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Conversation Monitoring via Low-cost Speaker Diarization using Wearable Wireless Sensors

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Abstract: This paper presents speaker diarization mechanisms using low-cost and low-resolution wearable wireless sensors. Speaker diarization is used for identifying speaking sequence and duration for all individuals engaged in a conversation session. The key advantage of the proposed mechanisms is their ability to monitor human conversation without having to perform energy- and processing-expensive speaker identification algorithms. A prototype system was constructed for experimental acoustic diarization using low-cost and low-resolution wearable sensors. It was experimentally demonstrated that an inexpensive threshold-based diarization mechanism can be used for conversation monitoring with acceptable accuracy. But for more detection accuracy, an acoustic comparator-based diarization is applied. It was shown that comparator-based diarization mechanism is able to consistently deliver significantly better acoustic detection performance than threshold-based mechanism in a more distance and noise independent manner. Controlled experiments using human subjects were carried out for evaluating diarization accuracy and the sensitivity to factors such as sampling rate and inter-speaker distance during conversations.