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# CSIFT: A SIFT descriptor with color invariant characteristics

Alaa E Abdel-Hakim, Aly A Farag

## Abstract:

SIFT has been proven to be the most robust local invariant feature descriptor. SIFT is designed mainly for gray images. However, color provides valuable information in object description and matching tasks. Many objects can be misclassified if their color contents are ignored. This paper addresses this problem and proposes a novel colored local invariant feature descriptor. Instead of using the gray space to represent the input image, the proposed approach builds the SIFT descriptors in a color invariant space. The built Colored SIFT (CSIFT) is more robust than the conventional SIFT with respect to color and photometrical variations. The evaluation results support the potential of the proposed approach.

## Keywords:

Colored noise Computer vision Feature extraction Histograms Image processing Image retrieval Laboratories Lighting Photometry Robustness

## Published In:

Computer Vision and Pattern Recognition, 2006 IEEE Computer Society Conference on , 2 , 1978,1983



( 2 )

# Tradeoff Between Reliability and Security in Multiple Access Relay Networks Under Falsified Data Injection Attack

" Taha A. Khalaf, Member, Sang Wu Kim, Senior Member, and Alaa E. Abdel-Hakim,

## Abstract:

We consider a multiple access relay network where multiple sources send independent data to a single destination through multiple relays, which may inject falsified data into the network. To detect the malicious relays and discard (erase) data from them, tracing bits are embedded in the information data at each source node. In addition, parity bits are added to correct the errors caused by fading and noise. When the total amount of redundancy, tracing bits plus parity bits, is fixed, an increase in parity bits to increase the reliability requires a decrease in tracing bits, which leads to a less accurate detection of malicious behavior of relays, and vice versa. We investigate the tradeoff between the tracing bits and the parity bits in minimizing the probability of decoding error and maximizing the throughput in multisource, multirelay networks under falsified data injection attacks. The energy and throughput gains provided by the optimal allocation of redundancy and the tradeoff between reliability and security are analyzed.

## Keywords:

Multiple access relay network, tradeoff between reliability and security, falsified data injection, forward error correction.

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( 3 )

# Graph-based superpixel labeling for enhancement of online video segmentation

Abdel-Hakim, A.E.

## Abstract:

We propose a low-cost low-rank-based framework for the operation of wireless surveillance systems. The proposed framework has two modes of operations: an initialization offline mode, in which low-rank terms of few initial frames are recovered using RPCA. Then these recovered low-rank terms are transmitted over the wireless network to the receiver. In the real-time mode of operation, sparse terms of the captured frames are calculated using FRPCA, then transmitted to the receiver. Transmission of only the sparse terms greatly saves the used bandwidth and hence the cost of the transmission process.

## Keywords:

INSPEC: CONTROLLED INDEXING radio networks video surveillance INSPEC: NON CONTROLLED INDEXING  
RPCA efficient bandwidth utilization initialization offline mode sparse representation transmission process wireless surveillance networks

## Published In:

Computer Engineering Conference (ICENCO), 2013 9th International , , 103 - 108



( 4 )

# Frpca: Fast robust principal component analysis for online observations

Abdel-Hakim, A.E.; El-Saban, M.

## Abstract:

While the performance of Robust Principal Component Analysis (RPCA), in terms of the recovered low-rank matrices, is quite satisfactory to many applications, the time efficiency is not, especially for scalable data. We propose to solve this problem using a novel fast incremental RPCA (FRPCA) approach. The low rank matrices of the incrementally-observed data are estimated using a convex optimization model that exploits information obtained from the preestimated low-rank matrices of the original observations. The evaluation results supports the potential of FRPCA for fast, yet accurate, recovery of the low-rank matrices. The proposed FRPCA boosts the efficiency of the traditional RPCA by multiple hundreds of times, while scarifying less than 1% of accuracy.

## Keywords:

INSPEC: CONTROLLED INDEXING convex programming matrix algebra principal component analysis INSPEC: NON CONTROLLED INDEXING FRPCA RPCA convex optimization model fast robust principal component analysis low-rank matrices novel fast incremental RPCA approach online observations

## Published In:

Pattern Recognition (ICPR), 2012 21st International Conference on , , 413 - 416



( 5 )

## PDE-based robust robotic navigation

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### Abstract:

In robotic navigation, path planning is aimed at getting the optimum collision-free path between a starting and target locations. The optimality criterion depends on the surrounding environment and the running conditions. In this paper, we propose a general, robust, and fast path planning framework for robotic navigation using level set methods. A level set speed function is proposed such that the minimum cost path between the starting and target locations in the environment, is the optimum planned path. The speed function is controlled by one parameter, which takes one of three possible values to generate either the safest, the shortest, or the hybrid planned path. The hybrid path is much safer than the shortest path, but less shorter than the safest one. The main idea of the proposed technique is to propagate a monotonic wave front with a particular speed function from a starting location until the target is reached and then extracts the optimum planned path between them by solving an ordinary differential equation (ODE) using an efficient numerical scheme. The framework supports both local and global planning for both 2D and 3D environments. The robustness of the proposed framework is demonstrated by correctly extracting planned paths of complex maps.

### Keywords:

Robotic navigation; Level set methods; Fast marching methods; Path planning; Optimum path; Skeletonization

### Published In:

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( 6 )

## A GA-based Method for Performance Improvement of Distribution Systems Using DG Sources

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### Abstract:

This paper presents a Genetic Algorithm (GA)- based method to determine the location and size of DG sources in distribution systems using single DG placement algorithm for determining the locations at first. Then, the GA is utilized to determine the global sizes of DG sources which minimize single- or multi-objective function related to these systems. The influence of active- and reactive-power injection on the sizing and placement of DG sources is investigated. The predictions of the proposed method as regards the sizing and placement of DG sources are compared with those obtained before using particle swarm optimization at steady weather conditions.

### Keywords:

NULL

### Published In:

Nineteenth International Middle East Power Systems Conference (MEPCON), Menoufia University, Egypt, , NULL , NULL



( 7 )

# Modulated clustering using integrated rough sets and scatter search attribute reduction

Hedar, Abdel-Rahman; Ibrahim, Abdel-Monem M.; Sewisy, Adel A.; Abdel-Hakim, Alaa E.

## Abstract:

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## Keywords:

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## Published In:

GECCO 2018 Companion - Proceedings of the 2018 Genetic and Evolutionary Computation Conference Companion , NULL  
, NULL