, however, in negative mood people often fail to express certain emotions; such as smile control during watching comedy movie etc. [2]. The project aims to use this phenomenon to infer mood. When the *user* of the proposed system takes part in a phone conversation the system will use the emotional construct of the speech of the other person in the conversation, the *listener*, as the "contextual information". If the *listener* is talking about an exciting event the *user* is expected to be excited or cheerful if he/she is in a positive mood, otherwise, it would be assumed that the *user* is in a negative mood.

This context-driven mood mining is a completely new concept. It is orthogonal to the most recent study, Moodscope [1], wherein phone interaction and usage patterns are used to infer mood. We use speech features and emotional context of a conversation to infer mood.

Mood mining on the smartphone is also constrained by real-world scenarios (ambient noise, nearby conversation and much more) which are likely to introduce noise to the speech. This project aims to take advantage of the emerging Deep Neural Networks, which has revolutionised the field of "noisy speech recognition" by significantly outperforming the best-reported methods. In particular, we aim to use **Deep Belief Networks (DBNs)**, which are generative and therefore offer powerful feature learning. Most studies have used DBNs as a classifier but we aim to use it for learning powerful features. Our proposed approach is a paradigm shift from the existing body of literature as it combines DBNs with an emerging classifier - **Sparse Random Classifier (SRC)** to utilise these two methods to their maximum strengths.

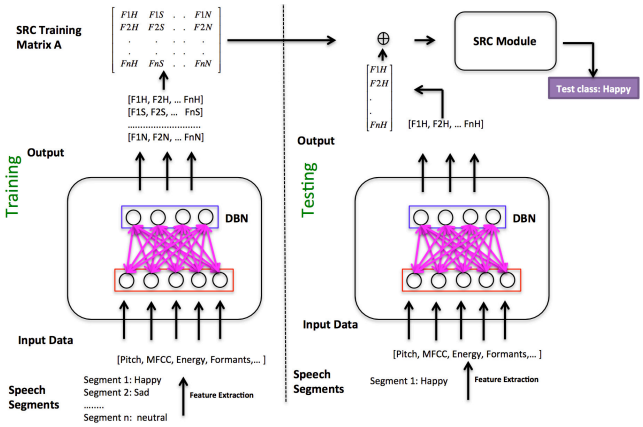

Figure 1: A DBN-SRC Classification Framework.

In the proposed system when the *user* engages in a phone conversation with the *listener* their voice will be assessed continuously to determine discrete emotions. Speech is first divided into utterances and each utterance is divided into segments. Emotion is first determined at the segment level and based on the emotions in all the segments of an utterance, the utterance level emotion is determined. In a given time window if the *user's* expressed emotions defer from that of the *listener's* expressed emotions more than a predefined threshold, it is assumed that the *user* is in a negative mood, otherwise, it is assumed that the *user* is in a positive mood.

1. REFERENCES

[1] R. LiKamWa, Y. Liu, N. D. Lane, and L. Zhong. Moodscope: building a mood sensor from smartphone usage patterns. In *Proceeding of the 11th annual international conference on Mobile systems, applications, and services*, pages 389–402. ACM, 2013.

[2] L. I. Reed, M. A. Sayette, and J. F. Cohn. Impact of depression on response to comedy: a dynamic facial coding analysis. *Journal of abnormal psychology*, 116(4):804, 2007.

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