

Editorial

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This second issue of Volume 19 of the Journal of the Brazilian Computer Society includes eight contributions on diverse topics: three papers address the computational processing of the Portuguese language, one paper is on image retrieval on the World Wide Web, another is on parallel graph algorithms and the remaining three papers contribute to the field of mobile and embedded robotics.

Authors Tiago Maritan Ugulino de Araújo, Felipe Lacet Silva Ferreira, Danilo Assis Nobre Santos Silva, Felipe Hermínio Lemos, Gutenberg Pessoa Neto, Derzu Omaia, Guido Lemos de Souza Filho and Tatiana Aires Tavares deal with the important issue of increasing content accessibility by deaf speakers of Portuguese. They describe the architecture and implementation of LibrasTV, a system that generates and displays LIBRAS (the Brazilian sign language) windows from a closed caption input stream in Brazilian Portuguese.

The paper by Arlindo Veiga, Sara Candeias and Fernando Perdigão handles the problem of grapheme to phoneme conversion to create a pronunciation dictionary from a vocabulary of words in European Portuguese. Their system relies on a stochastic model with embedded rules for stressed vowel assignment. Although the model can generate pronunciations from unrestricted words, a dictionary has been constructed with the 40K most frequent words. Both the model and the dictionary are publicly available.

Eder Miranda de Novais and Ivandré Paraboni describe a system that uses factored language models (FLMs) of Portuguese to overcome difficulties related with the application of statistical methods for natural language generation. The system combines FLMs trained on a large corpus with several publicly available resources for Natural Language Processing

of Portuguese. Authors have successfully applied the FLM-based approach to generate Brazilian newspapers headlines, and show that their approach outperforms some statistical and non-statistical baseline systems.

Considering that most current large-scale Web image search engines rely on textual descriptions of image content, authors Patrícia Correia Saraiva, João M. B. Cavalcanti, Marcos Antonio Gonçalves, Kátia C. Lage dos Santos, Edleno S. de Moura and Ricardo da S. Torres present a study on the usage of genetic programming to retrieve images from the Web using multiple textual sources of evidence and textual queries. They investigate parameter choices and report experiments on a large collection of images that illustrate the advantages of their evolutionary approach.

Alves, Cáceres, Castro Jr., Song and Szwarcfiter introduce a parallel algorithm to compute the transitive closure of a digraph. In particular, authors describe an implementation that uses the Warshall transitive closure algorithm on two Beowulf clusters using MPI. They show results that confirm the algorithm is efficient, scalable and compares favorably with other parallel implementations, besides being applicable to any square matrix that represents a binary relation.

Tiago Pereira do Nascimento, Pedro Costa, Paulo G. Costa, António Paulo Moreira and André Gustavo Scolari Conceição introduce a set of modifications applicable to any grid-based path planning algorithm from the A* family in mobile robotics. These modifications enable a robot to reach the target faster than with traditional algorithms while avoiding fast moving obstacles. Authors show results from simulations using a crowded and highly dynamic environment and also from real experiments.

Leandro de Souza Rosa and Vanderlei Bonato deal with the Extended Kalman Filter (EKF) algorithm employed to simultaneously estimate a model of the environment (map)

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and a robot position based on sensor information. In order to ensure efficient implementation on embedded mobile robots, authors introduce a method to automatically estimate the bit-range of the EKF variables in fixed-point implementations. The method incorporates a model to monitor algorithm stability and a first attempt to analyze the maximum acceptable system error.

Finally, Armando Alves Neto, Douglas G. Macharet and Mario F. M. Campos present a novel methodology

to generate smooth feasible paths for autonomous aerial vehicles in three-dimensional environments based on a variation of the Spatial Quintic Pythagorean Hodographs curves. Feasible paths should not violate the main kinematic constraints of the vehicle, which is accomplished by connecting waypoints with seventh order Bézier curves. Validation is performed in simulations with real parameters and with simulated flight data of a small autonomous aerial vehicle.