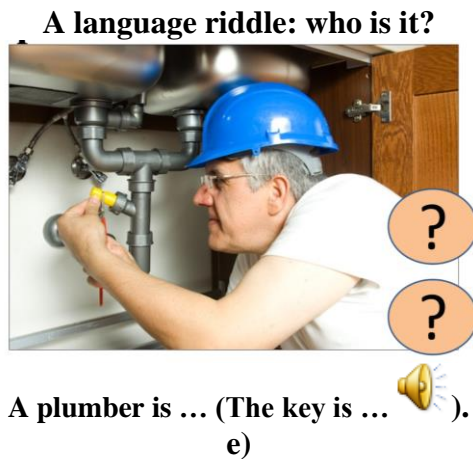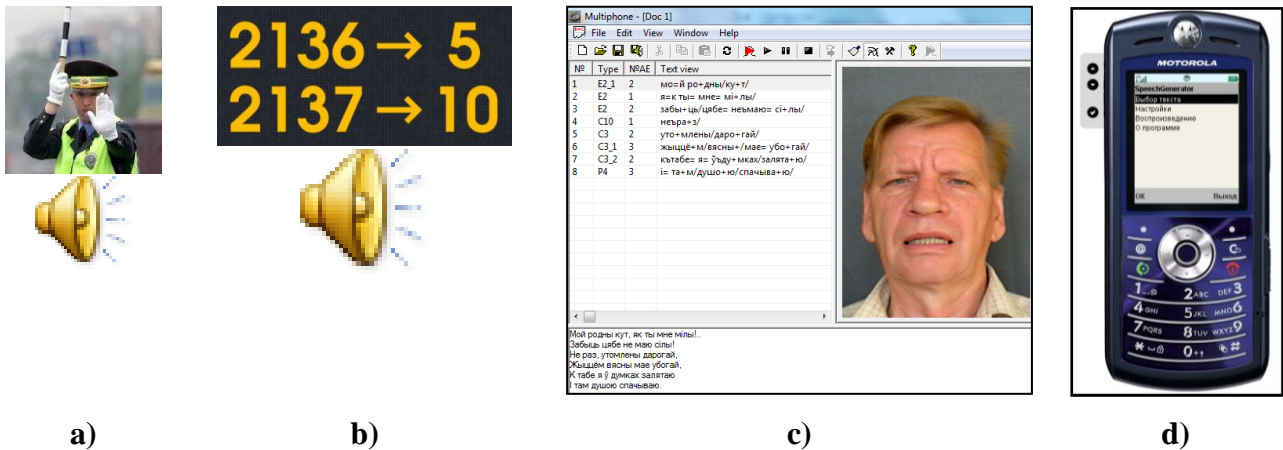# BELARUSIAN AND RUSSIAN SPEAKING
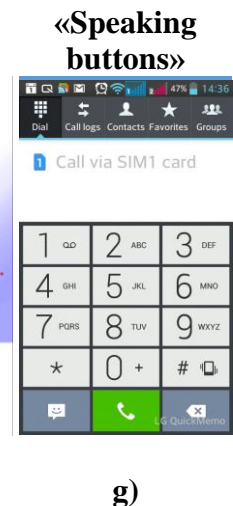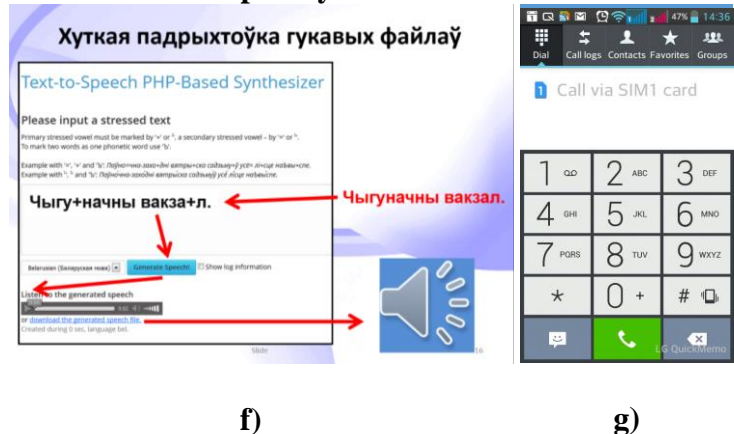
TEXT-TO-SPEECH SYNTHESIZER

FOR STATIONARY, MOBILE, AND INTERNET PLATFORMS

Usually people communicate with each other by means of voice and hearing. This method of interaction is also desirable for human-machine relationships. The development of the text-to-speech synthesizer (TSS) will allow mobile devices, desktop computers, or websites to read individual words, sentences and other text fragments in two official languages of the Republic of Belarus: Belarusian and Russian.

On the basis of the text-to-speech synthesizer, it is possible to quickly and easily build multimedia products (fig. 1): **a speaking electronic informant** (the voicing of traffic violations, names of transport stops, short messages, e-mails, chats; electronic queue systems); **audiobooks** (sequential reading, educational dialogues, audio guides); **Internet radio** (RSS readers, and website readers); **multimedia presentations** "text-image-sound".

a)   b)   c)   d)

A language riddle: who is it?

A plumber is … (The key is … 🔊).

e)

**Online text-to-speech synthesizer
www.Corpus.By/tts3**

**«Speaking
buttons»**

f)   g)

**Fig. 1. Belarusian and Russian speaking systems of text-to-speech synthesis:
a) notification of traffic violations; b) voicing of an electronic queue; c) on the stationary
platform; d), e) on the mobile platform; f) learning of foreign languages with correct answers
in Belarusian or Russian g) accessible at www.corpus.by/tts3**

Target audiences of the text-to-speech synthesizer cover almost all people in the country: attentive listeners in a particular room or passers-by of all ages (children, adults and retirees in the street, in the bank, office, apartment, at school, in a vehicle), people with disabilities (visually impaired, with weakened vocal cords or hearing).

Text-to-Speech Synthesizer for Stationary Platforms

The interface for stationary platforms asks a user in which language one enters a text. Then the entered text arrives at the input of specialized processors (linguistic, intonational (prosodic), phonetic, or acoustic). Finally, the processed text is converted into an audio signal (fig. 1, c). **The novelty and originality of the TSS design** lie in the following: the text-to-speech synthesizer uses the same algorithms and their realizations slightly altered according to language-dependent linguistic resources. As a result, this significantly saves computer resources.

The developed algorithms for turning numbers into ordinal or cardinal numerals and their modifications, allow voicing designations of dates (e.g., 25.10.2011), time, temperatures (e.g., 212 °F), scales, technical names (e.g., the Yakovlev Yak-15), abbreviations, and acronyms (e.g., UNIX, Android 4.3). These algorithms, unlike the existing ones, take into account the declination of ordinal numbers according to the categories of gender, number and case, and, therefore, can increase the natural sounding of synthesized speech.

Text-to-Speech Synthesizer for Mobile Platforms

The system of text-to-speech synthesis has been implemented on the J2ME platform used in a wide variety of mobile phones (fig. 1, d). The synthesizer has low requirements for this platform, which allows using it for the majority of mobile phones. Another distinctive feature that favours the use of the SST is the inbuilt technology of the placement of accents in words, which, unlike its known analogues, considers heuristic and statistical accent characteristics. Thanks to this, the volume of the grammatical dictionary is significantly reduced without loss of accuracy of the accent placement.

Text-to-Speech Synthesizer for the Internet

The system has been implemented in the free scripting programming language PHP that is considered the most popular one on the web (fig. 1, e). Users can visit the website **WWW.CORPUS.BY/TTS3** at any time and synthesize speech for any text in the appropriate language. After the generation of speech, it will become possible not only to play the resulting sound file, or to download and save it, but also to share the electronic link to it with friends via e-mail or a social network. For example, at **WWW.CORPUS.BY/TTS3** it is possible to quickly create language riddle tests (fig. 1, e).

Text-to-Speech Synthesizer is a Widely-Used Tool

The text-to-speech synthesizer is capable of providing the voicing of texts in the Belarusian and Russian languages for a wide range of users. Thanks to the language-independent architecture, it can speak the same voice (male or female) in different languages. The ability to launch the SST on different platforms allows its almost universal use.

Contacts

Speech Synthesis and Recognition Laboratory
Tel. +375 17 284-25-22, +375 14 284-27-73
Emails: ssrlab221@gmail.com, Yury.Hetsevich@gmail.com
Websites: www.ssrlab.by , www.corpus.by , www.new.ssrlab.by

United Institute of Informatics Problems
National Academy of Sciences of Belarus
Surhanava str., 6
220012, Minsk, Belarus

Yuras Hetsevich
Ph.D., Head of the Laboratory +375 (29) 882-14-87, +375 (29) 681-52-53