

## In This Issue...

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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.

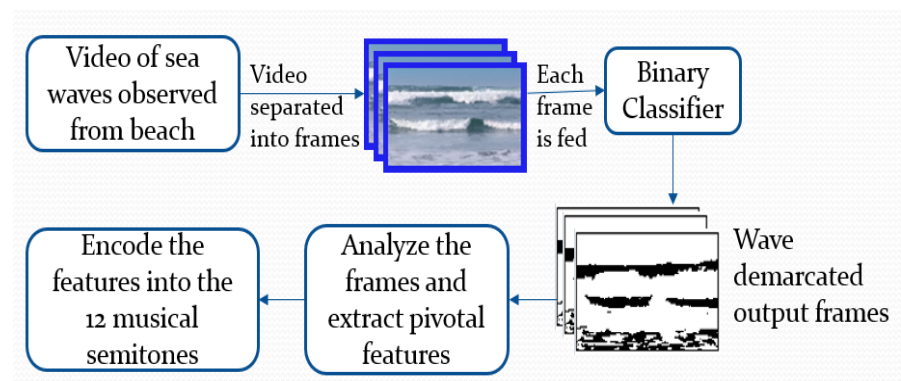
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### Team members

1. Dr.E.S.Gopi, Co-ordinator.
2. Ms.G.Jaya Brindha, Ph.D. Scholar.
3. Ms.M.Neema, Ph.D. Scholar.
4. Mr.Rajasekharreddy Poreddy, Ph.D. Scholar.
5. Ms.C.Florintina, M.Tech, Communication systems.
6. Mr.Ankur Satpute, M.Tech, Communication systems.

## Music Composition Inspired by Sea Wave Patterns observed from Beaches

Composing music without duplicating an existing piece becomes more and more arduous as years progress by. But it is quite an intriguing idea that nature might have been composing music all along the time unbeknown to us. The methodology adopted to generate music from sea wave patterns is as in the adjoining figure.



In order to evaluate how effective the technique is, an evaluation strategy becomes essential. Sample audio files are recorded by playing the notes generated by the above methodology. The aid of the public is enlisted to evaluate the outcome of this project by requesting them to listen to a set of audio files including both machine composed music and already existing human composed music (also played by the same person, on the same instrument to create a platform for fair evaluation) and identify which are the machine composed ones. The audios are clipped so that same duration audio files could be compared, hence the public are asked not to judge by how abruptly the music ends and certainly not by background noise. Random numbers are generated through Matlab, encoded into semi-tones following the same procedure as the one in this proposal and played in the same instrument, by the same person (*audio\_6*) and the public are asked to compare it with *audio\_5*, a stream of music generated by this project and specify how significant this project's contribution is to the field of music composition.

Interested people are requested to fill the form and aid this evaluation process.

Link to the Google form: <https://docs.google.com/forms/>

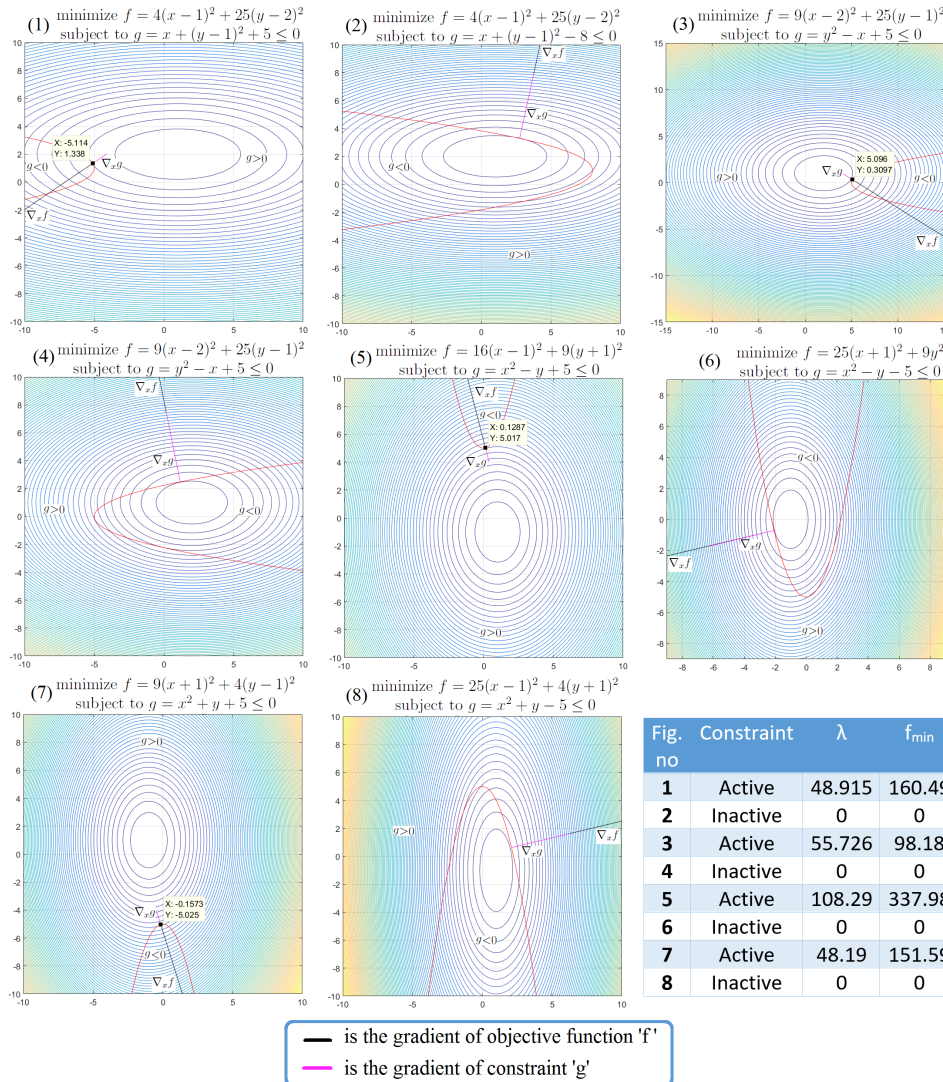
Link to the audio files needed for this evaluation: [Seawave Audio files](#)

For further details contact Ms.Florintina.C, M.Tech. (Communication systems) (mail id: florintinachaarlas @gmail.com)

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## Illustration

Minimizing the function  $f(x)$  with the constraint  $g(x) \leq 0$ , satisfies  $\nabla f(x) + \lambda \nabla g(x) = 0$  at the extremal points. If the optimal point satisfying the constraint happens to coincide with the one that minimizes the function  $f(x)$  without the constraint, the case is identified as the inactive constraint ( $\lambda = 0, g(x) < 0$ ). In such cases, both the gradients computed at the extremal point are in the same direction (refer 2,4,6,8). In the other cases (active constraints), it is observed from the figure (refer 1,3,5,7) that  $\nabla f(x)$  and  $\nabla g(x)$  are in the opposite direction computed at the extremal point and hence  $\lambda > 0$ , i.e. positive and the optimal point is the extremal point which lies on  $g(x) = 0$ . Thus the figure illustrates the usage of Karush-Kuhn-Tucker conditions ((a)  $\nabla f(x) + \lambda \nabla g(x) = 0$  (b)  $\lambda g(x) = 0$  and (c)  $\lambda \geq 0$ ) for optimizing a function using inequality constraints.



Link to the M file pertaining to this illustration: <http://silver.nitt.edu/~esgopi/mfiles/Kuhn-Tucker/>

For further details contact Mr.Rajasekar, Ph.D. scholar (mail id: sekarpraja@gmail.com)

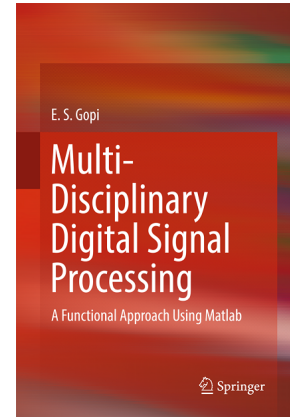
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## Quotes

*"Without your involvement, you can't succeed. With your involvement, you can't fail."* — Dr. A.P.J.Abdul Kalam

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## Coming up soon



The above book authored by Dr.E.S.Gopi, provides a comprehensive overview of digital signal processing for a multi-disciplinary audience and all the techniques are illustrated using MATLAB. For further information, visit: <http://springer.com/us/book/>

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## Feedback

COMPSIG NITT invites articles and innovative ideas from readers for the [Reader's Space](#) column. We expect feedback and comments to monthly newsletter [COMPSIG NITT](#). Readers can share their views in our facebook page, "[COMP-SIGNITT](#)". Those who are interested can be a part of the facebook group.

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