EMOTION DETECTION ON PATHOLOGICAL SUBJECTS

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Abstract

This project aims at providing robust recognition on naturalistic emotions in real-life environments. Both audio and video channels will be used in an embedded algorithm on an assisting robot for elderly people. The challenge is the detection of emotion on pathological subjects for perception-action loop based interaction through a virtual avatar.

Context

The detection and analysis of emotions is still quite basic in robotics: it is often limited to touch-sensitive interactions (as the therapeutic use of the seal-robot Paro [1]).

In the frame of the ARMEN project, which aims at developing a robot that will assist dependent citizens (elderly or disabled people), we are proposing to understand emotions (especially pain, fear and sadness) for both medical surveillance and stimulation. Based on the perception-action loop paradigm, the robot shall first detect the emotion displayed and express an emotion in return, according to simple behaviours as an "emotional mirror", providing a direct feedback or a more stimulating behaviour with positive empathy.

The LIMSI-CNRS has been involved is the detection of emotions through the vocal channel for some years now. So far, the emotion recognition community has mainly worked on acted data, with actors displaying exaggerated and prototypical emotions. The study of naturalistic emotions is quite recent [2], but to the best of the authors' knowledge, no research has been made on emotions from pathological subjects, with speech impediments for instance.

The LIMSI-CNRS is now willing to explore new channels (context, facial expressions...) as a way to improve the recognition of affects on audio data. Some studies on the combination of these two channel have already been conducted [4].

Challenges

- Adaptation of models for aged or pathological voices.
- New cues: facial expressions recognition from affect bursts (laughs, breath...). Exploration of the possible temporal correlation with the corresponding audio markers.
- Fusion of the two channels.

Work

- Data collection protocols: the protocols for the elicitation of the recorded emotions have been designed and approved by a board of occupational therapists of the french APPROCHE association [3], promoting the use of new technologies to assist dependent people.
- Corpus collection: two corpora will be collected, one for the construction of the models (around 60 people), one for testing. The corpora will consist in audio and video recordings of naturalistic emotions. The collection of the first corpus took place in June 2010 in three different medical centers in France.
- Analysis of the data, construction of the models: currently in progress.
- Clinical tests, under the supervision of APPROCHE: end-of-project validation phase.

References

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