E.S. Gopi

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https://sites.google.com/view/gopi-es/home

Dr. E. S. Gopi is a professor in the Department of Electronics and Communication Engineering at the National Institute of Technology, Tiruchirappalli (Government of India), with 25 years of experience in teaching and research. He has authored eight books and edited three publications with Springer, primarily focusing on signal processing and pattern recognition. His book Pattern Recognition and Computational Intelligence using MATLAB was recognized by Book Authority as a notable resource in the field. In addition, he serves as the series editor for Springer's Signals and Communication Technology series.

He has contributed to several research publications, including journal articles, book chapters, and conference proceedings. His publications include articles in IEEE Transactions on Cognitive Communications and Networking, IEEE Networking Letters, IEEE Geoscience and Remote Sensing Letters, IEEE Transactions on Emerging Topics in Computational Intelligence, Neurocomputing, Applied Mathematics and Computation, Expert Systems with Applications, Machine Learning with Applications, Ecological Informatics,Computers & Electrical Engineering and Swarm and Evolutionary Computation. He was the principal investigator for a GTRE (DRDO) project on machine learning applications for sensor modeling. Beyond writing, he creates instructional videos on topics such as pattern recognition, statistical theory of communication, and linear algebra, which are popular among students. He has also organized several academic events, including the virtual international conferences MDCWC2020 and MDCWC2023, with proceedings published by Springer.

He actively engages with the IEEE community as the Workshop, Tutorials & Symposia Officer for the Machine Learning for Communications Emerging Technologies Initiative. He has been invited to speak at platforms like the Global Initiative of Academic Networks (GIAN) and the IEEE Training School on Machine Learning for Wireless Communication. He was recognized as a ScholarGPS 2025 Highly Ranked Scholar - Lifetime in the specialty of Digital Signal. This distinction recognizes exceptional productivity, noteworthy impact, and the quality of scholarly work, placing his contributions within the top 0.05% of scholars in this field worldwide. His research interests include machine intelligence, pattern recognition, statistical signal processing, and computational intelligence..

Professional Experience

2006-till date : Faculty in the Department of ECE at National Institute of Technology Tiruchirappalli (Government of India) and currently designated as the Professor

1998- 2006 : Served as the faulty at various Institutions

Education

Doctor of Philosophy based on the research on Investigations on Linear Discriminant Analysis, National Institute of Technology Tiruchirappalli, 2015.

Master of Engineering in Communication Systems, Sri Venkateswara College of Engineering, Anna University, **First Class with Distinction,** 2005

Bachelor of Engineering in Electronics and Communication Engineering, Mohammad Sathak Engineering College, Madurai Kamaraj University, **First class with Distinction**, 1998

Book Publications

Sole authored the following books

[1] E. S. Gopi, *Pattern Recognition and Computational Intelligence Techniques Using MATLAB*. Transactions on Computational Science and Computational Intelligence. Springer Publications, 2026 (Second Edition). ISBN: 978-3-032-36997-0.

[2] E. S. Gopi, *Digital Signal Processing for Wireless Communication Using MATLAB*, 2nd ed. Signals and Communication Technology. Springer Publications, 2022. ISBN: 978-3030820350.

[3] E. S. Gopi, *Pattern Recognition and Computational Intelligence Techniques Using MATLAB*. Transactions on Computational Science and Computational Intelligence. Springer Publications, 2019. ISBN: 978-3030222727.

[4] E. S. Gopi, *Digital Speech Processing Using MATLAB*. Signals and Communication Technology. Springer Publications, 2014. ISBN: 978-8132216766.

[5] E. S. Gopi, *Multi-Disciplinary Digital Signal Processing: A Functional Approach Using MATLAB*. Springer Publications, 2017. ISBN: 978-3-319-57429-5.

[6] E. S. Gopi, *Digital Signal Processing for Wireless Communication Using MATLAB*, 2nd ed. Springer Publications, 2021. ISBN: 978-3030820350.

[7] E. S. Gopi, *Digital Signal Processing for Medical Imaging Using MATLAB*. Springer Publications, 2012. ISBN: 978-1-4614-3139-8.

[8] E. S. Gopi, *Mathematical Summary for Digital Signal Processing Applications with MATLAB*. Springer Publications, 2010. ISBN: 978-90-481-3746-6.

[9] E. S. Gopi, *Algorithm Collections for Digital Signal Processing Applications Using MATLAB*. Springer Publications, 2007. ISBN: 978-1-4020-6409-8. (The incomplete ISBN was completed.)

[10] E. S. Gopi, *Digital Image Processing Using MATLAB*. Scitech Publications, 2007. ISBN: 9788183715867.

Edited the following Books

[1] E.S.Gopi (Editor), Machine Learning, Deep learning and computational intelligence for wireless communication , Proceedings of MDCWC2020, Lecture Notes in Electrical Engineering, Series, ISBN 978-981-16-0289-4, Springer publications,2021

[2] E.S.Gopi, P Maheswaran (Editors), Machine Learning, Deep learning and computational intelligence for wireless communication, Proceedings of MDCWC2023, Signals and Communication Technology series, ISBN 978-3-031-47944-1, Springer publications,2023

[3] Hemant kumar, E.S.Gopi (Editors), RF, Microwave and Millimeter Wave Technologies, Signals and Communication Technology series, ISBN 978-3-031-62525-1, Springer publications, 2024

Selected Journal Publications

1. Kiruthika C., E.S. Gopi, Distribution aware kernel density function-based quantizer using trapezoidal approximation for massive MIMO CSI feedback, AEU - International Journal of Electronics and Communications, Volume 212, 2026, 156337,ISSN 1434-8411, https://doi.org/10.1016/j.aeue.2026.156337.
2. S. M. Baby and E. S. Gopi, "Complex Valued Linear Discriminant Analysis on mmWave Radar Face Signatures for Task-Oriented Semantic Communication," in *IEEE Transactions on Cognitive Communications and Networking*, vol. 12, pp. 1892-1904, 2026, doi: 10.1109/TCCN.2025.3598379.
3. S. M. Baby and E. S. Gopi, "Complex Chromatic Imaging For Enhanced Radar Face Recognition," *Computers & Electrical Engineering*, vol. 25, 2025.
4. C. Kiruthika and E. S. Gopi, "FBCNet: Fusion Basis Complex-valued Neural Network for CSI compression in Massive MIMO networks," *IEEE Networking Letters*, 2024.
5. C. Kiruthika and E. S. Gopi, "CSI compression with Kernel-based sparsity learning for FDD Massive MIMO systems," *IEEE Transactions on Cognitive Communications and Networking*, 2024.
6. K. Vinodha, E. S. Gopi, B. Bhatnagar Dhruv Bhagwanswaroop, and A. P. Kumar, "Generalized soil texture classification using systematic generation of mixtures based on USDA soil classification triangle," *IEEE Geoscience and Remote Sensing Letters*, 2024.
7. K. Vinodha, E. S. Gopi, and T. Agnibhoj, "LiDAR-based estimation of bounding box coordinates using Gaussian process regression and particle swarm optimization," *Biomimetic Intelligence and Robotics*, 2024.
8. K. Vinodha and E. S. Gopi, "Analyzing the performance improvement of Hierarchical binary classifiers using ACO through Monte carlo simulation and Multiclass Engine vibration data," *Expert Systems with Applications*, 2024.
9. P. Rajasekharreddy and E. S. Gopi, "Improvement of Accuracy of under-performing classifier in decision making using discrete memory less channel model and Particle Swarm Optimization," *Expert Systems with Applications*, vol. 8, Art. no. 100201, 2024.
10. G. Jayabrindha and E. S. Gopi, "Masking Technique based Attention Mechanism for Off-type Identification in Plants," *Machine Learning and Applications*, vol. 10, Art. no. 100412, 2022.
11. M. Neema and E. S. Gopi, "Data driven approach for mmWave channel characteristics prediction using deep neural network," *Wireless Personal Communications*, 2021.
12. G. Jayabrindha and E. S. Gopi, "An hierarchical approach for automatic segmentation of leaf images with similar background using kernel smoothing based Gaussian process regression," *Ecological Informatics*, vol. 63, 2021.
13. G. Jayabrindha and E. S. Gopi, "Ant Colony Technique for Optimizing the Order of Cascaded SVM Classifier for Sunflower Seed Classification," *IEEE Transactions on Emerging Topics in Computational Intelligence*, vol. 2, no. 1, pp. 78-88, 2017.
14. E. S. Gopi and P. Palanisamy, "Neural network based class-conditional probability density function using kernel trick for supervised classifier," *Neurocomputing*, vol. 154, pp. 225-229, 2014.
15. E. S. Gopi and P. Palanisamy, "Maximizing Gaussianity using kurtosis measurement in the kernel space for kernel linear discriminant analysis," *Neurocomputing*, vol. 144, pp. 329-337, 2014.

16. E. S. Gopi and P. Palanisamy, "Fast computation of PCA bases of image subspace using its inner-product subspace," *Applied Mathematics and Computation*, vol. 219, no. 12, pp. 6729-6732, 2013.
17. E. S. Gopi and P. Palanisamy, "Formulating particle swarm optimization based membership linear discriminant analysis," *Swarm and Evolutionary Computation*, vol. 12, pp. 65-73, 2013.
18. E. S. Gopi, "Digital image forgery detection using artificial neural network and independent component analysis," *Applied Mathematics and Computation*, vol. 194, no. 2, pp. 540-543, 2007.

Reviewed Book Chapters

[1] K. Vinodha and E. S. Gopi, "Optimization-Driven Sensory Data Analytics and Applications," in *Advanced Computing and Communications: Responsible AI. ADCOM 2024*, S. Srinivasa, S. Saragur, and S. Malapaka, Eds. Cham: Springer, 2025, vol. 2461.

[2] K. Vinodha, E. S. Gopi, and B. Vinnakota, "Experimental Analysis for Sensor Reduction to Depict Real-Time Applications Through Regression Techniques," in *The Future of Artificial Intelligence and Robotics. ICDLAIR 2023*, D. Pastor-Escuredo, I. Brigui, N. Kesswani, S. Bordoloi, and A. K. Ray, Eds. Cham: Springer, 2024, vol. 1001.

[3] K. S. Harshitha and E. S. Gopi, "Performance Analysis of Polar Decoding Using Linear Code Mapping with Feedback Based ANN Architecture," in *Proceedings of the International Conference on Machine Learning, Deep Learning and Computational Intelligence for Wireless Communication. MDCWC 2023*, E. S. Gopi and P. Maheswaran, Eds. Cham: Springer, 2024.

[4] Sharan Chandra, E. S. Gopi, Hrishikesh Shekhar, and Pranav Mani, "Deep Learning to Predict the Number of Antennas in a Massive MIMO Setup based on Channel Characteristics," in *Proceedings of MDCWC2020*, Springer, 2021, pp. 299-310.

[5] Yashvanth L, V. Dharanya, and E. S. Gopi, "Novel method of Self - Interference Cancellation in Full - duplex radios for 5G wireless technology using Neural Networks," in *Proceedings of MDCWC2020*, Springer, 2021, pp. 13-21.

[6] Pranav Mani, E. S. Gopi, Hrishikesh Shekhar, and Sharan Chandra, "Generative Adversarial Network and Reinforcement Learning to Estimate Channel Coefficients," in *Proceedings of MDCWC2020*, Springer, 2021, pp. 289-298.

[7] S. Swedha and E. S. Gopi, "LSTM Network for Hotspot Prediction in Traffic Density of Cellular Network," in *Proceedings of MDCWC2020*, Springer, 2021, pp. 41-49.

[8] Mayank Lauwanshi and E. S. Gopi, "Rank reduction and Diagonalization of Sensing matrix for Millimeter wave Hybrid precoding using Particle Swarm Optimization," in *Constraint Handling in Metaheuristics and Applications*, Springer, 2021, pp. 119-138.

[9] 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," in *Constraint Handling in Metaheuristics and Applications*, Springer, 2021, pp. 185-201.

[10] Shaik Mahammad, E. S. Gopi, and Vineetha Yogesh, "The Roulette Wheel selection based Computational Intelligence technique to design an efficient transmission policy for Energy Harvesting Sensors," in *Optimization in Machine learning and Applications*, A. J. Kulkarni and S. C. Satapathy, Eds. Springer, 2020, pp. 1-13.

[11] Sankar N. Nair and E. S. Gopi, "Deep Learning Techniques for Crime Hotspot Detection," in *Optimization in Machine learning and Applications*, A. J. Kulkarni and S. C. Satapathy, Eds. Springer, 2020, pp. 91-105.

[12] G. J. Brinda and E. S. Gopi, "Maximizing Profits in Crop Planning Using Socio Evolution and Learning Optimization," in *Socio-cultural Inspired Metaheuristics*, Springer, 2019, pp. 129-142.

[13] P. Rajasekharreddy and E. S. Gopi, "Feature Selection for Vocal Segmentation Using Social Emotional Optimization Algorithm," in *Socio-cultural Inspired Metaheuristics*, Springer, 2019, pp. 159-174.

[14] Vineetha Yogesh, E. S. Gopi, and Shaik Mahammad, "Particle Swarm Optimization based HMM parameter estimation for spectrum sensing in Cognitive radio system," in *Computational intelligence for Pattern Recognition*, W. Pedrycz and S. M. Chen, Eds. Springer, 2018, pp. 19-35.

[15] C. Florintina and E. S. Gopi, "Music composition inspired by sea wave patterns observed from beaches," in *Proceedings of the 2nd International Conference on Data Engineering and Communication Technology (ICDECT 2017)*, Springer, 2017, pp. 1-10.

[16] Kshitij Rachchh and E. S. Gopi, "Inclusion of Vertical bar in the OMR sheet for Image Based Robust and Fast OMR Evaluation Technique using Mobile Phone Camera," in *Proceedings of the 2nd International Conference on Data Engineering and Communication Technology (ICDECT 2017)*, Springer, 2017, pp. 411-420.

[17] E. S. Gopi and P. Palanisamy, "Scatter Matrix versus the Proposed Distance Matrix on Linear Discriminant Analysis for Image Pattern Recognition," in *Computational Intelligence for Pattern Recognition*, W. Pedrycz and S. M. Chen, Eds. Springer, 2014, pp. 101-108.

[18] E. S. Gopi, R. Lakshmi, N. Ramya, and S. M. Shereen Farzana, "Music indexing using Independent Component Analysis with pseudo-generated sources," in *Independent Component Analysis and Blind Signal Separation*, Springer Berlin Heidelberg, 2004, pp. 1237-1244.

Conference proceedings publications

[1] S. M. Baby and E. S. Gopi, "Kernel Linear Discriminant Analysis Based Precoding for Multitask Semantic Communication," *2026 National Conference on Communications (NCC)*, Hyderabad, India, 2026, pp. 96-101, doi: 10.1109/NCC68160.2026.11478856.

[2] S. M. Baby and E. S. Gopi, "Gaussian process based Semantic communication for translational pose prediction in vehicles," *2025 IEEE 9th International Conference on Information and Communication Technology (CICT)*, Chennai, India, 2025, pp. 1-6, doi: 10.1109/CICT67193.2025.11399086

[3] M. Neema, E.S. Gopi, Pulakunta Sandeep Reddy, Optimizing Broadband Access and Network Design in Wireless Mesh Networks using Multi-Objective Particle Swarm Optimization, Procedia Computer Science, Volume 230, 2023, 275-286, ISSN 1877-0509

[4] C Kiruthika, ES Gopi, Gutlapalli Swaroopa, 2025 IEEE International Conference on Interdisciplinary Approaches in Technology and Management for Social Innovation (IATMSI),

[5] Neema, E. S. Gopi, and Praveen Kumar Katoj, "User Spatial Localization for Vision Aided Beam Tracking Based Millimeter Wave Systems Using Convolutional Neural Networks," in *10th IEEE Conference on Information and Automation for Sustainability (ICIAfS)*, 2021, pp. 296-301.

[6] C. Florintina and E. S. Gopi, "Constructing a Linear Discrete System in Kernel Space as a Supervised Classifier," in *International Conference on Wireless Communications, Signal Processing and Networking (WiSPNET)*, 2017, pp. 248-252.

[7] E. S. Gopi, "A Novel approach to transformed biometrics," in *Second International Conference on Digital Image Processing (ICDIP)*, 2010, pp. 110-114.

[8] E. S. Gopi, Sylvester Vijay R, Vasudha Rangarajan, and Lakshmanan Nataraj, "Brain computer Interface Analysis using Wavelet Transformations and Auto Regressive Coefficients," in *9th International Conference on Electrical and Computer Engineering (ICECE)*, 2006, pp. 493-496.

[9] E. S. Gopi, N. Lakshmanan, T. Gokul, S. Kumar Ganesh, and Prerak R. Shah, "Digital Image forgery detection using Artificial Neural Network and Autoregressive Coefficients," in *IEEE Canadian Conference on Electrical and Computer Engineering (CCECE)*, 2006, pp. 2199-2202.

[10] E. S. Gopi, Poorani Vijayakumar, Shyamala Pandiyan, Preethi Kannan, and Revathy, "A Novel Approach to Transformed Biometrics using ANN," in *Third International Conference on Intelligent Sensing and Information Processing (ICISIP)*, 2006, pp. 129-133.

[11] E. S. Gopi, Vibha Viswanathan, Priya Sankaralingam, and Sowmya Ramakumar, "A New approach to create high level features from low level features of audio clips," in *International Conference on Communication, Circuits and Systems (ICCCAS)*, 2005, pp. 1022-1026.

[12] E. S. Gopi, S. R. Nirmala, Shreyans Chopra, and N. H. Kaliprasad, "Karhunen-Leove transform based hand identification system," in *Second International Conference on Intelligent Sensing and Information Processing (ICISIP)*, 2005, pp. 317-321.

[13] J. K. Patel and E. S. Gopi, "Musical Notes identification using Digital signal processing," *Procedia Comput. Sci.*, vol. 57, pp. 876–884, 2015.

[14] E. S. Gopi and P. Palanisamy, "Formulating Particle Swarm Optimization based Generalized Kernel Function for Kernel-Linear Discriminant Analysis," *Procedia Technol.*, vol. 6, pp. 517–525, 2015.

[15] H. B. Padarthi and E. S. Gopi, "Medical data classifications using Genetic algorithm based Generalized Kernel Linear Discriminant analysis," *Procedia Comput. Sci.*, vol. 57, pp. 868–875, 2015.

[16] H. Sharma and E. S. Gopi, "Signal processing approach for music synthesis using bird's Sounds," *Procedia Technol.*, vol. 10, pp. 287-294, 2013.

[17] S. Vinoth and E. S. Gopi, "Neural network modeling of color array filter for digital forgery detection using kernel LDA," *Procedia Technol.*, vol. 10, pp. 287-294, 2013.

Link to sample Youtube Video Lectures

[1] Invite talk delivered on Machine Learning" during Faculty development programme organized by Department of Telecommunications, India (2024)

[2] Invited talk delivered on "Machine Learning" during **GIAN** course organized by *Visvesvaraya National Institute of Technology* (*VNIT*), Nagpur

[2] Pattern recognition and Computational intelligence

[3] Statistical theory of Communication

Recognitions

[1] ScholarGPS 2025 Highly Ranked Scholar - Lifetime in the specialty of Digital Signal

[2] Received Best performer Award 2023-2024 NIT, Tiruchirappalli (Government of India)

[3] Received Best performer Award 2022-2023, NIT, Tiruchirappalli (Government of India)

[4] Life Time Golden Achievement award 2021, by Bharat Rattan Publishing House.

[5] "Best citizens of India 2013" by the International publishing house.

[6] "Shiksha Rattan Puraskar Award", certificate of excellence by Dr. Bhishma Narain Singh, Former Governor Assam and Tamil Nadu at India International Centre, New Delhi on 9th Feb 2013

[7] "Glory of India Gold Medal" by presented by Shri Syed Sibtey Razi, Former Governor of Jharkhand, at India International Centre, New Delhi on 9th Feb 2013

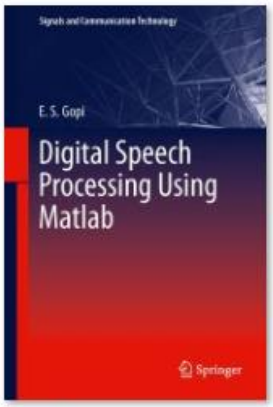
[8] Digital Signal Processing for wireless communication using matlab (second edition)" has been translated in chinese language and published by National Defence Industry press (ISBN-10: 7118133825)

[9] The book titled "Pattern reconition and Computational intelligence using Matlab" is recognized as one of the best pattern recognition books and one of the best Matlab ebooks by Book authority. It is also recognized as one of the best New Pattern recognition book by Book authority.

[10] The book titled "Digital Signal Processing for Wireless Communication using Matlab" is recognized as one the best new signal processing book,New signal processing books, Signal processing books of all time, Best wireless communication books of all time.

COVER PAGES OF BOOKS PUBLISHED AS THE SOLE AUTHOR

Algorithm_collections



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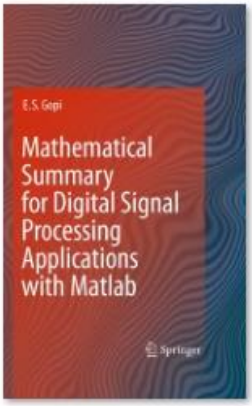
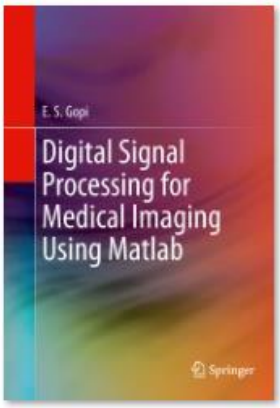
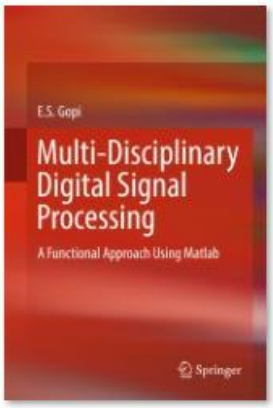


Mathsummary

MDCWC2020



Medicalimaging



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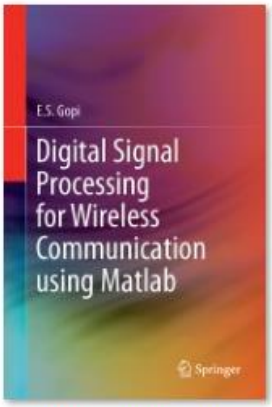

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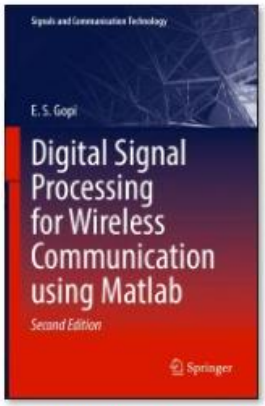

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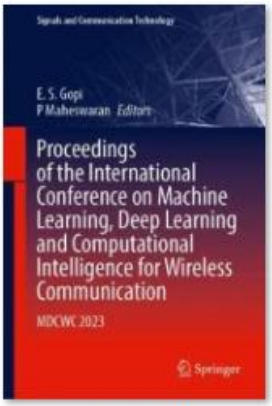
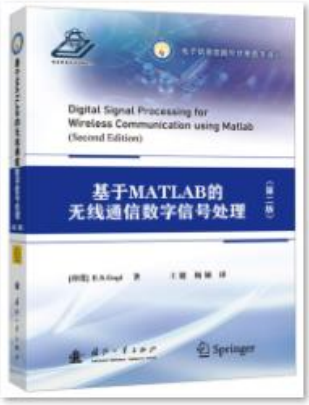


MDCWC2023



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