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# Abstracts

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Abstract

- 01 Image Color Reduction Algorithm For Digital Broadcasting Applications
- In this paper, we present a novel color reduction algorithm for digital broadcasting applications. The proposed algorithm is to help the Broadcasters to show the images with high quality even in spite of the bandwidth limitations. The proposed algorithm supports creation of a common palette for multiple images, transparent alpha images and flexibility to the user to add a color to the palette. This method was extensively tested and the results are reported here. The experimental results show that the proposed method produces excellent results and outperforms existing state-of-the-art color reduction methods. A sample BML program for advertisement service is demonstrated.
- 02 (2D)<sup>2</sup>LPP: A New Dimensionality Reduction Technique With Application To Face/Object Representation And Recognition
- In this paper, a new dimensionality reduction technique called Two-Directional Two-Dimensional Locality Preserving Projections ((2D)<sup>2</sup>LPP) is proposed. We have also introduced an Alternate 2DLPP which works in the column direction of images as opposed to the existing Two-Dimensional Locality Preserving Projection (2DLPP) method which works on row direction of images. To overcome the problem of higher memory requirements and to reduce computational complexity, (2D)<sup>2</sup>LPP is devised that captures both row and column information simultaneously to derive knowledgebase. In addition, the proposed models require less computing time and suitable even for singular data sets unlike the standard Locality Preserving Projection (LPP), which is based on one dimensional vector. Experimental results on subsets of ORL face database and COIL object database shows that the proposed method achieves higher recognition rate than (2D)<sup>2</sup>PCA and 2DLPP
- 03 Performance Degradation Due To Imperfect Channel Conditions In Pre-Rake DSSS Systems
- In the recent past, transmitter-based Pre-Rake diversity combining technique has gained importance as one of the important research topics in mobile communications as it reduces the complexity, size and cost of the mobile units, while achieving the same inter symbol interference (ISI) mitigation effects of receiver based Rake diversity combining method for direct sequence spread spectrum (DSSS) system. The technique is based on preprocessing of transmitted signal relying on knowledge of the channel state information (CSI) before transmission. In most of the previous works, this a priori information is assumed for the uplink and the same is applied to the downlink in Time Division Duplex systems due to channel reciprocity. In practice, the channel needs to be estimated. In such a case there will be marginal performance degradation depending upon on the estimation approach followed, and also due to time varying nature of the radio mobile channels. In this paper, we propose binary phase shift keying (BPSK) based single user Pre-Rake system for ISI mitigation, which in turn will increase channel capacity. Analytical expression has been derived for signal-to-noise ratio (SNR) of the proposed system. We will also propose a predictive channel estimation method to evaluate performance of the system in frequency-division duplex (FDD) and time-division duplex (TDD) modes through computer simulations for DSSS downlink.
- 04 A Segmental 2-D HMM For Face Recognition Using Subspace Analysis
- In this work, we have proposed a hybrid framework of feature extraction and segmental 2-D HMM (Hidden Markov Model) for face recognition. The proposed approach computes the Radon projections in different orientations to capture the features of face images. The Fourier transform applied on Radon space yields spatial frequency features of the image. The extracted features are used as observations vectors for Segmental 2-D HMM for classification. The feature extraction framework has the advantage of dimensionality reduction by preserving the intrinsic vectors required for statistical classification. A segmental HMM minimizes the effect of independence assumption without significantly increasing the parameters thus increases the efficacy of the proposed recognition system. This is one of the alternative models to address the short comings of the Conventional HMM. The Segmental HMM is a statistical model that can be used in many pattern recognition applications. The goal of this paper is to use Segmental HMM for face recognition on a Radon-Fourier feature space. The experimental results reported in face recognition reveals that the segmental HMM is promising since it outperforms some of the state of art classifiers.

- 05 Simulation Based Analysis Of One Neural Network And Rule Based Decision Support System For Flood Control
- In the present day of environmental calamities, the hydrological disaster like flood is a threat to our society. Flood means loss of life, food, domestic animal, crop and altogether the economy of local people. Now a day this flood becomes catastrophic for the people who are leaving by the side of river or sea. Sometimes it breaches due to heavy sediment in its existing path, and it heads towards the low land, and destroys the normal life in its way. In this paper, a decision support system using framework comprising of rule and neural network based learning is proposed. The Neural Network Based learning system is simulated,
- 06 Generation Of Case Markers For UNL-Punjabi Deconverter
- UNL-Punjabi Deconverter is designed to convert the Universal Network Language document to Punjabi Language. In this paper, the case marker module of the Punjabi Deconverter is discussed. The problems of the direct mapping of case markers with the UNL relations are highlighted in this paper. To overcome this problem a structure is defined for the construction of case marker rule base. It has nine columns separated by colon; very column has a specific role and meaning in the case marker rule base. The processing of this rule base is discussed with the reference of number of UNL examples. The implementation of the rule base is discussed with the overview of the data structures used in the system.
- 07 The Headline Removal Algorithm And Its Effect On Recognition Of Devanagari Handwritten Characters
- Recognition of handwritten characters of Devanagari script is an important area of research. The work done for the recognition of Devanagari handwritten script is negligible in literature despite it is being used by millions people in India and abroad and it has numerous applications. All the basic characters of Devanagari exhibits a horizontal line at top called as headline. We suggest removing this headline, automatically, before performing recognition process. We have developed an algorithm to remove this headline which has been tested on about 8400 real life Devanagari handwritten characters collected from different writers. In this paper we will report the results of this headline removal algorithm. The paper also covers the effects of removing headline from Devanagari handwritten characters on the recognition rate of Devanagari character recognition system. We have investigated the effect of headline removal from Devanagari handwritten characters on recognition rate of Devanagari handwritten character recognition system using two feature extraction methods i.e. distance transform and chain code histograms in combination with two classifiers i.e. k-NN and PNN.
- 08 Efficient Mining Of Concepts With Constraints
- In this paper, we address the problem of mining concepts (closed patterns) under constraints. We propose D+-Miner algorithm which extends D-Miner algorithm by optimizing the closure checking of concepts using bit-vectors and cutter generation using row cutter index. Our comprehensive experimental analyses involving both real and synthetic datasets show that our algorithm takes less memory and less computation time when compared to D-Miner algorithm.
- 09 Novel Approach Of Varying Mutation Probability In Genetic Algorithm
- This paper presents the novel approach to vary the mutation probability parameter of Genetic Algorithm (GA) to achieve fast convergence leading to improvement in the performance of GA. The principle is to vary the mutation probability ( $p_m$ ) of the current generation in accordance with the difference in the average fitness of the current generation and that of the previous generation. The crossover probability ( $P_c$ ) is kept constant to 1 so as to get the maximum exploration of search space. Literature survey related to adaptive variation in crossover and mutation probabilities highlights that researchers attempted to tune adaptively  $P_c$  and  $p_m$  of all the individuals of the generation till the convergence is achieved. But the proposed method differs in the principle of varying mutation probability. In our design,  $p_m$  is constant to all individuals of the same generation and varies only from generation to generation. The proposed concept is applied to solve well known NP hard Traveling Salesman Problem (TSP). Experiments are conducted with some standard test cases from the standard library of TSP instances mentioned in TSPLIB. TSPLIB instances are solved by the methods of standard GA with fixed  $p_m$  and proposed adaptive GA with variable  $p_m$ . The results achieved from both the methods are compared against the defined performance measures. We conclude that the convergence occurs in less number of generations for the new adaptive GA. Similarly it is also observed that there is a drop in the failure to reach global optimum.

- 10 Real Time Simulation Of Free Surface Flow For Computer Graphics Applications
- In this paper, a Lagrangian free surface flow is dynamically visualised using the VTK designer. We use a method of controlled execution to manipulate the communication structure during runtime, using shared memory. This work is the first stepping-stone towards the implementation of real time interactive flow visualisation for VR applications.
- 11 Cellular Logic Image Processing (Lecture Series – 14)
- In our discussions so far in the last three lectures, our attention has primarily been on the role of cellular automata and normal algorithms in the generation of patterns and pattern-like-images. We now look at their role in implementing image processing operations. In this role the image to be processed forms the initial configuration from which a cellular automaton evolves and produces the desired processed image as its final configuration. Thus, apart from generating patterns from initial states, normal algorithmic cellular automata could also be used for processing digital images. In what follows, we provide techniques for implementing morphological operations, and for implementing operations such as segmentation, binarization, and edge detection on digital images.