

## In This Issue...

- **Computational intelligence:** Medical data classifications using genetic algorithm by P.Hari babu, M.Tech (alumni).
- **Pattern recognition:** Color array filter for digital forgery detection by S.Vinoth, B.Tech (alumni).
- **Signal processing:** Musical notes identification by Jay.K.Patel, M.Tech (alumni).

**Dear friends!** We are launching the monthly newsletter **COMPSIG NITT** 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 1-1: October 2015**

### Team members

1. G.Jayabrintha, Ph.D. Scholar.
2. Samuel Cherukutty Cheruvathur, M.Tech, Communication systems.
3. Kshitij H. Rachchh, M.Tech, Communication systems.

## Computational intelligence

Result obtained for Weaning data

Type	Generalized		K1		K2		K3		K5		K6	
	count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Case1	176	72.73	124	51.24	156	64.46	123	50.83	117	48.35	145	59.92
Case2	177	73.14	179	73.97	145	59.92	127	52.48	122	50.41	154	63.64
Case3	171	70.66	158	65.29	120	49.59	150	61.98	180	74.38	126	52.07
Case4	194	80.17	162	66.94	192	79.34	181	74.79	171	70.66	177	73.14
Case5	169	69.83	124	51.24	181	74.79	173	71.49	183	75.62	109	45.04
Average	177.4	73.30	149.4	61.73	158.8	65.62	150.8	62.31	154.6	63.88	142.2	58.76

The generalized Kernel Linear Discriminant Analysis (KLDA) is the dimensionality reduction technique, with class

discrimination, to map the vectors from the feature dimensional space to the lower dimensional space. In this paper, we propose to tune the unknown parameters of the generalized KLDA using genetic algorithm to map the vectors from the feature dimensional space to the lower dimensional space. Nearest mean classifier is used for classification. Experiments are performed on medical data using the genetic algorithm based KLDA and reported in this paper. An average 5% increase in the detection rate is achieved using the genetic algorithm based KLDA when compared with the other kernel function based LDA

For further details : <http://www.sciencedirect.com/science/article/pii/S187705091502027X>

## Pattern recognition

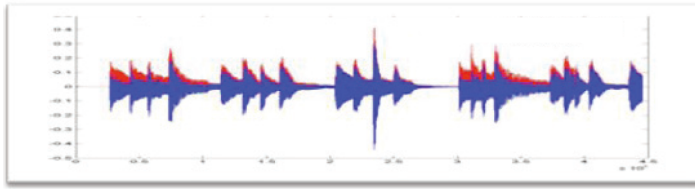


The technology today is well developed that images can be easily manipulated and tampered, with various digital tools, that we can no longer rely on these images. Doctored images have become ubiquitous and they are so real that they leave very little evidence of being tampered. There have been many attempts to detect such doctored images. Recent proposals have used linear models to represent interpolations in color array filters in digital cameras to identify forged images.

In practice, a nonlinear interpolation is done to perform this task. In this paper, we propose the idea of using Back propagation Neural network as the nonlinear model to represent this interpolation. The features collected from the model were subjected to dimensionality reduction using KLDA to formulate the NN, NM and SVM classifier and a reasonable success rate of 61.2 % was obtained in identifying the forged image.

For further details : <http://www.sciencedirect.com/science/article/pii/S2212017313005501>

## Signal processing



Songs play a vital role in our day to day life. A song contains basically two things, vocal and background

music. Where the characteristics of the voice depend on the singer and in case of background music, it involves mixture of different musical instruments like piano, guitar, drum, etc. Extracting the characteristic of a song becomes more important for various objectives like learning, teaching, composing. This project takes song as an input, extracts the features and detects and identifies the notes, each with a duration. First the song is recorded and digital signal processing algorithms used to identify the characteristics. The experiment is done with the several piano songs where the notes are already known, and identified notes are compared with original notes until the detection rate goes higher. And then the experiment is done with piano songs with unknown notes with the proposed algorithm.

For further details : <http://www.sciencedirect.com/science/article/pii/S1877050915020281>

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### Visit of Prof.Dr. K. K. Biswas, Indian Institute of Technology Delhi to NITT

Prof K.K.Biswas did his Btech in Electrical Engineering from IIT Madras, followed by Mtech in Control systems and Phd in signal estimation from IIT Delhi. After a brief stint at University of Roorkee, he joined the EE deptt of IIT Delhi. He later shifted to Computer science engineering department where he is currently serving as a professor. His teaching career spans over 35 years. He has been a visiting professor at the University of Auckland , New Zealand and at the University of Central Florida, USA. He has also acted as UNESCO expert for development of curriculum at university of Nigeria.He has been collaborating with University of Oxford and University of Texas at Austin. He has been an active researcher with 15 Phd students, and more than 70 publications in reputed journals and international conferences. His current area of research interest is image and video processing, machine learning with applications in activity recognition and Bio-informatics. His other main research interest is handling fuzzy models in probabilistic domain. He also has interest in Software Engineering, where he is trying to discover ambiguities in Requirements Engineering documents. He is likely to visit NITT during third week of October 2015.

URL: <http://www.cse.iitd.ernet.in/kkb/>

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### Quotes

*“ Do not wait for something big to happen, start where you are with whatever you have” — Dr. A.P.J.Abdul kalam*

## Challenge!



Do you see the leaf with shouldering? Given

the top view (Image) of the plant, can you develop the image processing algorithm to identify the leaf that has shouldering?

Do you see the leaf with serration?

Given the top view (Image) of the plant, can you develop the image processing algorithm to identify the leaf that has serration?

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## Feedback

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

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