

POSTER SESSION BOOKLET



ICVSS 2010
Registration and Video Analysis

<http://www.dmi.unict.it/icvss>

University of Catania - University of Cambridge

International Computer Vision Summer School 2010

Registration and Video Analysis

Sicily, 12-17 July 2010

International Computer Vision Summer School

Computer vision is the science and technology of making machines that see. It is concerned with the theory, design and implementation of algorithms that can automatically process visual data to recognize objects, track and recover their shape and spatial layout.

The International Computer Vision Summer School - ICVSS was established in 2007 to provide both an objective and clear overview and an in-depth analysis of the state-of-the-art research in Computer Vision. The courses are delivered by world renowned experts in the field, from both academia and industry, and cover both theoretical and practical aspects of real Computer Vision problems.

The school is organized every year by University of Cambridge (Computer Vision and Robotics Group) and University of Catania (Image Processing Lab). The general entry point for past and future ICVSS editions is:

<http://www.dmi.unict.it/icvss>

ICVSS Poster Session

The International Computer Vision Summer School is especially aimed to provide a stimulating space for young researchers and Ph.D. Students. Participants have the possibility to present the results of their research, and to interact with their scientific peers, in a friendly and constructive environment.

This booklet contains the abstract of the posters presented at ICVSS 2010.

Best Presentation Prize

A subset of the submitted posters is selected by the school committee for short oral presentation. A best presentation prize is given to the best presentation selected by the school committee.

Scholarship

A scholarship is awarded to the best PhD student attending the school. The decision is made by the School Committee at the time of the School, taking into account candidates'cv, poster and oral presentation.

Sicily, May 2010

*Roberto Cipolla
Sebastiano Battiato
Giovanni Maria Farinella*

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SHAPE-FROM-SHADING: COMBINING PROBABILISTIC & STATISTICAL MODELS

Ahmad T., Wilson R.C.

Abstract: In this work, we combine a probabilistic model of surface normals from shape-from-shading with a statistical model of 3D shape. We sample the Fisher Bingham FB8 distribution of surface normals from probabilistic SfS model using Gibbs sampling. We get surface normals from the statistical shape model. We fit individual normal distributions to each of these normals and combine them to give a product normal distribution i.e. a better model for SfS.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS1

BIOPSY SITE RE-LOCALISATION WITH EPIPOLAR LINES DERIVED FROM TWO PREVIOUS ENDOSCOPIC IMAGES

Allain B., Hu M., Lovat L. B., Cook R. J., Ourselin S., Hawkes D. J.

Abstract: Tracking biopsy sites in endoscopic images can be useful to provide a visual aid for the guidance of surgical tools, for example when endoscopic guided biopsy is required. We present a new method which re-localises a site in an image of an endoscopic sequence as the intersection of 2 epipolar lines derived from 2 previous images. The re-localisation accuracy was estimated at less than 1mm for gastroscopic data.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS1

VISUAL-HAPTIC INTERACTION FOR ROBOT GRASPING

Alt N., Steinbach E.

Abstract: Grasping of objects is a fundamental ability for cognitive robotic systems. These systems use vision to detect, locate and reconstruct objects of interest. However, vision can only deliver partial object information and must often be enhanced by haptic data. Using a combined visual-haptic object model, a grasping process adapted to the object can be performed. The goal of this work is to go towards a Cognitive Grasping System, which flexibly handles known and new objects.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS1

HEAD POSE ESTIMATION

Anishchenko S., Comley R., Gao X., Shaposhnikov D., Osinov V.

Abstract: The overall aim of this research is to investigate image analysis techniques suitable for application to the accurate estimation of head pose and hence to derive improved models and methods. An important application of this work is head motion correction in Positron Emission Tomography (PET).

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS1

ENDOSCOPIC VIDEO MANIFOLDS

Atasoy S., Mateus D., Lallemand J., Meining A., Yang G.Z., Navab N.

Abstract: In this work, we address two tasks: clustering of poor-quality frames and different scenes in endoscopic videos. For each task, our method creates a manifold representation using an appropriate inter-frame similarity measure and then performs a clustering on the created endoscopic video manifolds (EVMs). The introduced EVMs enable the clustering of poor-quality frames and grouping of different segments of the endoscopic video in an unsupervised manner. Furthermore, we present two novel inter-frame similarity measures for manifold learning to create structured manifolds from complex endoscopic videos.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS1

REAL-TIME ATTENTION SYSTEM ON-CHIP

Barranco F., Daz J., Tomasi M., Vanegas M., Ros E.

Abstract: This work proposes a novel architecture for the implementation of a real-time attention system on-chip. It integrates a bio-inspired attention model with the low-level visual primitives (optical flow and disparity). It computes a new saliency map biased with the weighted primitives, converting it in the most complex existing platform for scene understanding. The system is developed for hardware reconfigurable devices (FPGAs) as a hardware accelerator and could be used as a stand-alone platform.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS1

TOPOLOGICAL ACTIVE VOLUMES FOR 3D IMAGE SEGMENTATION

Barreira N.

Abstract: The Topological Active Volumes (TAV) model is a 3D active model focused on segmentation and reconstruction tasks. The segmentation process is based on the adjustment of a 3D mesh formed by polyhedra. The deformation process is guided by energy functions based on low-level information. The model undergoes changes in its structure to improve the surface adjustment or to detect several objects in the scene.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS1

A ROTATIONAL ROBUST SIFT-BASED DESCRIPTOR

Bellavia F., Tegolo D., Trucco E.

Abstract: Image descriptors are widely adopted structures to match image features. SIFT-based descriptors are collections of gradient orientation histograms computed on different feature regions. To achieve rotation invariance, feature patches are usually rotated in the direction of the dominant gradient orientation. The sGLOh and sGLOH+ are new SIFT-based descriptors, which avoid to rotate the feature patch before computing the descriptor vector. The proposed descriptors have been compared with the SIFT.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS1

VISUAL WORDS FOR 3D RECONSTRUCTION AND POSE COMPUTATION

Bhat S., Berger M.O., Simon G., Sur F.

Abstract: We present Transitive Closure based visual word formation technique for 1. Extracting the three dimensional geometry from a training video sequence 2. Using it to estimate the pose of a camera in a test video sequence Our framework permits to match points in spite of a large baseline, resulting in a denser 3D map in (1) and in a more accurate estimation in (2), compared to the standard keypoint matching. This also gives a handy way of getting rid of the perceptual aliasing problem and of non-informative image points.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS1

CLASSIFICATION-BASED COLOR CONSTANCY

Bianco S., Ciocca G., Cusano C., Schettini R.

Abstract: We present two different classification-based approaches for color constancy which are part of a PhD thesis founded by ST Microelectronics: the former exploits automatically extracted information about the content of the images; the latter exploits intrinsic, low level properties of the images. We have tested the proposed strategies on a suitable subset of the widely used Funt and Ciurea dataset. Experimental results clearly demonstrate that classification based strategies outperform recently proposed general purpose algorithms.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS1

SURFACE STEREO WITH SOFT SEGMENTATION

Bleyer M., Rother C., Kohli P.

Abstract: We propose a new stereo model that employs a surface-based representation, where each pixel is assigned to a 3D surface (planes or B-splines). This representation enables two important contributions: (1) We formulate a higher-order prior which incorporates the very popular color segmentation constraint in a soft and principled way. (2) We use a global MDL prior to penalize the number of surfaces.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS1

LOGO LOCALIZATION USING THE DISCREPANCY NORM

Bouchot J.-L., Moser B., Bauer F.

Abstract: In this poster, we discuss Hermann Weyl's discrepancy concept in the context of localization. A novel algorithm is introduced for logo localization in the field of Make and Model Recognition (MMR) for cars. It is shown in particular that combining a good a-priori knowledge with the monotonicity property of the introduced discrepancy norm yields an efficient and reliable logo localization.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS1

DEFINITION OF MOTIONLESS PHASES FOR MONITORING GATED RECONSTRUCTION OF SPECT IMAGES IN ALIVE MICE

Breuilly M., Malandain G., Ayache N., Franken P., Darcourt J., Pourcher T.

Abstract: The present method aims at defining motionless phases for monitoring gated reconstruction of SPECT images in the movable area containing lungs and liver among others. It is based on the filtering of gating signals that are generated from an abdominal pressure variation signal. This method is considering gating signals only for cycles for which the period is included in a defined range around periods mean. This correction is essential to improve the quality of SPECT reconstruction.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS1

EFFICIENT MULTI-LABEL RANKING FOR MULTI-LABEL LEARNING: APPLICATION TO OBJECT RECOGNITION

Bucak S.S., Mallapragada P.K., Jin R., Jain A.K.

Abstract: Multi-label learning is useful in object recognition when several objects are present in an image. Conventional approaches implement multi-label learning as a set of binary classification problems, but they suffer from imbalanced data distributions when the number of classes is large. We address multi-label learning via a ranking approach. Given a test image, the proposed scheme aims to order all the object classes such that the relevant classes are ranked higher than the irrelevant ones. We present an efficient algorithm for multi-label ranking based on block coordinate descent.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS1

ESTIMATING AND INCORPORATING TARGET ORIENTATION FOR A HUMAN FOLLOWING ROBOT USING MONOCULAR VISION

Burke M., Brink W

Abstract: We present a monocular vision-based human following robot that incorporates orientation information in its control strategy. We propose that the pose of a walking persons upper body typically indicates their intended travelling direction, and find that a simple planar fit to the back of a salient human torso contains sufficient information for the purpose of inferring orientation.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS1

BIOMETRIC SYSTEM IMAGE REGISTRATION USING DOMAIN INFORMATION

Calvo D., Ortega M., Penedo M.

Abstract: In this work a methodology for the classification of retinal feature points is applied to a biometric system. This system is based in the extraction of feature points, namely bifurcations and crossovers as biometric pattern. In order to compare a pattern to other from a known individual a matching process takes place between both points sets. That matching task is performed by finding the best geometric transform between sets, i.e. the transform leading to the highest number of matched points. The goal is to reduce the number of explored transforms by introducing the previous characterization of feature points. This is achieved with a constraint avoiding two differently classified points to match. The empirical reduction of transforms is about 20%.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS2

COMPRESSED HISTOGRAM OF GRADIENTS: A LOW BITRATE DESCRIPTOR

Chandrasekhar V., Takacs G., Chen D., Tsai S., Reznik Y., Grzeszczuk R., Girod B.

Abstract: Transmission and storage of feature descriptors are of critical importance in the context of mobile distributed camera networks and large indexing problems. We propose a framework for computing low bit-rate feature descriptors with a 16x reduction in bit rate. The framework is low complexity and has significant speedup in the matching stage. Our proposed CHoG descriptor outperforms all existing schemes.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS2

EMOTION DETECTION ON PATHOLOGICAL SUBJECTS

Chastagnol C., Devillers L.

Abstract: This project aims at providing robust recognition on naturalistic emotions in real-life environments. Both audio and video channels will be used in an embedded algorithm on an assisting robot for elderly people. The challenge is the detection of emotion on pathological subjects for perception-action loop based interaction through a virtual avatar.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS2

IMAGE BASED INFORMATION ACCESS FOR MOBILE PHONES

Chen X., Koskela M., Hyvkk J.

Abstract: Mobile phones with integrated digital cameras provide new ways to get access to digital information and services. Images taken by the mobile phone camera can be matched to a database of objects or scenes, which enables linking of digital information to the physical world. In this demonstration, we present a prototype system for image based linking of photos taken from pages of magazine. The system is intended not just for the high-end smartphones but for the current mainstream of camera-equipped mobile phones. The proposed system consists of a full architecture for a practical application developed in close collaboration with a magazine publisher.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS2

CO-RECOGNITION FOR IMAGE AND VIDEO ANALYSIS

Cho M., Shin Y.M., and Lee K.M.

Abstract: For unsupervised visual analysis of object patterns, we pose a co-recognition problem of detecting and segmenting all the object-level region correspondences by considering geometric relations of visual patterns. To solve it, a multi-layer match-growing framework is proposed which explores given visual data by intra-layer expansion and inter-layer merge. It applied to solve several vision problems such as identical object detection, image retrieval, symmetry detection, and action recognition.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

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Room: PS2

PROBABILISTIC DETECTION AND GROUPING OF HIGHWAY LANE MARKS

Corral E., Elder J.H.

Abstract: Most automated traffic surveillance systems use inductive loops to estimate traffic conditions such as traffic density. The main drawbacks of this technology are the high installation and maintenance costs. Alternatively, video cameras infrastructures are used to perform visual (i.e. human) monitoring. Such infrastructures could be used to perform more complex tasks such as vehicles tracking and classification as well as low-cost automatic traffic density estimation and motion analysis. One of the challenges in using highway camera data for traffic analysis is that the external parameters of each camera (pan/tilt/zoom) may be changed several times a day by the operator, precluding pre-calibration. Thus successful deployment of computer vision traffic analysis algorithms depends upon reliable algorithms for automatic camera calibration. The work presented here is focused on the automatic detection and grouping of highway structure for the purpose of camera calibration and image rectification of straight and curved highways. We focus on the detection and grouping of lane markings into curvilinear chains. Unlike existing Hough-based methods to extract lines and estimate vanishing points, our method is based on a probabilistic approach where the lane marks are detected locally by means of cross-correlating a set of hypothesized lane mark templates with the input image. Our detector produces a set of lane mark hypotheses including location, length and orientation. The problem of extracting lane marks chains from the set of detections is formulated as a graph problem in which the edges are lane mark hypotheses and the possible connections between them. Grouping cues such as proximity and good continuation are used to compute likelihood ratios which are used as weights for the connection edges. A greedy algorithm is used to compute a bipartite sub-graph, and the Hungarian algorithm is used to compute the most probable lane mark chains.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS2

SEE WHAT YOU HEAR AND HEAR WHAT YOU SEE

D'Arca E., Hopgood J., Robertson N.

Abstract: Abstract Surveillance in urban environments relies almost exclusively on visual information. Video information is spatially very informative but there are important outstanding research problems: tracking, for example, can be difficult when large occlusions occur. Since anomalous events often have a distinct audio component, for example, gunshot or car crash, the aim of this project is to investigate how to combine concurrent audio and visual information at the signal level in order to determine whether a significant event has occurred.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS2

GPU ACCELERATED LOCAL DESCRIPTORS IN VIDENTIFIER FORENSIC

Daoason K., Jóhansson Á., Lejsek H., Jónsson B., Amsaleg L.

Abstract: We present a high-speed GPGPU-based method to extract local image descriptors. The local descriptor scheme are the Eff descriptors, a variant of SIFT. The descriptors are used to feed the NV-Tree high-capacity high-speed multidimensional index for faster-than-realtime video identification, in conjunction with other large-scale descriptor-processing methods, such as a scene-based representative-descriptor filter.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS2

A PROBABILISTIC APPROACH TO TOF AND STEREO DATA FUSION

Dal Mutto C. , Zanuttigh P. , Cortelazzo G.M.

Abstract: Depth information can be acquired real-time by stereo vision systems and ToF cameras. Both solutions present critical issues that can be overcome by their combined use. In this work, a heterogeneous acquisition system is considered, made of two standard cameras and one ToF camera. This paper introduces a novel multi-camera calibration technique based on the combined use of the color information and of the ToF depth data and a probabilistic fusion algorithm to combine the two devices.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS2

STEREO VISION ACCURACY VERSUS RESIDUAL LENS DISTORTION

de Villiers J.P., Nicolls F.C.

Abstract: This work aims to quantify the effects of residual lens distortion (after camera calibration) on the spatial accuracy of 3D coordinates measured by triangulation with a stereo camera pair. Easily locatable checker references are used to isolate the problem from image segmentation and matching errors. Different orders of Brown's distortion model, with and without asymmetrical radial gains, are compared to prevalent calibration methods with a common dataset to yield real-world spatial accuracies.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS2

LOCAL 3D SURFACE POSE ESTIMATION BY NUISANCE RESIDUAL LEARNING

Del Bimbo A., Franco F., Pernici F.

Abstract: We present a method of estimating the pose of an imaged scene surface element provided that it can be locally approximated by its tangent plane. The approach simultaneously learn the “nuisance residual” structure present in the detection and description steps of the SIFT algorithm allowing local perspective properties to be recovered through a homography. The estimated local poses can be applied to non rigid surfaces, with an accuracy representative of state-of-the-art for this challenging task.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS2

LIFELONG LOCALIZATION AND MAPPING WITH A ROTATING AND ZOOMING CAMERA

Del Bimbo A., Lisanti G., Masi I., Pernici F.

Abstract: This work presents a method of estimating the pose of a single PTZ camera in a dynamic environment. While this has previously been attempted by adapting SLAM algorithms developed for robotic exploration, no explicit varying focal length estimation has been introduced before. We propose a novel system designed to track a PTZ camera in a wide area by exploiting device-tagged text information. The system indexes and refines at runtime a set of poses from a pre-build map of the observed scene.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS2

SAMPLING BEDROOMS

Del Pero L., Guan J., Schlecht J., Barnard K.

Abstract: We propose a top down approach to understanding indoor scenes such as bedrooms. Here we develop a generative statistical model for rooms imaged with perspective camera, where the room boundary and objects within it are approximated with simple non overlapping blocks. We determine fits to this model by combining several data-driven sampling techniques. We argue our representation has advantages over previous ones since the 3D geometry is extracted directly, and this often helps inference.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS2

GENDER CLASSIFICATION FROM UNCONSTRAINED VIDEO SEQUENCES

Demirkus M., Toews M., Clark J., Arbel T.

Abstract: Face classification has received wide amount of attention recently, especially in the context of video surveillance. However, it is a challenging task due to the joint occurrence of arbitrary head poses, scales, non-uniform illuminations and partial occlusions in real video surveillance. The proposed method in this paper presents the first attempt to achieve gender classification from face images acquired from totally unconstrained video sequences, where the scene is unrestricted in terms of facial expression, head viewpoint change, occlusion and illumination.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS2

LIDAR DATA ANALYSIS: OBJECT DETECTION VERIFICATION; GRAPH CUTS BASED INTERACTIVE SEGMENTATION

Doria D.

Abstract: Our work involves analyzing and interpreting data produced by 3D range (LiDAR) scanners. First, we have introduced a dual metric, Consistency and Confidence, for verifying in a physically meaningful way whether a 3D model occupies a hypothesized location in a set of LiDAR scans. Our current work involves interactively segmenting objects in LiDAR data using graph theoretic techniques. Our goal is to allow users to select an entire object in a scan using two mouse clicks.

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Presentation Type: POSTER PRESENTATION

Date: Monday 12 July 2010

Time: 17:30 - 19:30

Room: PS2

PREDICTIVE DIAGNOSIS OF CORONARY ARTERY DISEASE

Downe R., Yu P., Garvin J., Wahle A., Sonka M.

Abstract: Coronary artery disease is a leading cause of death in the industrialized world. By building a spatially accurate 3D model of the vasculature using image data, and of the disease using plaque characterization derived from analysis of the ultrasound signal, hemodynamic simulation of the vasculature, and enzymatic biomarkers measured by the physicians collecting the image data, we aim to build a model with which to accurately predict the development and progression of atherosclerotic plaque.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

Time: 18:00 - 20:00

Room: PS1

ATHLETE TRACKING IN MONOCULAR SPORTS VIDEO

Fastovets M., Guillemaut J.-Y., Hilton A.

Abstract: In this work we consider the task of tracking athletes in monocular sports sequences. We evaluate sparse feature tracking approaches and propose an evaluation framework to test the suitability of existing sparse feature detectors and descriptors for this difficult problem. The framework consists of two stages: parameter tuning and tracking evaluation. Preliminary results indicate that readily available detector-descriptor pairs are able to provide meaningful information in this scenario.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

Time: 18:00 - 20:00

Room: PS1

OPTIMIZING SHAPE PARTICLE FILTERS FOR THE DETECTION AND SEGMENTATION OF MEDICAL IMAGES

Fischer L., Donner R., Langs G., Kainberger F.

Abstract: Shape Particle Filters offer promising results for the segmentation of medical images e.g. vertebr, lungs and hearts. Based on a global shape model a region map for the following feature extraction is defined. The number and location of these regions was previously defined manually. Two novel approaches for the generation of the region map are proposed, namely automatic region maps and per-pixel region maps. The proposed methods are evaluated on different data sets. The results show a major gain in computational performance as well as better or at least equal segmentation results.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

Time: 18:00 - 20:00

Room: PS1

VEHICLE IDENTIFICATION IN TUNNELS BY USING THE TRACE TRANSFORM

Frias-Velazquez A., Pizurica A., Philips W.

Abstract: This work presents a vehicle identification approach for a multi-camera tracking setup distributed along a tunnel. Salient features, called signatures, are extracted through the Trace Transform by applying geometrical invariant functionals to the vehicle images. These sorts of affine-invariant features outperform interesting point detectors under challenging illumination conditions and low resolution images.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

Time: 18:00 - 20:00

Room: PS1

ACCURATE TOF CAMERA DATA FOR ROBOTIC APPLICATIONS

Fuchs S., Suppa M.

Abstract: ToF cameras provide range and intensity images at video frame rate independent of textures or illumination. By now, ToF sensors are available with a resolution of 204×204 pixels allowing for conventional computer vision algorithms and opening up new possibilities. The frame rate enables real-time applications, e.g. ego-motion-estimation or visual servoing. Admittedly, the complex error characteristic of ToF cameras constrains their spread. Using the example of object localization and ego-motion-estimation this poster describes two approaches dealing with these errors.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

Time: 18:00 - 20:00

Room: PS1

MULTIPLE 2D AND 3D OBJECT EXTRACTION USING POINT PROCESS

Gamal-Eldin A., Descombes X. and Zerubia J.

Abstract: We introduce a new probabilistic approach for multiple object extraction from still images, applied to 2D and 3D objects. A new model based on 3D scene simulation is applied to counting of penguins in colonies from images with perspective effects. In the 2D model, we introduce a new optimization method combining Multiple-Birth-and-Death and Graph-Cut. Our model is object based and embedded in a marked point process. A Gibbs energy is defined on the configuration space, taking into account both prior and data information, and we minimize it.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

Time: 18:00 - 20:00

Room: PS1

MULTI-FRAME OPTICAL FLOW FOR NON-RIGID OBJECTS

Garg R., Pizarro L., Agapito L.

Abstract: This poster discusses a novel approach to compute multi-frame optical flow for a non-rigid object. Imposing the rank constraint to compute a 2D motion basis and expressing 2D trajectories as a linear combination of this basis has been successfully used in the literature. In this work we present a continuous extension to rank-constrained optical flow, using a variational formulation to compute highly accurate optical flow. Since the optical flow obtained satisfies the subspace constraint it is directly usable by most of state of the art non-rigid structure-from-motion algorithms to obtain dense 3D reconstructions.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

Time: 18:00 - 20:00

Room: PS1

NEURAL DUAL BACKGROUND MODELING FOR REAL-TIME STOPPED OBJECT DETECTION

Gemignani G., Maddalena L., Petrosino A.

Abstract: Stopped object detection is a relevant step for computer vision applications and mainly in real-time vision systems where processing time is a challenging issue. We propose a dual background approach for detecting stopped objects based on a neural background model capable of learning from past experience and efficiently detecting stopped objects against light variations, shadows, etc. In our approach neurons are organized as a 2D flat grid on CUDA , a SIMD technology for high-performance parallel computing on NVIDIA GPUs. Achieved results show high detection accuracy and parallel efficiency.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

Time: 18:00 - 20:00

Room: PS1

RECONSTRUCTION OF 3D FLOW FROM MULTIPLE ECHO DOPPLER VIEWS

Gómez A., Simpson J., Yao C., Schaeffter T., Penney G

Abstract: We present a new method to reconstruct 3D flow from multi-view 3D Doppler echo. Doppler images only measure a 1D projection of velocity. Our method uses 3+ Doppler views. Angles between these views are calculated with 3D registration. 3D flow vectors are then calculated using a Least Mean Squares approach. We investigate the effect on accuracy caused by spatio-temporal averaging + altering view angle. Simulation and phantom data results show with angles between views $> 40^\circ$, 3D vectors may be reconstructed with $\approx 15\%$ magnitude and 15 angle error.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

Time: 18:00 - 20:00

Room: PS1

ON THE AUTOMATIC COMPUTATION OF THE ARTERIO-VEIN RATIO IN RETINAL IMAGES

González Vázquez S.

Abstract: Abnormalities in the retinal vessel tree are associated with different pathologies. Usually, they affect arteries and veins differently. Thus, the arterio-venous ratio (AVR), is a measure of retinal vessel caliber, widely used in medicine to study the influence of these irregularities in disease evolution. Hence, the development of an automatic tool for AVR computation as well as any other tool for diagnosis support need an objective, reliable and fast artery/vein classifier.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

Time: 18:00 - 20:00

Room: PS1

TOWARDS STRATIFIED MODEL-BASED ENVIRONMENTAL VISUAL PERCEPTION FOR HUMANOID ROBOTS

Gonzalez-Aguirre D., Asfour T., Dillmann R.

Abstract: An autonomous environmental visual perception approach for humanoid robots is presented. The proposed framework exploits the available model information and the context acquired during global localization by establishing a vision-model coupling in order to overcome the limitations of purely data-driven approaches in object recognition and surrounding status assertion. The exploitation of the model-vision coupling through the properceptive1 components is the key element to solve complex visual assertion-queries with proficient performance. This is achieved by the presented framework which implements the basic reasoning skills by extracting simple but compelling geometrical cues from the properception component. These cues are applied as clue-filters for the association of percepts either for tracking (by optimization of the region of interest in terms of size) or handling incomplete visual information. Experimental evaluation with the humanoid robot ARMAR-IIIa includes the recognition of furniture like door, handles, dishwashers, etc. Full papers and videos demonstrating the real-time experiments at <http://i61www.ira.uka.de/users/asfour/HumanoidsGroup/content/vision/topic2.html>

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

Time: 18:00 - 20:00

Room: PS1

BUILDING MODELING USING AERIAL AND TERRESTRIAL DATA

Hammoudi K., Dornaika F., Soheilian B., Paparoditis N.

Abstract: This poster presents researches dealing with the 3D building modeling. In the last decade, the mapping field has strongly evolved due to the needs of industrial and institutional applications, as well at civil level as military. At the French National Mapping Agency, approaches have been developed in order to model building facades and/or roofs using laser and image data acquired by terrestrial and aerial mobile mapping systems. The objective is a full building modeling.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

Time: 18:00 - 20:00

Room: PS1

CONTACTLESS SENSING OF BODY MOTION

Heinrich A., Bartula M.

Abstract: For contactless sensing of any type of body motion, we use an image sensor and analyze the captured video with smart motion estimation algorithms. The camera is a highly sensitive and versatile sensor which enables capturing of many features at the same time. Additionally, for the monitored person, a contactless sensor is more comfortable and less obtrusive than an on-body device. In this work, we present methods which allow us to estimate motion from body parts and breathing. Validation with the golden standard reference provides confidence that our proposed methods can replace on-body sensors in a wide range of applications.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

Time: 18:00 - 20:00

Room: PS1

A NEW VIDEO ACTIGRAPHY METHOD FOR NON-CONTACT ANALYSIS OF BODY MOVEMENT DURING SLEEP

Heinrich A., van Vugt H.

Abstract: To assess sleep in the home situation, wrist actigraphy is often used. However, it is an on-body sensor which may influence sleep and it only collects data on the movement of one wrist. We developed a near infrared (NIR) sleep monitoring system which overcomes these issues. It can handle many camera viewing angles and NIR lighting settings, which makes installation in the bedroom easy. The NIR sleep monitoring system performs the analysis in real-time. Our off-body video actigraphy system can successfully replace on-body actigraphs to monitor a sleeping persons movements.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

Time: 18:00 - 20:00

Room: PS1

SIMULTANEOUS COLOR CONSISTENCY AND DEPTH MAP ESTIMATION FOR RADIOMETRICALLY VARYING STEREO IMAGES

Heo Y.S., Lee K.M., Lee S.U.

Abstract: We propose a new method that iteratively infers accurate depth maps and color-consistent images for radiometrically varying stereo images. For stereo matching, we utilize the mutual information-based method combined with the SIFT descriptor. Then, we devise a stereo color histogram equalization method to make color-consistent stereo images. Experimental results show that our method produces both accurate depth maps and color-consistent stereo images for severely radiometrically varying stereo images.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

Time: 18:00 - 20:00

Room: PS1

EMBEDDING SPATIAL INFORMATION INTO IMAGE CONTENT DESCRIPTION FOR SCENE RETRIEVAL

Hoang N.V., Gouet-Brunet V. , Rukoz M. , Manouvrier M.

Abstract: We present Δ -TSR, an image content representation describing the spatial layout with triangular relationships of visual entities, which can be symbolic objects or low-level visual features. A semi-local implementation of Δ -TSR is also proposed, making the description robust to viewpoint changes. We evaluate Δ -TSR for image retrieval under the query-by-example paradigm, on contents represented with interest points in a bag-of-features model: it improves state-of-the-art techniques, in terms of retrieval quality as well as of execution time, and is scalable. Finally, its effectiveness is evaluated on a topical scenario dedicated to scene retrieval in datasets of city landmarks.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

Time: 18:00 - 20:00

Room: PS2

OBJECT SEGMENTATION BASED ON MOTION COMPENSATED BACKGROUND SUBTRACTION

Hosten P., Asbach M., Unger M.

Abstract: Background subtraction is a widely used technique for video object segmentation. Several proposals have been made to extend background model generation to camera movement, while few approaches can cope with many degrees of freedom in camera motion. We present a method to generate background images for unconstrained camera motion, zoom, rotation and even (weak) lens distortion. Our method is based on global motion estimation and a weighted summation of motion compensated images.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

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Room: PS2

MULTIPLE PEOPLE TRACKING AND POSE ESTIMATION

Huo F., Hendriks E.A.,

Abstract: Currently, multiple people tracking and pose estimation have drawn more and more attention due to their large application domains. In this poster we present a combined probability estimation approach to detect and track multiple people for pose estimation. It can deal with partial and total occlusion between persons by adding torso appearance to the tracker. Moreover, the upper body of each individual is further segmented into head, torso, upper arm and lower arm in a hierarchical way. The joints location and angles are obtained for pose estimation and can be used for pose recognition.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

Time: 18:00 - 20:00

Room: PS2

MONITORING CHANGES IN HUMAN BEHAVIOR DYNAMICS DURING MONOTONOUS DRIVING CONDITIONS FOR DRIVER STATE ESTIMATION

Khiat A., Matsuo H.

Abstract: How does our bodily behavior relate to our internal states? Earlier studies have shown that factory workers tend to engage in unrelated movements due to monotony. Here, we show that during monotonous driving conditions, drivers exhibit recurrent subsidiary behaviors, which are indicative of an imminent decrease in their arousal level. We also propose an approach for automatic detection of the considered behavioral events using non-intrusive computer vision techniques.

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Presentation Type: POSTER PRESENTATION

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Room: PS2

LEARNING FULL PAIRWISE AFFINITIES FOR SPECTRAL SEGMENTATION

Kim T. H., Lee K. M., Lee S. U.

Abstract: This paper studies the problem of learning a full range of pairwise affinities gained by integrating local grouping cues for spectral segmentation. By employing a semi-supervised learning technique, optimal affinities are learnt from the test image without iteration in a multi-layer graph with pixels and regions as nodes. These pairwise affinities are then used to simultaneously cluster all pixel and region nodes into visually coherent groups across all layers in a framework of Normalized Cuts.

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Presentation Type: POSTER PRESENTATION

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Time: 18:00 - 20:00

Room: PS2

COMBINATION OF STOCHASTIC SAMPLING METHODS AND DETERMINISTIC METHODS FOR OPTIMIZATION

Kim W., Lee K. M.

Abstract: Many computer vision applications have been formulated as optimization problems. Since most of them are NP-hard, all the existing methods end up with approximated solutions. To achieve better solutions, we propose a new hybrid algorithm which elegantly combines the stochastic sampling and deterministic algorithms. By combining those two different approaches in a unified framework, we can utilize the advantages from both approaches.

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Presentation Type: POSTER PRESENTATION

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Room: PS2

FROM LEARNING TO UNDERSTANDING - USING MOTION INFORMATION TO RECOGNIZE AND RECONSTRUCT HUMAN ACTIONS FROM VIDEO

Kuehne H.

Abstract: Knowing what a person does and having the structural information to analyze and reproduce the ongoing motion can be seen as the one of the major research objectives in the field of video-based motion recognition. To allow both, the following work proposes a way to build up recognition and pose reconstruction as two parallel processing steps. The idea is to use the same input data, but to process it differently leading to two different outputs whose interpretation can be linked on different levels. In this context, motion data gained from videos images can be seen as a good, abstract but also very general representation. As psycho-physiological experiments show, can even a few moving points comprise enough information to recognize and reconstruct human actions, allowing even to analyze higher level characteristics like distinguishing between male and female. For recognition it is critical to find discriminative features that form a description which can be used as an input vector for machine learning algorithms. Here, histograms of sparse feature motion can be used for a very fast and robust learning and recognition of human actions. Reconstruction, however, is depending on information that can be used for model-based pose reconstruction. The output is a model configuration as well as the related joint angle trajectories that can be used for further analysis. Here, moving feature points can be used for optimizing the model configuration for the ongoing motion in a least-square model fitting approach, allowing to estimate the current pose from the preceding and successive motion. The combination of both aspects covers the knowledge of what goes on and how it is done. It allows to understand the action, to analyze and to compare it, as well as to interpret and even reproduce it.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

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Room: PS2

PROCESSING OF X-RAY IMAGES OF THE HUMAN BODY FOR SECURITY TASKS

Kulikov V.A., Popov S.A., Kirichuk V.S.

Abstract: We present the application of different filtering algorithms to simplify the search for suspicious objects on the X-ray images. We have proposed a modification of Roberts gradient filter with window size 4×4 , allowing to identify 12 directions in the $O(36*N)$ operations over the image. Summation image after adaptive equalization with the obtained gradient image, corrects deficiencies of the equalization.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

Time: 18:00 - 20:00

Room: PS2

BASIN HOPPING MONTE CARLO TRACKER FOR NON-RIGID OBJECTS

Kwon J., Lee K. M.

Abstract: We propose a novel tracking algorithm for the target of which geometric appearance changes drastically over time. To track it, we present a local patch-based appearance model and provide an efficient scheme to evolve the topology between local patches by on-line update. In the process of on-line update, the patch can be moved, deleted or newly added. Additionally, we introduce the Basin Hopping Monte Carlo sampling method to our tracking problem to reduce the computational complexity and deal with the problem of getting trapped in local minima.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

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Room: PS2

NOVEL SHAPE AND TEXTURE DESCRIPTORS FOR FAST MULTICLASS TRAFFIC SIGN DETECTION

Landesa-Vzquez I., Parada-Loira F., Alba-Castro J.L.

Abstract: Detection of traffic signs is one of the most studied Advanced Driver Assistance Systems (ADAS), including solutions already used in vehicles. However these systems still have room for improvement, aimed at minimizing the chance of missing readable signs and saving processing time for other ADAS. In our work we propose a two-stage fast multiclass traffic sign detector for grayscale images, based on the use of novel shape (Local Contour Patterns) and texture (Quantum Features) descriptors.

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Presentation Type: POSTER PRESENTATION

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Room: PS2

VISUALIZATION OF THREE-DIMENSIONAL SPECTRAL DATA

Le Moan S., Mansouri A., Voisin Y., Hardeberg J.

Abstract: We address the issue of the visualization of multimodal data, containing both spatial and spectral information. With the growing need for high visual quality at lower computational costs, many methods have been developed to accurately extract the color information from high-dimensional spectral data. The spatial dimension adds very useful knowledge to identify salient regions and then adjust the mesh resolution to compress it without loss of visual information.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

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Room: PS2

A NOVEL 3D RECONSTRUCTION APPROACH BY DYNAMIC (DE)FOCUSED LIGHT

Lertrusdachakul I., Fougerolle Y., and Lalignant O.

Abstract: In this paper, we propose a novel active 3D recovery method based on dynamic (de)focused light. The method combines both depth from focus (DFF) and depth from defocus (DFD) techniques. With this approach, optimized illumination pattern is projected on the object in order to enforce strong dominant texture on the surface. The imaging system is specifically constructed to keep the whole object sharp in all captured images. Consequently, only projected patterns experience the defocused deformation according to an object depth. Projected light pattern images are acquired within certain focused ranges similar to DFF approach, while the focus measures across these images are calculated for depth estimation by using DFD manner. This guarantees that at least one focus or near-focus image within depth of field exists in the computation. Therefore, the final reconstruction is supposed to be prominent to the one obtained from DFD and also less computational extensive compared to DFF provided.

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Presentation Type: POSTER PRESENTATION

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Room: PS2

EFFICIENT HUMAN ACTION RECOGNITION BY CASCADED LINEAR CLASSIFICATION

Mauthner T., Roth P. M., Bischof H.,

Abstract: We present a human action recognition system suitable for very short sequences. In particular, we estimate Histograms of Oriented Gradients (HOGs) for the current frame as well as the corresponding dense flow field estimated from two frames. The thus obtained descriptors are then efficiently represented by the coefficients of a Non-negative Matrix Factorization (NMF). To further speed up the overall process, we apply an efficient cascaded Linear Discriminant Analysis (CLDA) classifier. In the experimental results we show the benefits of the proposed approach on standard benchmark datasets as well as on more challenging and realistic videos. In addition, since other state-of-the-art methods apply weighting between different cues, we provide a detailed analysis of the importance of weighting for action recognition and show that weighting is not necessarily required for the given task.

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Presentation Type: POSTER PRESENTATION

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Room: PS2

STREAKLINES, POTENTIALS, AND CROWD ANALYSIS

Mehran R., Moore B., Shah M.

Abstract: Streaklines are the traces in a fluid flow of an injected color material, which are transported with the flow and are used for visualization. Streaklines may be used in a similar way to transport information about the scene, and they are obtained by repeatedly initializing a fixed grid of particles at each frame, then moving both current and past particles using optical flow. A streakline representation of the flow is presented to solve computer vision problems involving crowd and traffic flow.

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Presentation Type: POSTER PRESENTATION

Date: Tuesday 13 July 2010

Time: 18:00 - 20:00

Room: PS2

BLORT - THE BLOCKS WORLD ROBOTIC VISION TOOLBOX

Mörwald T., Prankl J., Richtsfeld A., Zillich M. and Vincze M.

Abstract: The vision and robotics communities have developed a large number of increasingly successful methods for tracking, recognising and on-line learning of objects, all of which have their particular strengths and weaknesses. A researcher aiming to provide a robot with the ability to handle objects will typically have to pick amongst these and engineer a system that works for her particular setting. The work presented in this paper aims to provide a toolbox to simplify this task and to allow handling of diverse scenarios, though of course we have our own particular limitations: The toolbox is aimed at robotics research and as such we have in mind objects typically of interest for robotic manipulation scenarios, e.g. mugs, boxes and packaging of various sorts. We are not aiming to cover articulated objects (such as walking humans), highly irregular objects (such as potted plants) or deformable objects (such as cables). The system does not require specialised hardware and simply uses a single camera allowing usage on about any robot. The toolbox integrates state-of-the art methods for detection and learning of novel objects, and recognition and tracking of learned models. Integration is currently done via our own modular robotics framework, but of course the libraries making up the modules can also be separately integrated into own projects.

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Room: PS2

AUTOMATED GLAND SEGMENTATION AND CLASSIFICATION FOR GLEASON GRADING OF PROSTATE TISSUE IMAGES

Nguyen K., Jain A.

Abstract: The well-known Gleason grading method for an H&E prostatic carcinoma tissue image uses morphological features of histology patterns within a tissue slide to classify it into 5 grades. We have developed an automated gland segmentation and classification method that will be used for automated Gleason grading of a prostatic carcinoma tissue image. We demonstrate the performance of the proposed classification system for a three-class classification problem (benign, grade 3 carcinoma and grade 4 carcinoma) in this research.

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Presentation Type: POSTER PRESENTATION

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Room: PS1

SEMANTIC CONTENT-BASED VIDEO RETRIEVAL

Nodari A., Gallo I., Cavallaro A., Speroni Colombo M.

Abstract: This study proposes an innovative approach to extract information from multimedia data using high-level features in the visual description. Ontology and machine learning techniques are used to map the low-level in high-level features to compose a document which describes the multimedia data content and is readable and understandable by a human being. The document is used in the indexing and retrieval operations using the inherited techniques of the text mining field. Therefore it is possible to perform a search by using directly a query expressed in natural language.

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Room: PS1

HAND SHAPE RECOGNITION USING SHIFT-INVARIANCE FEATURE FROM THE MULTI-VIEWPOINT IMAGES

Ohkawa Y., Fukui K.

Abstract: We propose a method of recognizing a hand shape using multi-viewpoint images. The recognition of a hand is a difficult problem, as its appearance changes largely depending on view point. To overcome this problem, we apply the Kernel Orthogonal Mutual Subspace Method(KOMSM) to shift-invariance features from multiple view images of a hand. The validity of the proposed method is demonstrated through the evaluation experiments using the multiple view images of 16 kinds of hand shapes.

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Room: PS1

4K2K IMAGING USING DUAL RESOLUTION AND EXPOSURE

Okada Y., Azuma T., Imagawa T., Ugawa S., Komobuchi H.

Abstract: We propose a set of imaging and processing methods for spatiotemporal high-resolution videos in dark conditions. The imaging part captures color video sequences RB and G videos of which are low-resolution and long-exposed respectively to increase the amount of light. The processing part reconstructs high resolution videos from those input videos. In addition, we have developed a real-time 4K2K processing system using multiple FPGAs.

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Room: PS1

ENCODER METHOD FOR EVALUATION OF CUED SPEECH INTELLIGIBILITY

Ondrusová S., Polec J., Mordelová A.

Abstract: This paper deals with the problem of the cued speech recognition methods in videoconferences. Cued speech is a specific gesture language (different from the sign language) used for communication between deaf people. The aim of this paper is to show new objective method of testing sentence intelligibility (as is used in telephonometry for speech sentence articulation). The logatomes are not used to testing syllable intelligibility because they have no meaning and cannot be part of common words.

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Room: PS1

REGISTRATION OF VIDEO SEQUENCES OVER A MESH FROM 3D SCANNING

Palma G., Callieri M., Corsini M., Dellepiane M., Scopigno R.

Abstract: We present a new method for the incremental registration of video sequences of a real object over its triangular mesh built with 3D scanning techniques. Our solution uses two different approaches: feature based registration by KLT video tracking; statistic based registration by maximizing the mutual information between the gradient of the image and the gradient of the rendering of the 3D model with some illumination related properties, such as surface normals and ambient occlusion.

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Presentation Type: POSTER PRESENTATION

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Room: PS1

ACCURATE MOSAICING OF CELL IMAGES ACQUIRED WITH NON AUTOMATED EQUIPMENT

Piccinini F., Bevilacqua A., Gherardi A., Carozza L., Lucarelli E.

Abstract: One of the most important requirements for in-vitro cell analysis is the ability to visualize a large part of a cell culture with an elevated level of detail. The creation of image mosaics is a useful process for extending the field of view and preserving the resolution of an image. The methods in the field make use of holder known displacements to achieve this goal. Moreover, mosaics are usually built off-line. Our proposed method is able to create a mosaic of microscopic images of cells in real time, without relying on acquisitions performed by automated equipment and without requiring a uniform light field. The accuracy of the mosaic is assessed by measuring the intensity values of a region of interest (ROI) before and after registration.

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Presentation Type: POSTER PRESENTATION

Date: Thursday 15 July 2010

Time: 18:00 - 20:00

Room: PS1

IMAGING UNDER STRUCTURED LIGHT

Rangarajan P.

Abstract: The present work describes a novel attempt at using Structured Light, to resolve spatial detail exceeding the optical bandwidth of a perspective camera (Optical Super-Resolution). It also identifies a family of camera+projector arrangements that can recover depth maps & realize OSR, in an un-calibrated fashion.

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Presentation Type: POSTER PRESENTATION

Date: Thursday 15 July 2010

Time: 18:00 - 20:00

Room: PS1

AUDIENCE ADAPTIVE DIGITAL SIGNAGE

Ravnik R., Batagelj B., Solina F.

Abstract: A real-time audience measurement system which is based on detecting faces in images using computer vision methods can generate accurate statistics on how many people have seen a particular ad. In addition, observers can be grouped into gender and age groups based on their faces. Since the audience measurement is performed in real time, this data can be used also to adapt the content and scenario for displaying messages in real time.

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Presentation Type: POSTER PRESENTATION

Date: Thursday 15 July 2010

Time: 18:00 - 20:00

Room: PS1

GALLERY PAINTINGS FOR BLIND AND VISUALLY IMPAIRED

Reichinger A.

Abstract: The goal of this project is to transfer paintings into tactile representations. This will make twodimensional art originally intended for sighted people accessible for blind and visually impaired people. We have developed a semi-automatic process that converts images into three tactile forms of increasing complexity, suitable to be produced on rapid prototyping machines: tactile diagrams on swell paper, laser-cutted layered depth diagrams, and CNC-milled detailed reliefs.

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Presentation Type: POSTER PRESENTATION

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Room: PS1

A SPATIALLY VARYING PSF-BASED PRIOR FOR ALPHA MATTING

Rhemann C., Rother C., Kohli P., Gelautz M.

Abstract: We propose a new image formation based prior for alpha matting. The prior matte is obtained by convolving the high-resolution binary object segmentation with the spatially varying point spread function (PSF) of the camera. By assuming that the PSF is a single peaked kernel, we recover the binary segmentation with an MRF-based approach, which exploits flux and a new way of enforcing connectivity. Our new prior enables us to generate results that outperform all competitors on a public benchmark.

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Presentation Type: POSTER PRESENTATION

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Room: PS1

RECTIFYING ROLLING SHUTTER VIDEO FROM HAND-HELD DEVICES

Ringaby E., Forssn P.

Abstract: Most hand-held video capturing devices sold today (e.g. cell-phones, camcorders, compact cameras, and music players) use CMOS sensors that are prone to rolling shutter (RS) artefacts. We introduce a method for rectifying video sequences from RS cameras. In contrast to previous RS rectification attempts we model distortions as being caused by the 3D motion of the camera. The camera motion is parametrised as a continuous curve, with knots at the last row of each frame. Curve parameters are solved for using non-linear least squares over inter-frame correspondences obtained from a KLT tracker. We have generated synthetic RS sequences with associated ground-truth to allow controlled evaluation. Using these sequences, we demonstrate that our algorithm improves over to two previously published methods. The RS data-set is available on the web to allow comparison with other methods.

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Presentation Type: POSTER PRESENTATION

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Room: PS1

REAL TIME MONOCULAR SLAM ON A GPU

Sánchez J., Álvarez H., Borro D.

Abstract: Traditionally the monocular SLAM problem is solved using non-linear minimization techniques that are very accurate but are hardly used in real time. This work presents a highly parallelizable random sampling approach based on Monte Carlo simulations that fits very well on the graphics hardware. It achieves the same precision as non-linear optimization methods, without losing the real time performance running on commodity graphics hardware.

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Presentation Type: POSTER PRESENTATION

Date: Thursday 15 July 2010

Time: 18:00 - 20:00

Room: PS1

ENDOSCOPIC VIDEO ANALYSIS FOR SURGICAL TRAINING, OBJECTIVE EVALUATION AND IMAGE-GUIDED SURGERY

Sánchez-González P., Gómez E.J.

Abstract: Automatic analysis of Minimally Invasive Surgical videos has the potential to drive new solutions to develop safe and reproducible training and assessment programs and provide new tools for surgical navigation, thus improving patient safety. Surgical video is an always available source of information, which can be used without any additional intrusive hardware in the operating room. Our research efforts are focused on two key aspects, the 3D reconstruction of the surgical field and the segmentation and tracking of tools and organs based on video analysis.

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Presentation Type: POSTER PRESENTATION

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Time: 18:00 - 20:00

Room: PS1

HIERARCHICAL REGISTRATION BASED ON PATCH-SSMs

Schumann S., Zheng G.

Abstract: The extrapolation of sparse point cloud data by statistical shape models is a common problem. In the present case, a patient-specific model of the pelvis needs to be reconstructed based on sparse 3D point-cloud data derived from B-mode ultrasound images. In order to solve this problem, we propose a hierarchical registration method based on patch statistical shape models (SSMs), which iteratively compensates the speed of sound variation for different propagation distances of the ultrasound beam. We validated our new method with several phantom studies and one cadaver trial.

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Presentation Type: POSTER PRESENTATION

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Room: PS1

NON-PARAMETRIC ANOMALY DETECTION EXPLOITING SPACE-TIME FEATURES

Seidenari L., Bertini M.

Abstract: We propose a real-time anomaly detection system for video streams. Spatio-temporal features are exploited to capture scene dynamic statistics together with appearance. Anomaly detection is performed in a non-parametric fashion, evaluating directly local descriptor statistics. A method to update scene statistics, to cope with scene changes that typically happen in real world settings, is also provided. The proposed method is tested on publicly available datasets.

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Presentation Type: POSTER PRESENTATION

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Room: PS2

POLARIZATION VISION IN THE EYE OF A CATADIOPTIC SENSOR

Shabayek A., Morel O., Fofi D.

Abstract: Humans have marginal sensitivity to polarized light, however many animals are sensitive to it. This extra dimension of reality remains mostly invisible to us without the aid of instruments. Combining polarization with catadioptric sensors provides a natural compass for autonomous robots. Light in nature is mostly partially linearly polarized. After being reflected on a metallic mirror, its polarization state is changed. By redesigning the catadioptric sensor, we proved that we can measure the polarization state of the incident light after being reflected from a metallic surface.

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Presentation Type: POSTER PRESENTATION

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Room: PS2

NON-ASSOCIATIVE MARKOV NETWORKS FOR POINT CLOUD CLASSIFICATION

Shapovalov R., Velizhev A., Barinova O., Konushin A.

Abstract: Associative Markov Networks are generally used for semantic segmentation of 3D point clouds. This implies that pairwise potentials are constant for a pair of different class labels. The constraint is too rigorous since it does not allow expressing some natural interactions between objects such as “roof is likely to be above the ground”. We use general form of pairwise potentials instead. Oversegmentation is used to subsample a scan in order to improve efficiency and use natural edge features.

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Presentation Type: POSTER PRESENTATION

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Room: PS2

DISPLACEMENT CALCULATION OF HEART WALLS IN ECHO IMAGES USING LEVEL SET AND B-SPLINE FREE FORM DEFORMATION

Skalski A., Turcza P., Zielinski T.

Abstract: Problem of displacement calculation of the heart walls ECHO ultrasound sequences is addressed. A method, which is proposed in it, consists of: 1) speckle reduction anisotropic diffusion filtration of USG images, 2) segmentation of heart structures in consecutive denoised frames via active contour without edges method, 3) calculation of frame-to-frame deformation vectors by B-Spline FFD algorithm. Results from method testing on synthetic USG-like and real ECHO images are presented.

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Presentation Type: POSTER PRESENTATION

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Room: PS2

PARALLEL AND DISTRIBUTED VISION ALGORITHMS

Strandmark P., Kahl F., Schoenemann T.

Abstract: We investigate dual decomposition approaches for optimization problems arising in low-level vision. Dual decomposition can be used to: Parallelize existing algorithms, Reduce memory requirements. Obtain approximate solutions of hard problems. Application considered include graph cut segmentation, curvature regularization and the optimization of general MRFs. We demonstrate that the technique can be useful for desktop computers, graphical processing units and supercomputer clusters.

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Presentation Type: POSTER PRESENTATION

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Room: PS2

ACCURATE AND ROBUST MEASURING OF BALL SPIN

Szep A.

Abstract: We present a novel ball spin measurement method which can be applied for reasoning on racket sports equipment properties. Based on high-speed video we require high accuracy and robustness which influences our ball and feature tracking approach. Our measurement setting cannot simulate sufficiently realistic ball rebound, though we can prove the correctness and applicability of our method.

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Presentation Type: POSTER PRESENTATION

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Room: PS2

AUTOMATIC PROSTHESIS SEGMENTATION IN 3D FLUOROSCOPY

Tersi L., Tarroni G., Corsi C., Stagni R.

Abstract: 3D video-fluoroscopy can accurately estimate in-vivo kinematics of joint prosthesis. To this aim, for each of the hundreds of frames of an acquisition, a 3D surface model of the prosthesis is registered to the relevant contours on the 2D X-ray projections. Commercial software only provide simple edge detector (e.g., Canny) followed by a time consuming manual procedure to delete the undesired contours. A fast and robust semi-automated prosthesis segmentation method, combining region growing and level set methods, is proposed to speed up the analysis and to reduce the human interaction.

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Presentation Type: POSTER PRESENTATION

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Room: PS2

A COMPUTERIZED SYSTEM FOR DIAGNOSTIC PARAMETER ESTIMATION IN RETINAL IMAGES

Tramontan L.

Abstract: The capillary network in the retina can be readily imaged using a normal fundus camera, therefore its analysis may provide an early warning about serious cardiovascular diseases. An important sign is the generalized arteriolar narrowing, usually expressed by the Arteriolar-to-Venular diameter Ratio (AVR). The current procedure requires long and cumbersome manual measurements. I developed an objective, fast and user-friendly computerized system to quantitatively assess these vascular parameters in retinal images

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Presentation Type: POSTER PRESENTATION

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Room: PS2

ACCURATE MULTI-VIEW 3D RECONSTRUCTION

Tylecek R., Sara R.

Abstract: We present a pipeline for accurate 3D reconstruction from multiple images, where we address the problem of inaccurate camera calibration and propose method adjusting the camera parameters in a global structure-and-motion problem, which is solved with a depth map representation that is suitable to large scenes. Subsequently we refine the output triangular mesh both geometrically and radiometrically. We propose surface energy which includes contour matching in photoconsistency, and use coarse-to-fine strategy to find its minimum with a gradient method. High quality results are demonstrated on large and standard datasets.

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Room: PS2

TEXTURE ANALYSIS IN QUANTITATIVE OSTEOPOROSIS ASSESSMENT: CHARACTERIZING MICROARCHITECTURE

Valentinitisch A., Patsch J., Kainberger F., Langs G.

Abstract: The aim of the proposed texture analysis is to learn characteristic bone microarchitecture patterns from high resolution peripheral quantitative computed tomography (HR-pQCT). We conduct a pilot study to evaluate if the distribution of the microarchitecture categories can differentiate between osteoporotic and healthy subjects. The categories mimic medical expert observation of distinct patterns in the trabecular bone, but make quantitative measurements possible. The approach could aid treatment decisions by providing more fine-grained differentiation of the effect osteoporosis has on the bone.

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Room: PS2

IMAGE ANNOTATION WITH TAGPROP ON THE MIRFLICKR SET

Verbeek, J., Guillaumin, M., Mensink, T., and Schmid, C.

Abstract: Our goal is to predict keywords for images to support image annotation, and keyword based retrieval. The nearest neighbor approach is simple & effective, but: which distance, and how many neighbors? We present TagProp, a probabilistic nearest neighbor model, that learns these parameter from data. Different variants of TagProp are compared to SVMs learned for each annotation term. As additional features set, and to replace manual annotation we use Flickr tags.

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Presentation Type: POSTER PRESENTATION

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Room: PS2

LEARNING THE SPATIAL PYRAMID REPRESENTATION FOR VISUAL CATEGORIZATION

Wang S.-C., Wang Y.-C. F.

Abstract: We propose a novel class-specific spatial pyramid representation for image classification by learning the best weights for each scale in the pyramid. We approach this problem as solving a multiple kernel learning task, and learn the optimal combination of base kernels constructed at different pyramid levels. We study different codebook learning and feature encoding techniques. Empirical results support the use of our method for real-life image classification problems.

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Room: PS2

SEMI-AUTOMATIC CONTENT BASED VIDEO QUALITY ASSESSMENT

Winter M., Schallauer P., Fassold H., Hofmann A., Bailer W., Stiegler H.

Abstract: Automatic quality control for audiovisual media is an important task for media production, delivery and archiving processes. We focus on semi-automatic video quality inspection and develop algorithms for the detection of various visual degradations and appraisal of quality measures. To enable efficient human interaction we integrate our algorithms into the quality.summary viewer which allows to quickly grasp frequency and strengths of visual degradations and quality measures in the content.

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Presentation Type: POSTER PRESENTATION

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Room: PS2

AN ADAPTIVE VIDEO SURVEILLANCE ARCHITECTURE FOR BEHAVIOR UNDERSTANDING

Zini L., Noceti N., Odone F.

Abstract: Adaptivity to scene changes is a main requirement for video analysis. The interpretation of video streams can be dealt by triggering different techniques depending on the scene properties. We design a video surveillance architecture where different tasks in the context of behavior analysis are addressed, depending on the crowd level. An estimation of the scene occupancy allows us to focus on single person or groups, adopting appropriate strategies to model the dynamic information.

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