Laughtert in conversational speech - more than just amusement

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1 Introduction

Humour finds itself left out of most curent technology, and with some notable exceptions (e.g., [2, 3]) laughter is not yet generally considered to be a useful component for processing in current speech technology. However, experiments with CHATR waveform-concatenative speech synthesis in the mid nineties showed that the inclusion of laughter in speech significantly added to the perception of naturalness in the synthesis [4].

Recent work by Vettin & Todt has shown laughter in conversation to be much more frequent than has been described previously in the literature, and suggests that this form of interactive conversational laughter may primarily serve both to regulate the flow of the interaction and to mitigate the meaning of a preceding utterance [5]. It would therefore be useful to incorporate in conversational speech synthesis such as is now being developed for human-computer interaction, speech translation, and intelligent virtual agents or robots [6].

Laughter may be very common in everyday conversation but, perhaps because they are not aware of how often they make use of it, people regularly under-report the frequency of their own conversational laughter [5]. Two types of laughter expression have been distinguished in the literature. [7] Duchenne laughter is usually the result of humour, while non-Duchenne laughter is more

common in social usage and conversational speech [8]. Gervais & Wilson propose that such non-Duchenne laughter is "akin to other learned complex motor acts that become awkward and unnatural the more we think about them but that we can nonetheless become quite adept at through practice and conditioning of unconscious motor programs" [9].

In studies of the acoustics of laughter, Kipper & Todt and Bachorowski, Smoski, & Owren have shown the acoustics of laughter to be both complex and highly variable [10] with voiced and unvoiced variants functioning separately and having different effects on the listener [11]. High intra-individual variability which greatly exceeded the parameter variability between subjects was found in the acoustic parameters of this type of laughter [12].

In the present talk we examine the nature and characteristics of some conversational laughs extracted from the very large Expressive Speech Corpus [13] and show how they can be modelled for inclusion in speech synthesis and recognition.

The talk is organised as follows. Section 2 describes the speech corpus that forms the basis of this work. Section 3 describes laughs found therein and reports an attempt to classify them according to their function and structure. Section 4 expands on the syntax of laughs and reports the results of an automatic classification. Section 5 describes the acoustics of some social laughs from telephone conversations and shows that both laughs and laughing speech exhibit different acoustic characteristics consistently as a factor of interspeaker relations.. The talk closes with a discussion of the relevance of these findings for future speech technology.

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