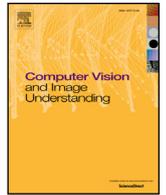




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# Computer Vision and Image Understanding

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## Editorial

### Special issue on Assistive Computer Vision and Robotics - Part I



In the last decades, there has been a tremendous increase in demand for assistive technologies useful to overcome functional limitations of individuals and to improve their quality of life. Assistive technologies provide a set of advanced tools that can improve the quality of life not only for impaired people, patients and elderly but also for healthy people struggling with everyday actions. Recently, novel assistive tools have been successfully commercialised bringing the Computer Vision and Robotics research from theory to applications exploited by the society. After a period of slow but steady progress, this new scientific area is mature for new research and application breakthroughs.

This CVIU special issue gathers very recent and various works on assistive computer vision and robotics. We have received 121 papers of authors from different countries. The submissions went through an initial check by the guest editors for suitability to the scope of the special issue, and 54 submissions had to be rejected without review because they were considered out of scope. The remaining papers went then through the standard review process, with up to three rounds of revisions for some papers. In the end, 31 papers were considered suitable for publication in this special issue that is divided in two parts. Part I contains papers related to computer vision and machine learning issues such as motion analysis, image segmentation and annotation, object recognition, extreme learning, statistical classification, feature extraction, tracking, 3D morphometric analysis. Part II collects papers dealing with some computer vision issues which have applications in robotics such as multi-modal human-robot interaction, autonomous navigation, object usage, place recognition, robotic manipulator, egocentric vision.

We would like to thank here all the authors who submitted their work to our special issue, and our reviewers who put their precious expertise and time in their reviews in a very professional manner. We also wish to thank the Editor-in-Chief, Professor Nikos Paragios and the editorial staff at the Computer Vision and Image Understanding Journal who have guided and supported us throughout the process of producing this special issue.

In the following, we briefly describe the papers related to the Part I of the CVIU special issue on Assistive Computer Vision and Robotics.

The paper “Expressive Visual Text-To-Speech as an Assistive Technology for Individuals with Autism Spectrum Conditions” by S. A. Cassidy et al. discusses the challenge of improving ability to interpret emotions in realistic social situations in people with Autism Spectrum Conditions by demonstrating a method for generating a near-videorealistic avatar (XpressiveTalk), which can

produce a video of a face uttering inputted text, in a large variety of emotional tones.

The paper “Lip Event Detection Using Oriented Histograms of Regional Optical Flow and Low Rank Affinity Pursuit” by X. Liu et al. consider the problem of understanding Lip events by using oriented histograms of regional optical flow (OH-ROF) and low rank affinity pursuit.

The paper “Eye Blink Detection Based on Motion Vectors Analysis” by A. Fogelton et al. presents an approach for eye blink detection based on the analysis of motion vectors and introduces a new dataset which is publicly available for testing purposes.

The paper “Robust Traffic Lights Detection on Mobile Devices for Pedestrians” by S. Mascetti et al. addresses the problem of the independent mobility. The paper proposes a robust and efficient method for recognizing traffic lights through the analysis of images acquired by a mobile device camera.

The paper “Human Fall Detection in Videos via Boosting and Fusing Statistical Features of Appearance, Shape and Motion Dynamics on Riemannian Manifolds with Applications to Assisted Living” by Y. Yun et al. considers the problem of fall detection from videos with an approach that performs analysis on Riemannian manifolds.

The paper “Wise Mirror - a smart, multisensory cardio-metabolic risk monitoring system” by Y. Andreu et al. introduces a multi-sensor device for health self-monitoring and assessment. A method for 3D morphological analysis of the face and recognition of psycho-somatic status both linked with cardio-metabolic risks is presented.

The paper “Toothbrush Motion Analysis to Help Children Learn Proper Tooth Brushing” by M. Marcon et al. proposes a framework to help children learn proper tooth brush. The visual data acquired with a tablet camera are processed in order to track both the toothbrush target and the child’s facial parts in order to estimate the brushed dental side and hence help children through a tooth brushing gamification based on avatars.

The paper “A Supervised Extreme Learning Committee for Food Recognition” by N. Martinel et al. presents a food recognition system exploiting a supervised learning algorithm useful to select the optimal features for the problem. The selected features are combined with a new approach and the overall pipeline is tested on representative dataset of the literature.

The paper “A Novel 2D/3D Database with Automatic Face Annotation for Head Tracking and Pose Estimation” by M. Ariz et al. considers the problem of head tracking and pose estimation and introduces a new public labelled dataset which can be exploited for

algorithm validation. A comparison of state-of-the-art algorithms is reported.

The paper “A Comparative Study of Pose Representation and Dynamics Modelling for Online Motion Quality Assessment” by L. Tao et al. is related to the study of the performances of different pose representations and HMM models to understand the human motion in the monitoring of patients.

The paper “Improving Posture Classification Accuracy for Depth Sensor-based Human Activity Monitoring in Smart Environments” by E. S. L. Ho et al. proposes a classification framework able to identify 3D postures from Kinect data for Human Activity Monitoring.

The paper “Characterizing Everyday Activities from Visual Lifelogs based on Enhancing Concept Representation” by P. Wang et al. provides a method for the characterization of everyday activities from egocentric images.

The paper “Spatio-Temporal Hough Forest for Efficient Detection-Localisation-Recognition of Fingerwriting in Egocentric Camera” by H. J. Chang et al. proposes a view independent hand posture descriptor. The proposed descriptor is used to detect writing hand posture, and locates the position of index fingertip in each frame. From the trajectory of the fingertip, the written character is localised and recognised simultaneously.

The paper “Geodesic pixel neighborhoods for 2D and 3D scene understanding” by V. Haltakov et al. proposes a two-stage semantic

segmentation framework based on the concept of pixel neighborhoods.

The paper “Purely Vision-Based Segmentation of Web Pages for Assistive Technology” by M. Cormier et al. describes a method to analyse the layout of a web page to produce a hierarchical segmentation of the page reflecting its structure. The obtained structure can help create modified presentations for users with assistive needs.

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