VOWEL ANALYSIS WITH LINEAR PREDICTION

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The autocorrelation method of linear prediction is used in order to determine the first four formant frequencies of a number of consecutive speech segments that represent a specific vowel phoneme. This method is able to supply a pattern of formants given as functions of time, which characterize the particular vowel or diphthong. It has been applied to the study of vowel systems of regional languages in the Netherlands, in particular Frisian.

We find some characteristic acoustic features for the Frisian diphthongs, which can be divided into 5 closing diphthongs ɛi̯, ɑi̯, ɔi̯, ɔu and ʌü and 6 opening diphthongs i̯ə, üə, ɪə, ʌə, uə, ɔə. Many of these diphthongs are characterized by a short transition segment between an initial and a final stationary part. The formant values F1 and F2 for these stationary parts are obtained as acoustic parameters determining these diphthongs. For several diphthongs we find that the value of F1 and F2 for the first or the last stationary part can differ considerably from the value which belongs to the short vowel representing this part of the diphthong in its phonetic notation.

The opening diphthongs show the property of breaking: an interchange into a rising diphthong with other acoustic parameters, that are also measured and compared to the parameters of the original falling diphthong. Due to language interference on the phonetic level the acoustic manifestation of these phonemes can be changed under the influence of the Dutch language.

In order to study these phenomena in detail a further acoustic analysis is made of a large sample of speech sounds pronounced by different persons (Frisian or non Frisian) in various contexts. Results illustrating the acoustic properties of the Frisian phoneme system and acoustic data related to the process of language interference will be presented in August 1979 at the Congress of Phonetic Sciences in Copenhagen.