

A TWO-DIMENSIONAL LIP MODEL FOR MANDARIN CHINESE

Xiaosheng Pan*

Shanghai Normal University

ABSTRACT

A two-dimensional lip model with inner lip information is provided in this paper.¹ The lip model can precisely describe all possible lip states, which generally include complete closure, half opening, and full opening. By changing the values of the lip model's parameters, all kinds of lip contours with different shapes can be generated, and the lip contours can fit the real lip shape quite well. The lip geometrical features based on lip contour are extracted and used to define a basic linguistic term, lip rounding. This paper has shown that the width of the inner lip is as important as the width of the outer lip when defining lip rounding. In the Audio-Visual (AV) speech perception experiment of the McGurk Effect, samples are developed with the aid of the lip model. The first sample is to keep all lip information including the tongue and the teeth information, the second sample is to keep both outer and inner lip information, and the last sample is to keep the outer lip information only. The result proves that the inner lip provides the most visual information of speech in the McGurk Effect experiment. It is concluded that the inner lip information is indispensable in the lip model for linguistic study based on the above research.

SUBJECT KEYWORDS

Lip model Lip rounding Audio-Visual speech perception McGurk Effect

* **Xiaosheng Pan** 潘曉聲 teaches at The Research Center for Computational Linguistics, Shanghai Normal University; [itol_xs@shnu.edu.cn]

漢語普通話二維唇模型

潘曉聲*

上海師範大學

提要

本文提出了一種具用內唇信息的二維唇模型。此模型可以精確的描述所有可能的唇形狀態，包括全閉合狀態，半開合狀態和全張開狀態。通過調整模型的參數，可以生成各種不同形狀的唇形，並能完全擬合真實嘴唇輪廓。本文提取了基於嘴唇輪廓的唇形幾何特徵，並用之定義語言學的一個基本概念，圓唇。本文的研究結果表明在定義圓唇時，內唇寬度和外唇寬度的重要性相似。利用本文提出的唇模型所生成測試樣本，將其用於 McGurk 效應的可視語音感知實驗中。第一個樣本保留了外唇輪廓信息，第二個樣本同時保留了內外唇輪廓信息，最後一個樣本除了保留內外唇輪廓信息之外還提供了舌頭和牙齒的信息。實驗結果證明在 McGurk 效應的實驗中內唇輪廓提供了語言的大部份的視覺信息。可以由此得出在涉及語言的研究中，唇模型的內唇信息是必不可少的。

主題詞

唇模型 圓唇 可視語音感知 McGurk 效應

*潘曉聲 執教於上海師範大學計算語言學研究中心; [itol_xs@shnu.edu.cn]