SPEECH SYNTHESIS COMPUTER FOR THE BLIND

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ABSTRACT
The invention of speech synthesizers have made revolution in the computerization of the blinds life.But these people can use special computers only,for serial computers are rarely equipped with synthesizers whereas displays are obligatory. Speech synthesizer that does not speek Russian cannot be reconstructed to be used by the Russian speaking blind. We have made a computer for the blind with the speek synthesizer"PhonemophoneWS", that is speaking Russian. It is being produced in small series.

1.Its hardware represents a printed circuit board for IBM PC.Its software – a 64 kbyte control file and a 10 kb. lexical dictionary file. Synthesizer's driver can be loaded automatically or from keyboard. The text for the sound-track in Russian can be taken from the file,from the user's programme, from display, from keyboard.

2. Synthesizer is able to carry out the following functions:
- synthesize oral speech on arbitrary text in Russian;
-oral speech can be synthesized by a female voice or by one out of two male ones;
-modulate the phrase's intonation of the type of question, exclamation,narration, enumeration;
- stress the words automatically;
-provide for about99% understanding of words in speech;
-provide for the sound-track of numbers from 0 to one milliard;
-provide for the sound-track of the signs like % # @ $ & * ( ) { } = / \ " - ' ` [ ] _. articulate in full voice abridgements in the text (like etc., i.e., mo, tu,), abbreviations(like USSR,IBM, USA, UK, ICPhS).

3.The work of a blind with a computer in most cases implies the text revision.That is why the speech synthesizer is additionally equipped with the form of the programme CONVEYORof multistage transformation of the Russian orthographic text into orthoepic text. The whole conveyor is called READER.It consists of the following successive bl:
-the block of text's segmentation into sentences;
- the bl.of words' stressing according to a special100000 words Russian language dictionary of stresses;
- the block of substitution of abbreviations for fulltoned words(for example: etc. etcetera)according to the1000 wordsRussian language dictionary of abbreviations;
-the block of substitution of orthographic abbreviations for orthoepic words;
-the block of substitution of signs of the type % #@ $ for the words corresponding to their names;
- the block of substitution ofnumbers from0 to one milliard for words allowing to pronounce these numbers;
- the block used to delete the so-called"text rubbish", for exe.:unnecessary blanks, dot doubles,exclamation and question marks' doubles;
-the block to provide soundtracks of Engl.language key words according to 200 key words dictionary (BASIC).

4.When working with the text for the blind,the modes of asking again about what had been said and about detailed elaborat.of phrases' sounding are quite common. That is why the speech synthesizer is equipped with MONITOR, which controls a group of keys located tothe right on an ordinaryIBMkeyboard. Monitor's keys realize the following modes:
-return to the listening to a previous phrase (word);
-return to the beginning of the previous paragraph;
- jump forward to every other phrase;
- jump to the beginning of the next paragraph;
- a temporary stop of the listening to the text;
-transition to the detailed listening to the text by words or letters;
- substitution of one diction voice for another male voice or female one;
- change of synthesized loudness and tempo speech.

5. The synthesizer connected to the computer via CONVEYOR & MONITOR allowed to produce for a blind the following special programmes meeting diff. requirements these people were examined of
-"SOUNDING KEYBOARD"provides for the sound-track of all keyboard's alphab.and service keys.Capital letters are rendered into a sound-track by one voice,ordinary letters - by another, Latin ones - by the third.A key can be heard after it had been pressed or after the end of the word;
-"READING OF THE TEXT FILES" is carried out after a blind man's answer to the question concerning what file he wants to listen to using monitor;
- "THE CLOCK" reports time, date and day when called;
- "CALCULATOR", when called, allows a blind to perform computations with six-digit numbers using subtraction, division and multiplication;
- "NOTR-BOOK" helps a blind to record on the disk from the keyboard short text notes for future reproduction of them and listening to them in own interests;
- "TYPEWRITER" provides a blind with the possibility to type quality and long text in upper and lower case letters using the format common for the sighted;
-"ENGLISH-RUSSIAN DICTIONARY" allows to learn oral translation of the English word entered from the keyboard;
- "PSYCHOLOGICAL TESTS" are entered fromthe keyboard via synthesizer in the form of oral questions the one being tested answers via keyboard. With the help of the key computer analyses the answers and individually estimates the one being tested on diff. psychological scales.

All above mentioned special programmes are written in CI language in MS DOS for the computers IBM PC AT/XT.