

1: Biologically Inspired Computer Vision | Download eBook PDF/EPUB

This book constitutes the refereed proceedings of the Second International Workshop on Biologically Motivated Computer Vision, BMCV, held in Tübingen, Germany, in November. The 22 revised full papers and 37 revised short papers presented together with 6 invited papers were carefully.

Computer vision researchers design intelligent machines capable of perceiving visual information. One of many approaches is to model the fascinating visual processing done by primates. The eyes, the brain, and their interconnections provide a rich set of visual perceptions without conscious effort. How primates "see" has long been an intriguing research question in neuroscience, biology, physiology, and psychology. Based on discoveries in these fields, computer scientists have attempted to apply biologically plausible models to the design of visual machines. While still inferior to primates, the performance of existing systems has been demonstrated to be quite promising. It appears that a machine based on biological principles can be simple yet achieve high accuracy and generalize well. This thesis takes a closer look at an artificial vision system based on biological principles, specifically with respect to object recognition and categorization. An existing system will be investigated, followed by various modifications leading to a new and improved system. The proposed model employs unsupervised feature learning, simulating a hypercolumn of the primary visual cortex, a hierarchical feed-forward framework, mimicking simple and complex cells, and finally neural network classification, based on a computational model of interconnected neurons. Compared to existing approaches, the proposed system is not only more biologically inclined, but also more effective. With significantly shorter running times it achieves good accuracies on several data sets compared to other state-of-the-art systems. Another key feature is good generalizability. The proposed approach does not rely on delicate domain specific segmentation procedures often employed by traditional vision systems. There are few parameters and a single set of parameters can be applied to images from different domains without significant loss of accuracy. In order to evaluate the system, experiments are conducted both on a commonly used collection of natural scenes as well as a challenging collection of realistic underwater marine images. The latter data is a rather uncommon data source in the computer vision community. Although automated labeling of various species of tiny planktonic organisms has recently attracted the attention of a number of researchers, biologically inspired vision systems had not previously been applied to this kind of data. Despite domain specific difficulties, such as low image quality, and high diversity of shapes and motions, the potential of the proposed system is shown to be quite promising. As plankton plays an important role in the carbon cycle, high-volume automated labeling of planktonic specimens may lead to new insights concerning global climate changes. The encouraging experimental results in the marine domain bode well for future application of the proposed approach to other domains currently not considered by mainstream computer vision applications. The 22 revised full papers and 37 revised short papers presented together with 6 invited papers were carefully reviewed and selected from 97 submissions. The papers are organized in topical sections on neurons and features, motion, mid-level vision, recognition - from scenes to neurons, attention, robotics, and cognitive vision.

2: Biologically Motivated Computer Vision: Second International Workshop :: www.enganchecubano.com

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3: CiteSeerX " A biologically motivated scheme for robust junction detection

Biologically Motivated Computer Vision. Digital Image Processing. Sumitha Balasuriya Department of Computing Science, University of Glasgow. General Vision Problem.

Show Context Citation Context The color brightness histograms split the image into four channels gray, red, green, blue and counted the frequencies in 16 equally spaced bins. This measured reflected the global distribution of Bootstrapped learning of novel objects by unknown authors " Recognition of familiar objects in cluttered backgrounds is a challenging computational problem. But what if the object is unfamiliar? A novel camouflaged object poses a paradox: But, how is the visual system to build such a model of the object without easily segmentable samples? One possibility is that learning to identify and segment is opportunistic in the sense that learning of novel objects takes place only when distinctive clues permit object segmentation from background, such as when target color or motion enables segmentation on single presentations. We tested this idea and discovered that, on the contrary, human observers can learn to identify and segment a novel target shape, even when for any given training image the target object is camouflaged. Further, perfect recognition can be achieved without accurate segmentation. We call the ability to build a shape model from high-ambiguity presentations bootstrapped learning. Increasing Efficiency in Airport Security Screening by unknown authors " The prominence of aviation security has increased dramatically in recent years. As a reaction to the new threat situation large investments into modern security technology have been made. State-of-the-art X-ray screening equipment provides high resolution images, many image enhancement features and even automatic explosive detection. However, the most expensive equipment is of limited value if the humans who operate it are not selected and trained to perform their task accurately and efficiently. In fact, according to several experts, the human operator is currently the weakest link in aviation security. This article presents results of studies conducted over the last four years which clearly show that threat detection in X-ray images can be increased substantially by investing into human factors technologies that are based on results of visual cognition, object recognition and psychophysics.

4: PPT - Biologically Motivated Computer Vision PowerPoint Presentation - ID

This book constitutes the refereed proceedings of the First IEEE/CS International Workshops on Biologically Motivated Computer Vision, BMCV , held in Seoul Korea in May

5: Biologically Inspired Computer Vision: Fundamentals And Applications Download

The rapid progress being made in the field of computer vision has had a tremendous impact on the modeling and implementation of biologically motivated computer vision. A multitude of new advances and findings in the domain of computer vision will be presented at this workshop.

6: CiteSeerX " Citation Query Biologically Motivated Computer Vision

One of the advantages of the study of biological organisms is to devise very different type of computational paradigms by implementing a neural network with a high degree of local connectivity. This is a comprehensive and rigorous reference in the area of biologically motivated vision sensors.

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