

Editorial: Neural Processing Letters Special Issue on “Neural Networks for Vision and Robotics”

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The International Joint Conference on Neural Networks (IJCNN) is the premier professional conference in the field of neural networks. A special session on Neural Networks for Vision and Robotics (NNVR) was organized with a large volume of high quality papers. A small number of outstanding papers presented at this special session were invited to submit extended versions of their work to this special issue. Additionally, a number of external papers were solicited and only the best of them accepted.

This special issue aims to bring together research work in the area of neural networks applied to the fields of computer vision and robotics, investigating novel solutions and discussing the future trends in this field. Each paper was reviewed by at least three reviewers based on the preferences expressed by the Program Committee members, with at least two rounds before acceptance.

This compilation is composed of 10 papers selected from more than 25 submissions. The papers are organized into two main groups according to their applications. In the first group we find 6 papers that present computer vision related applications: Firouzi and Conradt propose a cooperative fully event-based stereo matching algorithm using Silicon Retina. Rekabdar et al. address the problem of encoding and classifying spatio-temporal patterns, which are typical for human actions or gestures. In Dominguez et al., a colour space and a colour component weighting selection is proposed to detect foreground objects in video sequences using self-organizing maps. Azorin et al. propose a predictive method based on a simple representation of the trajectory data of a specific person in the scene which allows a high level understanding of the global human behavior. In Zhand et al., an adaptive convolutional neural network (ACNN) based method is presented with application to face recognition. Finally, Orts et al. describe a 3D reconstruction method based on Self-Organizing Maps (SOMs) able to successfully create 3D faces online without post-processing steps.

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In the second group, we find four papers with robotics vision applications: Nelson et al., present a neural identification approach to estimate the parameters of a mobile robot, where an inverse optimal control is built to compute the desired trajectory during the navigation process using a stereo camera sensor. Falcao et al. investigates low-power consumption hardware models and processor architectures for real-time object recognition in power-constrained autonomous systems and robotics. In Aguilar and Angulo, a novel technique is introduced for real-time video stabilization with low computational cost, without generating false movements or decreasing the performance of the stabilized video sequence. Finally, Duro et al. describe and test an approach to improve the temporal processing capabilities of the NeuroEvolution of Augmenting Topologies (NEAT) algorithm with applications in the area of intelligent robotic systems.

In summary, the ten selected papers present recent developments of neural network-related research, with a focus on mobile robotics and computer vision.