


Research group in speech technology and communication techniques

Contact details

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Areas of expertise

Voice Synthesis and Voice Recognition

We have made thesis and research projects in this field, and we have realised functional voice synthesis and voice recognition systems

Network Communication Techniques

Network installation and configuration, modulation techniques, network communication techniques

Parallel Architectures and Neural Networks

Parallel virtual machine applications, solving tasks with parallel algorithms, applications on multicore and parallel graphics processors, grid systems

Microprocessors and Microcontroller based Architectures

Automation systems based on microprocessors and microcontrollers

Team and key skills

Prof. dr. eng. Todorean Gavril: experience in speech technology, communication techniques, neural networks, microprocessors, as well as project management and leadership

Assist. Prof. Dr. Eng. Buza Ovidiu: experience in voice synthesis, microprocessor systems, parallel and distributed applications

Assist. Andras Balogh: experience in voice signal compression, DSP, microprocessors, communication techniques, network management

Fitigau Ioan: experience in network protocols and network management

Infrastructure

- Multicore multimedia systems
- Functional voice synthesis systems
- Microcontroller and DSP development systems
- Cisco Wireless VPN Network

Development strategy

Developing applications in speech technology, networking, parallel architectures, systems with microcontrollers

Representative projects

1. Annotated vocal database for Romanian for using in voice synthesis and speech recognition systems (2011-2013)
2. Electronic voiced library for the Blind (2008-2010)
3. Voice synthesis system for Romanian based on syllable concatenation (2008-2010)
4. Voice synthesis system for Romanian with prosody implementation using a modified PSOLA method (2007-2009)
5. Database with elementary sounds in Romanian and types of intonations (2007-2009)
6. Word processing system in Romanian for syllables detecting and word accentuation (2008-2010)

Significant results

The most representative publications of the past 5 years:

1. O. Buza, G. Todorean, J. Domokos, A. Zs. Bodo, *Building a Text to Speech System for Romanian through Concatenation*, The 5th IEEE Conference on Speech Technology and Human Computer Dialogue SpeD 2009, organized by the University "Politehnica" of Bucharest, the Romanian Academy, the Research Institute for Artificial Intelligence, in cooperation with EURASIP and IEEE, Constanta, Romania, June 18-21, 2009
2. G. Todorean, O. Buza, A. Zs. Bodo, *Voice Synthesis Methods*, Risoprint Publishing House, ISBN 978-973-53-0114-9, Cluj-Napoca 2009
3. A. Zs. Bodo, O. Buza, G. Todorean, *Experiments with the prediction and generation of Romanian intonation*, published in the volume „From Speech Processing to Spoken Language Technology”, the Publishing House of the Romanian Academy, composed of the Proceedings of the 5th IEEE Conference on Speech Technology and Human Computer Dialogue, SpeD 2009, Constanta, Romania, June 18-21, 2009, pp.103-114
4. J. Domokos, G. Todorean, O. Buza, *Text Conditioning and Statistical Language Modeling for Romanian Language*, published in the volume „From Speech Processing to Spoken Language Technology”, the Publishing House of the Romanian Academy, composed of the Proceedings of the 5th IEEE Conference on Speech Technology and Human Computer Dialogue, SpeD 2009, Constanta, Romania, June 18-21, 2009, pp.161-168
5. O. Buza, G. Todorean, J. Domokos, *A Rule-Based Approach to Build a Text-to-Speech System for Romanian*, the 8th International Conference on Communications COMM 2010, organized by the University "Politehnica" of Bucharest, the Military Technical Academy, under the aegis of IEEE Romanian Section and Romanian Academy of Technical Sciences, Bucharest, Romania, ISBN 978-1-4244-6363-3, June 10-12, 2010, pp.83-86
6. O. Buza, G. Todorean, J. Domokos, Á. Zs. Bodó, *Applied Method for Region and Phonetic Segmentation of Voice Signal*, the 6th European Conference on Intelligent Systems and Technologies ECIT 2010, organized by Romanian Academy - Iasi Branch, "Gheorghe Asachi" Technical University of Iasi, "A.I. Cuza" University of Iasi, under the aegis of the Romanian Academy, Iași Branch and IEEE Romanian Section, Iasi, Romania, ISSN 2069-038X, October 7-9, 2010, pp. 54-60
7. J. Domokos, O. Buza, G. Todorean, *Automated Grapheme-to-Phoneme Conversion System for Romanian*, published in the volume „From Speech Processing to Spoken Language Technology”, the Publishing House of the Romanian Academy, composed of the Proceedings of the 6th IEEE Conference on Speech Technology and Human Computer Dialogue, SpeD 2011, Braşov, Romania, ISBN: 978-1-4577-0440-6, 18-21 May 2011, pp. 1–6
8. O. Buza, G. Todorean, J. Domokos, *Automatic Algorithm for Region Segmentation of Speech Signal*, the 4th International Conference on Communications, Mobility and Computing (CMC 2012), Guilin, China, 21-23 May 2012, pp.179-182
9. G. Oncea, O. Buza, G. Todorean, *Temperature control system for infrared soldering*, IEEE International Conference on Automation Quality and Testing Robotics (AQTR 2012), Cluj-Napoca, 24-27 May 2012, pp.564 - 568
10. J. Domokos, O. Buza, G. Todorean, *100K+ words, machine-readable, pronunciation dictionary for the Romanian language*, the 20th European Signal Processing Conference (EUSIPCO-2012), organised by European Association for Signal, Speech, and Image Processing (EURASIP) and Institute of Electrical and Electronics Engineers IEEE, Bucharest, 27-31 August 2012, ISBN 9781467310680, pp. 320 – 324
11. V. Moldovan, O. Buza, *Vocal Interaction with a Virtual Library using VXML*, Novice Insights in Electronics, Communications and Information Technology, UTCN Press, Cluj-Napoca, Issue 13, 2013, pp. 17-23
12. J. Domokos, O. Buza, G. Todorean, "Romanian phonetic transcription dictionary for speeding up language technology development", *Language Resources and Evaluation*, DOI 10.1007/s10579-013-9262-z, ISSN 1574-020X, Springer Netherlands, January 2014, pp. 1-15

Remarkable results achieved in the projects in the last 5 years:

1. We have developed a voice synthesis system for Romanian based on syllables concatenation, using an original method designed by members of the group
2. We have developed a voice synthesis system based on modified PSOLA method, that includes speech prosody modeling
3. The vocal database constructed by our team was used by the Technical University of Budapest for achieving a continuous speech recognition application, within a FP7 European project. When complete, the database will be public accessible by Internet (in Romanian, Hungarian and Polish languages)

The offer addressed to the economic environment

Research & development in core areas	Research & development in speech technology, network communication, parallel architectures
Research & development in applied fields	Research & development for realising voice synthesis, voice recognition and voice compression applications, network and parallel applications, systems based on microcontrollers
Consulting	Consulting in the field of speech technology
Applied engineering services	Development of voice synthesis and voice recognition applications, parallel applications, microcontroller-based systems



Fig. 1. Speech synthesis methods



Fig. 2. One of our speech synthesis systems integrated in the Audacity application