

# SPOKEN LANGUAGE TECHNOLOGY

Mihai Drăgănescu,  
Romanian Academy

Almost 20 years ago, in 1984, the Romanian Academy organized the first session on the analysis and synthesis of the speech signal and published a volume with the papers of this session [1]. It was a moment of recognition of the activity of a community of Romanian scientists in the domain of *speech technology*, with works beginning in 1963 (Edm. Nicolau, I. Weber, Șt. Gavăț), 1973 (Aurelian Lăzăroiu), 1976 (Eugeniu Oancea, with a volume on analysis and synthesis of speech) and with new papers of Corneliu Burileanu, Horia Nicolai Teodorescu, Eugeniu Oancea, Grigore Stolojanu, Virgil Enătescu and others.

Since then the domain evolved from *speech technology* to *spoken language technology*. This had to be foreseen however from the very beginning [2] involving the use of artificial intelligence, both for natural language processing and for acoustic-phonetic processes of the spoken language.

The language technology is seen today with two great subdivisions [3]: technologies of the written language and technologies of the spoken language. These subdivisions have to work together in order to obtain a valuable and efficient human-computer dialogue. This is the aim of the new Institute for Research in Artificial Intelligence of the Romanian Academy (2002, extending a research center founded in 1994 by acad. Gheorghe Tecuci) - director Dan Tufiș, corresponding member of the Romanian Academy, working in collaboration with the DiSPALL Laboratory (head, prof. Corneliu Burileanu) of the Faculty of Electronics and Telecommunications of University Politehnica of Bucharest. The participation of colleagues from Iasi, Cluj-Napoca, and Military Technical Academy-Bucharest and other universities, and their collaboration in the framework of the Commission of the Romanian Academy for the Informatisation of the Romanian Language will bring a new stage in developing these domains in Romania.

Concerning the spoken language technology, the initiative of prof. Corneliu Burileanu to organize this 2-nd session and to publish a new volume, and the effort he has done for them, is as an important contribution to the domain at the beginning of the third millennium. It is to be mentioned also the contribution of Dragoș Burileanu who edited a special issue of International Journal of Speech Technology, Kluwer

Academic Press, in 2002, with invited romanian papers of Horia Nicolai Teodorescu, Dan Tufis, Dragoş Burileanu, Inge Gavăţ, Corneliu Burileanu [4].

Proceedings of the IEEE published, in August 2000, a special issue on Spoken Language Processing [5]. From the guest editors preface we mention here very clear and authorized remarks:

"Spoken language processing systems have been developed for a wide variety of applications, ranging from small-vocabulary keyword recognition for telephone routing, to medium-size vocabulary voice command and control systems (as in rudimentary dialogue systems) for information retrieval and electronic commerce, to large-vocabulary speech dictation, spontaneous speech understanding, and limited- domain speech translation. They have already had a large impact on society. **Spoken language processing systems have reached a critical point, and the technology is now poised on the threshold of broad deployment.** With the steady increase in computing power, the growing reliance on rapid electronic communication, and the maturing of spoken language processing technologies, we will see functional, commercially viable spoken language interfaces emerge, soon and ubiquitously. In the near future, spoken language processing is expected to flourish further and bring about an era of true human-computer interaction" [6].

Indeed, we entered an era of e-functions. An e-function is a function helped by electronics and informatics. We thought many years ago that *functional electronics* is the domain of conventional functions (of communication, of command and control a.o.), of competence (for designing in any branch of technology, of decisions with partial or complete automation, for research in science), of robotics (for written and spoken natural language, for artificial vision, for mechanical movements), of coupling with the living matter and many others [7]. Now, for the knowledge society there are e-books, e-learning systems, e-commerce, e-business, e-health, e-government etc. All these e come from electronics, and all such e-functions are forming functional electronics. The science and technology of information is, for a good number of years, in its greatest part coincident with functional electronics.

1. Ed. M. Drăgănescu, C. Burileanu, *Analiza și sinteza semnalului vocal*, Ed. Academiei, Bucureşti, 1986.
2. Mihai Drăgănescu, *Tehnologia vorbirii*, vezi ref. 1, p.9-16.
3. Ed. Dan Tufiş, Florin Gh. Filip, *Limba română în Societatea Informațională-Societatea Cunoașterii*, Editura Expert, Bucureşti, 2002.
4. Invited Chief Editor Dragoş Burileanu, *Special issue* (papers by Horia Nicolai Teodorescu, Dan Tufis, Dragoş Burileanu, Inge Gavăţ, Corneliu Burileanu), International Journal of Speech Technology, vol.5, No.3, Sept. 2002, Kluwer Academic Press.
5. \*\*\* *Special issue on spoken language processing*, Proceedings IEEE, August 2000, Guest editors, Biing-Hwang Juang, Sadaoki Furui.
6. Biing-Hwang Juang, Sadaoki Furui, in ref. 5, p.1139.
7. Mihai Drăgănescu, Gheorghe Ştefan, Corneliu Burileanu, *Electronica funcțională*, Bucureşti, Editura Tehnică, 1991 (see pag. 26-34).