

In This Issue...

- **Computational intelligence:** Digital Image Forgery Detection using Artificial Neural Network and Auto Regressive Coefficients .
- **Pattern recognition:** Scatter Matrix versus the Proposed Distance Matrix on Linear Discriminant Analysis for Image Pattern Recognition .
- **Signal processing:** Music indexing using Independent Component Analysis with pseudo-generated sources, Independent Component Analysis and Blind Signal Separation

Dear friends! COMPSIG NITT is a monthly newsletter to share the research work done in the Pattern recognition and computational intelligence laboratory, Department of Electronics and Communication Engineering, National Institute of Technology Trichy.

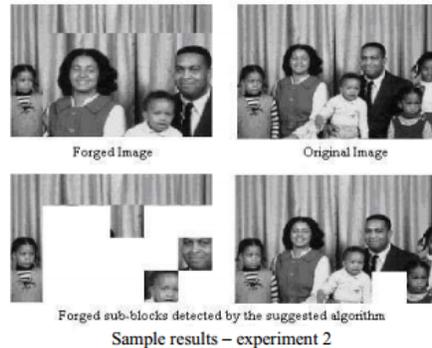
Concepts, Ideas pertaining to Computational intelligence, Pattern recognition and Signal processing are also included in this newsletter.

We expect the feedback, comments and articles from you all.
Issue 2-1: January 2016

Team members

1. **Dr.E.S.Gopi, Co-ordinator**
2. **G.JayaBrindha, Ph.D. Scholar.**
3. **Samuel Cherukutty Cheruvathur, M.Tech, Communication systems.**
4. **Kshitij H. Rachchh, M.Tech, Communication systems.**

Computational intelligence



Digitally forged photographs are so real that they do not leave any evidence of having been tampered with and can be indistinguishable from authentic photographs. Digitally processed image forgery makes the digital image data highly correlated. In this, we exploit this property by using auto regressive (AR) coefficients as the feature vector for identifying the location of digital forgery in a sample image. 300 feature vectors from different images are used to train an artificial neural network (ANN) and the ANN is tested with another 300 feature vectors.

Two experiments were conducted. In experiment 1, manipulated images were used to train the ANN. In experiment 2, a database of forged images was used. Percentage of hit in identifying the digital forgery is 77.67 % in experiment 1 and 94.83 % in experiment 2. The percentage of miss and the false alarm for the same is given as 22.33 % and 32.33 % in experiment 1 while it is 4.33 % and 0 % in experiment 2 respectively.

For further details : [http://ieeexplore.ieee.org/Digital forgery detection](http://ieeexplore.ieee.org/Digital%20forgery%20detection)

Pattern recognition

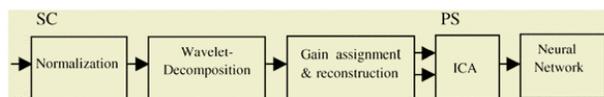


(a) Illustration of the proposed technique. (b) Sample Images of the ORL face database corresponding to the identical person with different poses replacing the scatter matrix with the distance matrix for image classification. First we present the intuitive arguments for using the distance matrix in LDA. Based on the experiments on face image database, it is observed that the performance in terms of prediction accuracy is better when the distance matrix is used instead of scatter matrix in Linear Discriminant Analysis (LDA) under certain circumstances. Above all, it is observed consistently that the variation of percentage of success with the selection of training set is less when distance matrix is used when compared with the case when scatter matrix is used. The results obtained from the experiments recommend the usage of distance matrix in place of scatter matrix in LDA. The relationship between the scatter matrix and the proposed distance matrix is also deduced.

For further details : [http://link.springer.com/chapter/scatter matrix vs distance matrix](http://link.springer.com/chapter/scatter%20matrix%20vs%20distance%20matrix)

In this, we explore the performance of Linear Discriminant Analysis (LDA) by

Signal processing



Block diagram showing flow of project , SC – song clippings, PS – Pseudo sources.

In this, we present a new approach towards Singing Voice/ Music segmentation using Independent Component Analysis. If the singing voice and the background

music are assumed to be two independent signals mixed to form the song, Independent Component Analysis can be used to separate them. ICA requires at least two sources in order to separate two mixed signals, whereas in this case only a single source, i.e. the recording of the song, is available. Another pseudo source is generated from the single source using Discrete Wavelet Transform and the discrimination between singing voice and music is done using a Feed Forward Back Propagation Neural Network.

For further details : <http://link.springer.com/chapter/Music indexing>

[Back to Contents](#)

Challenge !



The image of the leaf is captured from

a plant where the other leaves are present in the background. Is it possible to have the leaf (region of interest) on a clear background such that the boundaries of the leaf are undisturbed, where the boundaries of the leaf are an important characteristic to be retained for classification purposes.

COMPSIG NITT Wishes You A Very Happy New Year



[Back to Contents](#)

We expect feedback, comments and the articles to monthly newsletter [COMPSIG NITT](#).

[Back to Contents](#)

Contact Information:

[Pattern recognition and computational intelligence laboratory](#),
Department of Electronics and Communication Engineering,
National Institute of Technology Trichy - 620015
E-mail: esgopi@nitt.edu

Quotes

“All Birds find shelter during a rain. But Eagle avoids rain by flying above the Clouds. Problems are common, but attitude makes the difference!!”
— Dr. A.P.J.Abdul kalam