DEVELOPMENT OF BISYLLABIC AUDIO TEST FOR THE UKRAINIAN LANGUAGE

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Here the technique of audio test development is offered. The audio test intended for use in clinical audiology, for testing of transmission paths of audio information, for measurement listener's acoustical abilities on the basis of intelligibility task on spoken Ukrainian. According to the technique was developed a bisyllabic audio test to be applied in the space of Ukrainian language.

INTRODUCTION

Many directions of development of science and engineering are directed on creation of more comfortable conditions for work of man. It is reached by more active influence on person's sense organs. Today the information which coming trough the acoustic channel of human perception is becoming more and more important, and its flow is increased. In some cases the overload of the acoustic organs can result in partial or complete loss of ability of man to hear. These and other circumstances put new tasks before the researchers. One of them is the development of methods of measurement, both acoustical abilities of the individual, and quality of devices influencing acoustic bodies of the man.

Among the means used for these purposes, there is an audiological test. Frequently used type of audiological tests is the speech test [1,2]. One of the features of such tests is that for reception of adequate results, the person should perceive native speech. The exactest speech tests, allowing with high probability to receive authentic results, should offer representative selection from the appropriate language.

Now in Ukraine there is no standard test. The given work is an attempt to make a test, which could be used both in Ukraine, and beyond its borders - in Ukrainian communities.

TESTS DRAWING UP

Words. One of the main points of a speech test development is selection of words. The words used in the test, are the typical representatives of colloquial Ukrainian language. They were taken from a small volume dictionary [3], and such dictionaries, by definition, have the most common vocabulary. In addition, interrogation of the Ukrainian understanding citizens of Germany and Ukraine was carried out with the purpose to reveal seldom-used words in the received set. The final set of words, suitable for use in the test, has slightly more than 2000 bisyllabic words.

The languages characteristics. Phonemic balance was accepted as the basic characteristic of language. The average frequency of the uses for each of 38 Ukrainian phonemes and also other characteristics of a colloquial Ukrainian language was counted up earlier in the Institute of the Ukrainian Language and Literature [4]. Other features of the language were not taken into account.

Method of tests drawing up. For selection of 400 words, which in the aggregate satisfy phonemic balance designed on the basis of average words length of set of suitable words, were applied the specially developed software. The algorithm of its work is based on a method of a casual excluding choice.

The selection of words is carried out in two stages. The first stage is the selection of words so that the minimal number of words (block) satisfied phonemic balance typical of the Ukrainian language and the test consisted of blocks with identical quantity of words. Experimentally it was established that it can be achieved for the block with the size of 80 Ukrainian bisyllabic words. The second stage consists in checking on phonemically equation of the test as a whole and replacing the words breaking this balance by others (about 10 -15 % of words). Infringement of balance inside separate blocks is, naturally, minimized.

After selection of the balanced words the division of blocks into lines in 20 words is carried out. The infringement of phoneme balance inside separate lines should be minimal. Arrangement of words inside lines is made so that the frequency of occurrence of separate phonemes in the test is with minimal deviation. After this operation the strictly certain place is fixed for each line and block.

THE CHARACTERISTICS OF THE TEST

In figure 1 the diagram of phonological distribution for the test as a whole is submitted. The moments listed below were accounted by development and realization of bisyllabic speech test for the Ukrainian language.

- The test by its structure corresponds to German Freibuergerwoertertest (20 lines in 20 words)
- Only frequently used bisyllabic words were used in the test

- The words are divided into 5 phonological balanced blocks
- The phonological balanced blocks represent typical of the Ukrainian colloquial language phonemical distribution, and are the smallest units of the test.
- Each block contains 4 lines
- Each line has close to typical of the Ukrainian colloquial language phonemical distribution
- In each line separate phonemes are placed at regular intervals as possible
- In the test the words with an accent on both syllables are submitted.
- The distribution of an accent has not any law
- The words are submitted with a step of 5 seconds
- The duration of words is on the average equaled 1.2 seconds
- The maximum level of words record ("Fast") has the maximal fluctuations less than 1.5 dB
- The test is recorded by a man's unprofessional voice
- The test signal is recorded on DAT Cassette (channel 1)
- Together with a speech material on the channel 2 the FASTL-noise is recorded
- The maximum level of noise (“ Fast ”) is exactly the same, as the median meaning of a maximum level of speech material (“ Fast ”).
- On the carrier of the information are also recorded calibration signals: noise CCITT Rec. G. 227 and sine wave signal
- The level of calibration signals is equaled to median meaning of a maximum level of a speech signal.

CONCLUSION

On the offered technique, based on a method of a casual excluding choice, was developed the bisyllabic speech test for the Ukrainian language. The test on its structure answers to German speech text Freiburger Woertertest (DIN 45 621). Because of good conformity of the designed audio tests parameters, it is expected, that this test can be successfully applied in clinical audiology, for testing of transmission paths of audio information, for measurement listener’s acoustical abilities on the basis of intelligibility task on spoken Ukrainian.

REFERENCES

[1] Hasso von Wedel. Investigations concerning the Freiburg speech test - group comparability with regard to diagnosis and rehabilitation (Fitting of hearing aids and hearing training). - Audiologische Akustik, v. 25. p. 60-73.
[2] Kathrin Kleim, Birger Kollmeier. Development and evaluation of a bisilabic rhyme test to be used in German Speech audiometry. - Audiologische Akustik, 6, 1994. p. 4-14.
[3] Словник: Німецько-український. Українсько-німецький: Посібник для загальноосвітних шкіл та вищих навчальних закладів / Уклад. З.О. Басанець та ін. – Київ; Ірпінь: ВТФ “Перун”,1997.-640с.
[4] Сучасна Українська літературна мова [В 5ти кн.] За загальною ред. Акад. АН УРСР І.К. Білодіда.-Київ, Наукова думка, 1969.-375с. / Вступ Фонетика