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Development of Assisting System for Learning Chinese Aspirated Sounds

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Chinese aspirates are generally difficult for Japanese to pronounce and perceive. In order to assist Japanese students to learn Chinese, the authors attempt to build a system to automatically evaluate the pronunciation of Chinese aspirates by Japanese students. To do so, this study analyzed 21 single-vowel syllables of six different Chinese aspirates, bilabial, alveolar, velar, palatal, retroflex and dental using two evaluation parameters: the voice onset time (VOT) and mean breathing power during VOT. The speech materials were uttered by nine Japanese students and nine native Chinese speakers. It is found that for a given aspirate, the longer the VOT is, the better the score is, as is generally said. But we found that an aspirate with a larger breathing power acquires good mark even with a shorter VOT in a certain range of VOT. The testing results showed that a combination of these two parameters can distinguish aspirated and unaspirated sounds quite well. To achieve an assisting system, we developed a method to automatically detect the VOT. To detect the burst of an aspirate, a filter bank was used to measure signal energy in frequency domain, and the burst timing was determined.