COMPSIG NITT

## In This Issue. . .



**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. G.JayaBrindha, Ph.D. Scholar.
3. Neema. M, Ph.D. Scholar.
4. Rajasekharreddy Poreddy, Ph.D Scholar.
5. Vinodha K, Ph.D Scholar.
6. Katoj Praveen Kumar, M.Tech, Communication Systems.
7. Bandi Likhitha Reddy, M.Tech, VLSI System .


**Scan the QR code for previous issues of our newsletter**

# Illustration Of Dijkstra's Algorithm

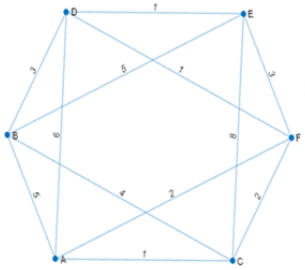



Fig.1

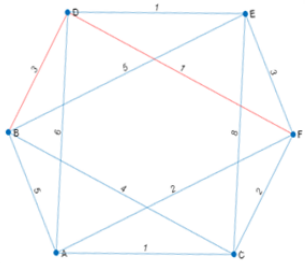
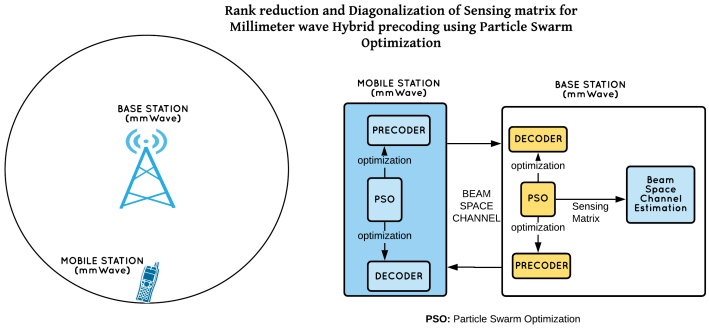



Fig.2

**Dijkstra's Algorithm:** (1)Set $l(u_0) = 0, l(v) = \infty$ for $v \neq u_0$ and $i = 0$. (2)For each $v \in S_i$, replace $l(v)$ by $\min\{l(v), l(u_i) + w(u_i v)\}$. Compute $min\{l(v)\}$ and let$u_{i+1}$ denote a vertex, for which this minimum is attained. Set $S_{i+1} = S_i U \{u_{i+1}\}$. (3)If $i = v - 1$, stop. If $i < v - 1$, replace i by $i + 1$ and go to step 2. When the algorithm terminates, the distance from $u_0$to v is given by the final value of the label $l(v)$. For the undirected weighted graph as shown in fig.1, dijkstra's algorithm can be applied to find the shortest distance between any two nodes. Fig.2 shows the simulated graph with shortest path between nodes 'B' and 'F' highlighted in red color.
**Link to M file:** http://silver.nitt.edu/ esgopi/mfiles/Dijkstrasalgo/
**For further details contact:** Bandi Likhitha Reddy, M.Tech, VLSI System, Email: likhithareddy.bandi@gmail.com

# Summary Of Recently Selected Reviewed papers

**Mayank Lauwanshi and E.S.Gopi "Rank reduction and Diagonalization of Sensing matrix for Millimeter wave Hybrid precoding using Particle Swarm Optimization"**




Precoder is implemented at the Transmitter station performs hybrid coding (digital + analog). The channel is modelled as a beam space channel.The precoding and decoding optimization is done with the help of PSO. PSO optimizes the precoder such that the Sensing matrix is diagonal matrix(diagonalization method) and is a reduced rank matrix (rank reduction method). Based on the sensing matrix the beam space channel coefficient matrix is estimated.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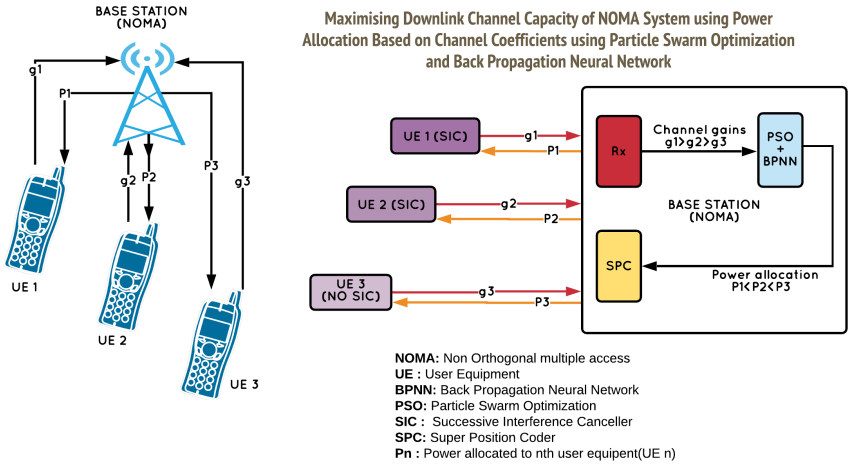
**Shailendra Singh and E.S.Gopi "Maximising Downlink Channel Capacity of NOMA System using Power Allocation Based on Channel Coefficients using Particle Swarm Optimization and Back Propagation Neural Network"**




NOMA makes the users use all of the subcarriers of the channel with diversity in power levels of the entire spectrum. Here g1, g2, g3 are the channel gain coefficients of signals received at the base station from different user equipment. Channel gain is higher from user equipment which is closer to the base station. Base station performs the channel estimation based on the pilot symbols received from all the users. Power allocation for downlink signals to each UE is done based on the channel gains in the increasing order of gain coefficients, using Particle Swarm Optimization(PSO). If the channel gain is high(good condition), less power is allocated to that user, else quite high power is allocated to that user. At the base station Super position coder generates a single signal based on allocated power levels to each user. In this proposal, an attempt is made to optimize the power allocation using PSO and BNN.

**For further details contact:** Katoj Praveen Kumar, M.Tech, Communication Systems, Email: praveen.katoju@gmail.com

## MDCWC2020 ONLINE WORKSHOP

**Machine Learning, Deep Learning and Computational Intelligence**
**22nd to 24th October 2020**
**Last date for submitting the papers through easychair: $31^{st}$ August 2020**
**All the accepted papers will be published as the chapter in the Lecture Notes in Electrical Engineering, Springer publications(ISI Proceedings, EI-Compendex, Scopus, Meta press, Web of science)**
**Details for Participants:**
**Tutorial lectures will be based on the book titled "Pattern Recognition and Computational Intelligence Techniques Using Matlab" 2019, Transactions on computational Science and intelligence, Springer publications authored by the Co-ordinator for the event MDCWC 2020.**
**Link to the brochure**
**Link to the participants brochure**
**Link to the Website**
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Quotes

*"There has to be a global mission of human progress." — Dr.A.P.J.Abdul Kalam*



## On-going Research

- Investigating Regression techniques for solving the sunflower leaf segmentation problem
- Application of machine learning techniques in next generation wireless communication
- Classification of Music composition styles using probabilistic generative model
- Engine health monitoring using Machine learning, Deep learning and Computational intelligence

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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, COMPSIGNITT. Those who are interested can be a part of the facebook group.

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**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