Development of Multimodal Interfaces: Active Listening and Synchrony

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chess engine) is capable to address the opponent in synthetic speech, display emotional facial expressions and gazing. Experimental results show that though the embodiment is far from realistic, subjects reacted toTurk2 as a real human, and usually preferred it over the 'faceless' version it was compared to.

6.22 Yannis Stylianou: *Multimedia character of Voice Function Assessment*

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Abstract:
TBA

6.23 Maria Eugenia Torres: *A new approach based on Empirical Mode Decomposition for the analysis of voice features*

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Abstract:
Empirical Mode Decomposition (EMD) is a data driven technique proposed by Huang. We explore properties of the intrinsic mode functions (IMFs) and present two applications to the analysis of voice. First we apply EMD to obtain new tools for discrimination between normal and pathological voices, applying it to speech signals corresponding to real and simulated sustained vowels. For the synthetic sustained vowels we propose a phonation model that includes perturbations implied in common laryngeal pathologies. By means or standard spectral analysis of the IMFs, we extract features from each signal. Using a basic pattern classification algorithm, the spectral features of only three intrinsic mode functions are enough to discriminate between normal and pathological voices, with a data base of 106 different voices, half normal and half of diverse pathologies. Additionally we consider two pathologies of different etiology and treatment, which, given the similarity of their voice characteristics, are frequently misdiagnosed in clinical practice: muscular tension dysphonia and adductor spasmodic dysphonia. Preliminary results with a reduced real data base (33 pathological voices) suggest that this approach could provide useful orientation to physicians and voice pathologists. A second application to the extraction of the voice

fundamental frequency will be introduced. A new algorithm and preliminary results will be presented. Taking into account the relationship between this parameter and emotions.

6.24 **Luigi Trojano:** *How Emotional Feelings Come from the Brain*

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Abstract:

6.25 **Wolfgang Tschacher:** *Embodiment and Social Interaction*

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Abstract:
Empirical and conceptual issues. In recent years, cognitive scientists and psychologists have proposed that cognition should be grounded in the body, hence the novel concept 'embodied cognition'. There are basically two reasons for this reconceptualization of the cognition construct in psychology. The first reason is a growing number of empirical findings, such as experimental evidence from social psychology showing the impact of bodily parameters on cognitive and emotional responses. The research on the mirror-neuron system has offered a neuronal basis for such 'psychosomatic' linkages. The second reason is theoretical – the philosophical mind-body debate appears to have reached the conclusion that a purely cognitivistic approach to human intelligence is ill-advised. The development of 'classic' Artificial Intelligence (based on the symbol-systems approach) towards embodied Artificial Intelligence (based on robotic agents) reflects this fundamental paradigm change in cognitive science and the philosophy of mind. Implications. Embodied cognition has clear implications for social science. The concept of embodiment in the context of social systems means that the body is important as a crucial parameter of social interaction, which can then no longer be understood as information processing or information transfer alone. There are further implications concerning applied social science. Our own research has especially targeted the synchrony that emerges in social and psychotherapeutic exchanges. For instance, cognitive and nonverbal synchrony in dyadic human systems shows how embodiment supports the establishment of a therapeutic alliance. In the design of man-machine interfaces, findings of embodied cognition must therefore be carefully considered.