Using of systems of artificial speech in training the students of
the philological department

L.N. Titova, A.R. Mirgalina

Bashkir State Pedagogical University, Bashkortostan, Russia
ln_titova@rambler.ru

The central concept of computer science is the information. The information processes in many respects are defined by representation of the information. They can be natural (characteristic for objects of an alive nature) and artificial (connected with technical systems), proceeding on the basis of realization of concrete algorithms, i.e. on the basis of computer technologies.

The formations of coherent and correct speech skills play the large role in training the students of the philological department. In the application the statement of correct speech can be made by a natural and an artificial way. On educational process of the students of the philological department the greatest preference gives back systems of artificial speech, such as synthesis, analysis of oral speech and its recognition.

The systems of synthesis of speech are systems which gives the information by speech and it basis on the samples from the dictionary with ready sound sequences. The simplest variant is the sample of ready sound, but in view of the large size of “sound files”, the giving of the large number of words in this case practically is impossible. In such simple systems frequently are used the menu, on which the user can choose those statements, which he would like to hear. At presence of the necessary records in a database their text is sounded.

The mastering of sounds and construction of correct speech on educational process of the students of the philological department at use of computer technologies goes more effectively at study of language. The fear disappears at wrong recurrence and there is a positive motivation to application of computer technologies, which promotes activity of correct speech and reliance of him at formation of speech.

Identification speeches in training in the beginning reduced a problem to identification sounds. More often in a sound the amplitude and spectral structure of sound fluctuation, and also their change in time is considered. The amplitude defines the maximal intensity of fluctuations – loudness or force of a sound. The spectral structure defines a timbre of a sound.

Digital processing of a sound is usually directed on reception of new sounds from already existing (for example, a voice of the robot), or giving of additional qualities by it or elimination existing (for example, addition of effect of chorus, removal of noise or clicks). The basic unit of measurements of a sound is the decibel is a relative logarithmic unit of measurements of the sizes connected to intensity of a sound (capacity, amplitude, a voltage or a current of a signal, amplification / easing, etc.). Sensitivity of hearing has logarithmic character – increase of intensity, as sedate function is perceived on hearing as linear increase in loudness, therefore in some cases it is more convenient to use logarithmic, instead of linear units.

The threshold of audibility is defined by intensity of decibels. Intensity of silent whisper – about 35 decibels, loudness of a voice – about 95 decibels. The sound is represented in a digital kind by time and peak digitization of measurement of instant values of amplitude of a sound signal with the certain accuracy. Accuracy of measurement defines a parity signal / noise, and frequency of digitization – a frequency range numbered signal. That lost-free to number a signal, frequency of digitization should get out, proceeding from a passband.

For synthesis of a sound the following methods are used:

**Additive** - is the sum of clean tones (sine wave fluctuations with various frequencies and amplitudes). The principle of creation of a sound is based on this method in organ.

**Subtractive** – generation of a sound signal with a rich spectrum of frequency components. It is a principle of work of the speech device of the person.

**Frequency modulation** – mutual modulation on frequency between several sine wave generators.

**Sample** - sample, enters the name real sounding and during the necessary moment it is reproduced.

**Wavetable** - separate phases – attack, initial attenuation, an average phase and final attenuation that allows to lower sharply a memory size required for storage samples enter the name.

**Physicalmodelling** - sounding of the real tool on the basis of its set parameters. Thus the following methods for processing sounds are used:

**Installation** – will consist in a cutting of record of one sites, an insert of others, their replacement, duplication, etc. Refers to also as editing. Frequently it is used in programs of Flash-technology

**Peak transformations**

**Frequency (spectral) transformations.**

**Phase transformations.**

**Time transformations** – addition to the basic signal of its copies shifted in time for various sizes.

**Formatted transformations** – to each sound the parity of amplitudes and frequencies several format which defines a timbre and legibility of a voice. Changing parameters format, it is possible to emphasize or shade separate
sounds, to change one vowel for another, to shift the register of a voice, etc.

For record of a sound the following programs: Cool Editor, Sound Forge, Samplitude are used, Software Audio Workshop (SAW). They enable to consider oscillograms of both stereo channels, to listen to the chosen sites, to do (make) cuttings and inserts, peak and frequency transformations, sound effects, imposing of other numbering, change of frequency of numbering to generate various kinds of noise to synthesize a sound on additive and FM to methods, etc. Cool Editor contains the spectral analyzer displaying a spectrum of the chosen site of numbering.

Many programs of processing of a sound allow loading and keeping numbering in various formats that enables to transform files from one format to another and to divide stereochannels.

On the educational employment Sound Forge connected to record and processing of a sound the student gets skill and skill of work to write down a sound from a microphone in the form of a verse and songs; to edit the written down material deleting superfluous pauses in the beginning and at the end of a file, appeared as a result of a delay between the moment of pressing of button Record/Stop and the beginning and the termination of a sound recording, to copy, move phrases and to hear the received result.

Now the soundtrack is present and at electronic dictionaries and translators, for example: Promt Family. Recognition of written speech is made also on educational employment at students of philologists with the help of programs of scanning of texts (Fine-Reader) and figures (Picture Scan) or the built - in command of scanning in graphic editor Photoshop.

The systems focused on recognition of separate words, commands and questions name systems of speech management as their primary goal – will provide performance by computer system of the actions set by a voice.

Such systems have received the greatest distribution in speech telephone directories.

Systems of recognition of numbers which can be attributed to means of recognition of the first generation are most developed. In advanced such systems the person all over again speaks the numerical password, then the numerical identifier and only after that can name the number coding essence of a question.

Systems of recognition of names concern to means of recognition of the second generation. These systems are based on use of the key words stored; it is natural in a database. The set of stored words also limits possible names (by a call of the telephone subscriber, for example), commands and questions. System Voice Writer of company Curzvail allows to distinguish about 10000 words of English language, which after identification will be transformed to corresponding ASCII-sequences and or machine (if it is commands), or will be worn out in a file.

Essentially more difficultly system of the third generation building dialogue with the user with the help of system of voice menus. Such systems are based on idea of training: during some time the system is trained on a plenty of typical speech dialogues (including, by the way, and words - parasites). During this training the working dictionary and a database of relations between separate words is under construction. As an example of system of the third generation the product « the Voice mouse », a pronunciation and the decision of problems (tasks) with the help of studying of " 15 languages » on 1 CD ROM can serve Natural Dialogue System firms Philips, used by the Swiss railway company Swiss Railway for help system.

Systems of recognition of offers and coherent speech share on systems of separate dictation and system of recognition of coherent speech.

It is easier than system of separate dictation in development and technical realization, but they demand from the user not absolutely natural pronouncing of phrases – with a short pause before each following word. To such systems concern, for example, ViaType corporations IBM, Dragon Dictate firms Dragon System. Last system allows, alongside with other, directly to dictate the text in programs Word, Word Perfect, Internet Explorer, Netscape Navigator, etc. The Active dictionary totals tens thousand words and can will be filledup with the user, say, on his professional subjects.

Specificity of creation of small programs of dialogue of a computer with use of written speech. As an example the following programs of the various level, used on lessons can serve at training students of philologists.
The chatter where the student pawns base of words and phrases in this program and operates with them, communicating in writing with it.
The artificial intellect where the student enters the questions and receives answers on beforehand ready database.

Written speech brings the greatest effect at dialogue with Internet with the help chat.ru, ufacom.ru.

Spelling of texts with use Microsoft Word where spelling mistakes are emphasized by red color, and syntactic – green. Correction of mistakes is promoted by laboratory works « Editing of the text » and « Replacement of symbols ». As a result of it without mistakes the role of typing has increased by 36 %.

At use of system of artificial speech the student not only receives the information, forms ways of the cogitative activity, but also by means of imitation and loan, empathy acquires human emotions.

Introduction of use of artificial speech in system of training of students of philologists promotes formation of positive motivation of behaviour of students, formation of activity and cognitive interest to creation of socially valuable interpersonal relations, stimulates self-education and self-education.

If to accent as obligatory, a task of development of professional quality during artificial speech this purpose
carries out function of special vocational training, and communicative skills act as professional quality.

The recognition of written speech is made also on educational employment process at the students of the philological department with the help of the programs of scanning of the texts (Fine Reader) and figures (Picture Scan) or built - in team of scanning in the graphic editor Photoshop.

The systems focused on recognition of separate words, teams and questions name as systems of speech management, as their basic task — to supply performance with computer system of actions set by a vote.

The greatest distribution such systems have received in the speech telephone directories.

The systems of recognition of numbers are most developed which can be attributed to means of the first generation recognition. In advanced such systems the man at first speaks the numerical password, then the numerical identifier and only after that can name number coding essence of inquiry.

The systems of recognition of names concern to means of the second generation recognition o. These systems on use of key words (names) kept, naturally, in a database of system are based. The set of kept words also limits possible names (by a call of the telephone subscriber, for example) and questions. The system Voice Writer of the company Curzvail allows to distinguish about 10 000 words of the English language, which after identification will be transformed to the appropriate ASCII-sequences and or are executed by machine or are brought in a file.

Much more difficult is system of the third generation building dialogue with the user with the help of system of the voice menus. Such systems are based on idea of training: during some time the system is trained on a plenty of typical speech dialogues (including, by the way, and words - parasites). During this training the working dictionary and database of the attitudes between separate words is under construction. The example of system of the third generation can be served Natural Dialogue System of firm Philips, used by the Swiss railway company Swiss Railways for help system, a product «the Voice mouse»

The systems of recognition of the coherent speech are divided into systems of separate dictation and systems of recognition of coherent speech.

The systems of separate dictation are easier in development and technical realization, but they require of the user not of absolutely natural pronouncing of phrases — with a short pause before each following word. To such systems concern, for example, Via Type of corporation IBM, Dragon Dictate of firm Dragon System. Last system allows, alongside with other, to dictate the text in the programs Word, Word Perfect, Internet Explorer, Netscape Navigator and so on. The active dictionary of system totals tens thousand words and can replenish with the user on his professional subjects.

The specificity of creation of correct speech with use of computer technologies consists in strengthening a professional orientation of training, integration with educational subjects.

There are a number of the small programs of dialogue of the computer with use of written speech. The example can be served by the following programs of a various level used on lessons of computer science at training the students of philological department:

1. Govoron (the speaker), where the student pawns base of words and phrases in this program and operates with them, communicating in writing with it.

2. Artificial intelligence, where the student enters the questions and receives the answers on a beforehand ready database.

3. A spelling of the texts with use Microsoft Word, where the spelling mistakes emphasise by red colour, and syntactic - green. Corrections of a mistake promote work with laboratory works “Editing of the text” and “Replacement of symbols”. The role of typing without mistakes by 36 % grows.

At use of system of artificial speech the student not only receives the information, forms ways understanding activity, but also by means of imitation and borrowing, empathies acquires human emotions, feelings.

The introduction of use of artificial speech in system to training of the students of the philological department promotes formation of positive motivation of student’s behaviour, creation of the socially valuable interpersonal relations, stimulates self-education and self-education.

If accent as an obligatory task of development of professional quality during artificial speech, this purpose (assignment) carries out function of special professional training, and the communicative skills act as professional quality.