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A pilot study on Mandarin Cued Speech

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Abstract

To overcome the low performance of lip reading and improve the reading ability of deaf children, in 1967, Cornett invented a Cued Speech system which uses the hand gestures to complement the lips information to make all the phonemes of spoken languages clearly visible. It is reported that the Cued Speech system has been developed for more than 60 languages in the world. However, as far as we know, there seems no official accessible Mandarin Cued Speech. In this work, we propose a Mandarin Cued Speech system, which possesses several advantages, especially in terms of efficiency.

Keywords: Cued Speech, Mandarin Cued Speech

1. Introduction

Cued Speech (CS) is a system¹ using the hand codes as a complement to the natural lip reading, invented by Dr. Cornett [1] in 1967 to make the hearing impaired people access spoken language easier. In this system, as a combination of different hand shapes and positions near the face, the hand coding complements the lip reading process to enhance the speech perception. More precisely, the hand shapes are used to code the consonants, while the hand positions on one side of the face or the neck are used to code the vowels.

CS is now becoming more and more attended by the world and has been adapted to over sixty languages for the moment. The *National CS Association* (NCSA)² for American English CS and *Cued Speech Association United Kingdom* (CSAUK)³ for British English CS have been established to general-

¹A demo can be seen on Youtube: <https://www.youtube.com/watch?v=jn4e9V3oigs>

²<http://www.cuedspeech.org/>

³<http://www.cuedspeech.co.uk/>

ize this system. For the French CS, which is named *Langue Française Parlée Complétée* (LPC) [2], the ALPC⁴ has been established. These associations have been trying their best to improve the communications between the deaf or hearing impaired children and the normal hearing family members through the CS system.

Although the CS system has been developed for many spoken languages in the world⁵, as far as we know, it seems that no official research work⁶ has been dedicated to Mandarin version of CS. However, according to the *China Disabled Persons' Federation*⁷, about 21 million people have hearing loss out of the 60 million disabled people in China. For the moment, Sign language is the most popular method for the communication among Chinese deaf people. It will be meaningful if the Mandarin CS system can be developed, which will make the deaf people (especially deaf children) have better communications. On the other hand, it provides another way for people to learn Mandarin.

In this work, we propose an efficient and reasonable design for Mandarin Cued Speech (MCS) system, which satisfies the main criterion that no intersection between hand and lips coding (i.e., the phonemes which have similar lip shape should be distinguished by different coding). At the same time, the proposed MCS need coders spend minimum energy to use it. In our proposed MCS, five groups of hand positions and eight hand shapes are used to code vowels and consonants. More precisely, it uses minimum hand positions (five) to code all basic vowels without using any additional hand movement. All the combined vowels which start with [i,u,y] are coded with semi-consonants. The proposed MCS system possesses about 95% compatibility with the French CS, which has confirmed its optimal performance.

2. The development of Mandarin Cued Speech

The MCS is based on the following criteria. In Mandarin, there are 35 vowels, and about 20 of them are combined vowels beginning with [i,u,y] (i.e., [ia, uai]). It causes a huge difficult to code them only with several hand positions. We may add some additional movements to distinguish them. How-

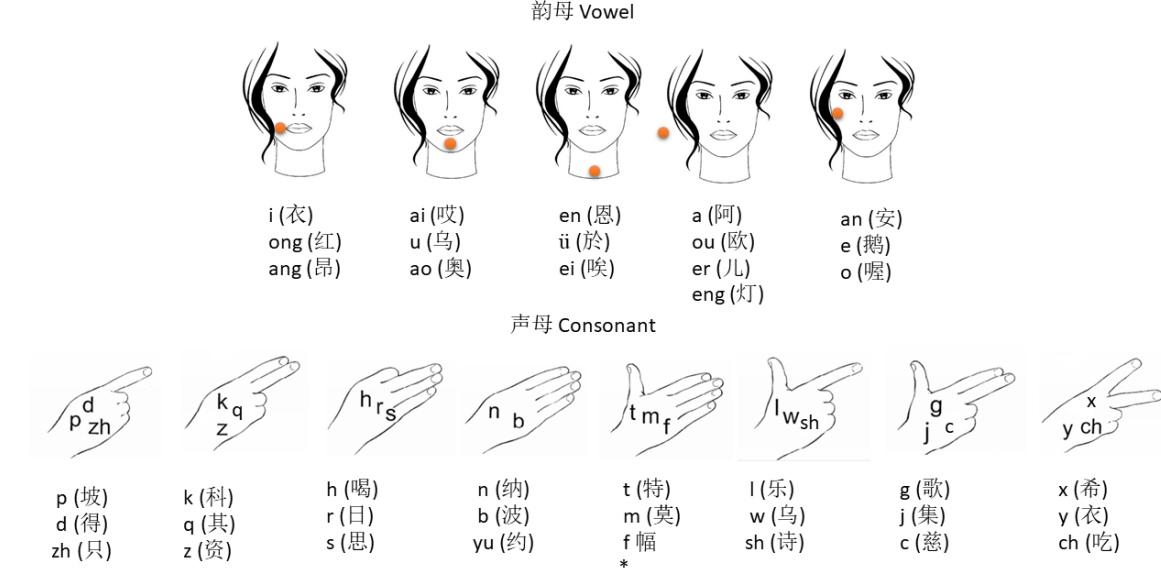
⁴<http://alpc.asso.fr/>

⁵<http://www.cuedspeech.org/cued-speech/about-cued-speech>

⁶An analysis of Mandarin CS is referred to <https://acroakingdalek.wordpress.com/2015/09/23/cued-mandarin-planting-the-seed/>.

⁷<http://www.cdpf.org.cn/english/>

汉语全唇语表 Mandrin Cued Speech (MCS)



* This position also means an isolated vowel

Figure 1: The proposed chart for Mandarin Cued Speech.

ever, this coding system will be very complicated and be difficult for the CS learners. Since [i,u,y] play a semi-consonant role in all these combined vowels, we propose to code [i,u,y] in case of combined vowels by semi-consonants instead of vowels. This reduces the number of vowel from 35 to about 15, which can be efficiently coded by 5 hand positions. In addition, we have found these 15 vowels have a good correspondence with 15 French vowels, which leads us to construct the MCS with a maximum compatibility with French CS system.

All these considerations make us propose an MCS which is shown in Fig. 1.

- [1] R. O. Cornett, Cued speech, American annals of the deaf 112 (1967) 3–13.
- [2] C. J. LaSasso, K. L. Crain, J. Leybaert, Cued Speech and Cued Language Development for Deaf and Hard of Hearing Children, Plural Publishing, 2010.