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Professor, Department of Electronics and Communication Engg
Dean Research & Development, RVCE
Coordinator for Center of Excellence Macroelectronics (Flexible Electronics)
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Personal Information

Name: M UTTARA KUMARI

Designation: Professor

Department: Department of Electronics and Communication

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Faculty Photo

Domain of Expertise

Research Focus

Areas: Radar Signal Processing, Speech Processing, Computer vision
Autonomous Vehicle, AI, Thin Film Sensor

Academic Qualifications

- **Ph.D.:** Radar Signal Processing, Andra University, 2007.
- **ME:** Electronics, Bangalore University, 1996.
- **B.Tech:** Electronics & Communication Engg , Nagarjuna University, 1989.

Professional Experience

- Professor Since 2008
- Dean PG Studies: Department of ECE & TCE : 2009-12
- Head of the Dept, ECE 2012-15
- Dean R&D : Since 2025
- 28 of Teaching Experience

Publications & Patents

Citation in text book:

1. Paper titled "Generation of Orthogonal Discrete Frequency Coded Waveform Using Accelerated Particle Swarm Optimization Algorithm for MIMO Radar" is cited in the text book "Multi-Antenna Synthetic Aperture Radar" by Wen-Qin Wang CRC Press . Reference No. 323 Page no 418.
2. Sudha R Karbari, Shashank Jain, Shivam Gaur, Uttara Kumari M, Shireesha G," Optimization, Design and Analysis of a MEMS Microphone with PVDF as a structural layer for cochlear implant applications" Springer Nature 2020.
3. Sudha R Karbari, Shashank Jain, Shivam Gaur, Uttara Kumari M, Shireesha G," Effect of Ultrasonication and Centrifugation on the pore size of PVDF/ CNT nanocomposites", Springer Nature 2020.

Patents [Filed / Published / Granted]

Patent Granted :

1. Flexible Artificial Basilar Epithelium, Indian Patent No: 359557, Dt:25/02/2021 ,, M.Uttara Kumari, Rohini Hallikar, Sireesh G
2. Method For Optimization Of One Dimensional Nanostructured PVDF Doped MWCNT Nanofiber, Indian Patent granted : Indian patent number: 517659, 29/02/2024, Sudha R Karbari, Shireesha G, Uttara Kumari M
3. A Multi-Layered Mask with Hydrophobic Nanofibers as functional layer with a smart valve for protection against the Aerosol transmission of COVID-19, Indian Patent no: 559558, Dt 04/02/2025

Patents Filed & Published

1. Extended Polyphase (E-P4) code for high performance Modern radar Systems, Patent application No: Application No.202441015207 A, Date of filing of Application :29/02/2024, Publication Date : 15/03/2024
2. Smart Land mine System , Patent application no: 202441008490, Dt 20/01/2024 Filed, Published

R & D Grants & Consultancy Projects

Ongoing & Completed Research Projects

- PI for "Design and Fabrication of Flexible Artificial Basilar Epithelium", SERB, DST, 3Y, Role: PI. (ongoing), 30Lakhs, 2022-25
- Faculty Coordinator for RVCE-AICTE IDEA lab , Rs90 Lakhs, Ongoing 2025-27
- PI for "Development of classifier based on deep/ machine learning algorithms for land-based munitions", ARDE, DRDO, Pune, 2Y, Role: PI (Completed)Rs 37.50 lakhs 2020-22
- Project Coordinator for the development of Autonomous Electric Vehicle (AV) Interdisciplinary project, Wipro Pvt Ltd, 3Y, Role: PI and Project Coordinator. Rs450lakhs, 2020-24
- PI for Design, development and implementation of an adaptable ground vehicle classification system for battlefield surveillance, ARDE, DRDO, Pune, 2Y, Role: PI (Completed) , Rs12 lakhs, 2017-19
- TEQIP CoE Co-Ordinator for MHRD (world bank) Funded Project under TEQIP-II Subcomponent 1.2.1: setting up Center of Excellence in Macroelectronics. (2013 to 2016) (Completed) Rs 500 lakhs

Ongoing & Completed Consultancy Projects

- An IOT based smart and portable sensor device for rapid detection of meat spoilage. : BioSouk Life sciences LP
- Development of a Solenoid Valve for Pneumatic Actuation System in Seed Segregation: Swarn Sorter
- Executed worklets on IoT, Embedded, Beyond 5G, AI for voice and Speech intelligence: Samsung Prism
- Simulation Studies to Understand the Properties of Pure Skies Omnidirectional Antenna: Devic-earth ltd
- Development of highly transparent and conducting nano-scaled Indium Tin Oxide(ITO) powder for surface coating applications, Nano Ram Technologies private limited

Journal Publications

International Journals:

1. PDE based physics guided neural network for sar image segmentation, In IEEE access.
2. Mrs. Sujatha B, Dr. M. Uttara kumari "Vehicle Classification Based on Acoustic Signals using Machine Learning Algorithm", Science Technology and Development Journal, Volume VIII, Issue X, October, 2019.
3. Sudha R Karbari, Uttara Kumari M, Shireesha G,"Simulation and Optimization of stacked PVDF membrane for piezoelectric application", International Journal of Engineering and Advanced Technology, IJEAT,Vol-9, Issue -5. June 2020.
4. Sudha R Karbari, Uttara Kumari M, Shireesha G, "Optimization and Simulation of PVDF and CNT Nanocomposites as Artificial Basilar Membrane", Solid State Technology, Issue-September 2020.
5. Design and simulation of stacked PVDF layers with ZnO for piezoelectric nanodevices, Material today Proceedings, 13th Feb 2021
6. Uttara M. Kumari, K. Rajarajeswari, Murali K. Krishna, Low Sidelobe Pattern Using Woo Filter Concepts, International Journal of Electronics & Communication. 2005.
7. Sidelobe reduction using Padé approximation technique, International AMSE Journal. 2006.
8. Filter Model for reduced sidelobes in pulse compression Radar, WSEAS Transactions on Signal Processing, pg 308,Issue 4, Volume 3, April 2007.
9. Schemes for Evaluating Signal Processing Properties of Audio Watermarking IJCSNS, 2008.
10. Kariyappa Bs, Uttara Kumari, FPGA based speed control of ac servomotor using sinusoidal PWM. IJCSNS - International Journal of Computer Science and Network Security, Korea
11. Microcontroller Based AC Power Controller, International Journal on Wireless Sensor Networks, Scientific Research Publication, 2009.
12. DSP 2407-A Based PWM Controlled Rectifier, International Journal of electronic and electrical engineering, Scientific Engineering Research Corporation, May 2009
13. T.C Thanuja and Uttara kumari, Swift and Precise Reversible Watermarking Scheme for Medical Image Authentication, International Journal of Computational Intelligence Research (IJCIR), India, 2009.

14. Multiplier less Recursive algorithm using Ramanujan ordered Numbers, IETE Journal of Research, ISSN: 0377-2063 Vol.56., No.4, July-Aug 2010, Pg 182-188
15. A new multiplier less discrete cosine transform based on the Ramanujan ordered numbers for image coding, International Journal of Signal Processing, Image Processing and Pattern Recognition, ISSN: 2005-4254 Vol. 3, No. 4, December, 2010. Pg 1-14. published by Science &Engineering Research Support Center, Republic of Korea
16. A Novel Cosine approximation for high-speed evaluation of DCT” International Journal of Image Processing, Volume: 4 Issue: 6 Pg 539 – 548 Publication Date: January / February 2011 ISSN (Online): 1985-2304 CSC Journals, Kuala Lumpur, Malaysia
17. A Novel Method for obtaining a Better Quality Speech Signal for Cochlear Implants Using Kalman with DRNL and SSB Technique , Advanced Computing: An International Journal (ACIJ), Vol.3, No.4, July 2012.
18. Performance Analysis of MIMO Radar waveform using Accelerated Particle Swarm Optimization Algorithm, Signal & Image Processing: An International Journal (SIPIJ), vol.3, no.4, pp. no.193-202, August 2012.
19. Target Detection Using Orthogonal Polyphase MIMO Radar Waveform against Compound Gaussian Clutter, Elsevier Procedia Engineering Journal, vol. 64, pp. no.331-340, 2013.
20. Orthogonal MIMO Radar Waveform Performance Analysis with Ambiguity Function, International Journal of Engineering and Advanced Technology (IJEAT), vol 3, issue 4, pp. no. 168-173, April 2014.
21. MIMO Radar Detection in Compound Gaussian Clutter using Orthogonal Discrete Frequency Coding Space Time Waveform, International Journal of Multimedia & Its Applications (IJMA), vol.6, no.4, pp. no. 39-47, August 2014.
22. Optimization of Orthogonal Adaptive Waveform Design in Presence of Clutter for MIMO in journal springer plus. 2015
23. Synthesis and fabrication of Pentacene Thin Films, International Journal of Electronics Circuits and Systems (IJECS), p 145-147, Volume 2, 2015.
24. A Reliable Hardware Implementation Using Turbo Filters for Cochlear Implants, published in International Journal of Engineering Technology Science and Research(IJETSR), Volume 4, Issue 11, November 2017
25. Speech Enhancement Using Adaptive Turbo Filter for Cochlear Implants, published in International Journal of Engineering Technology Science and Research (IJETSR), Volume 4, Issue 12, December 2017

26. Rohini S.Hallikar, Uttara Kumari , K Padmaraju and Yashas D, " Modified Turbo and SDROM Method for Speech Processing for Cochlear Implants" published in special Issue 5 of International Journal of Engineering & Technology IJET (UAE) Vol 7, No 4.5 (2018)(Scopus indexed)
27. Rohini S.Hallikar, Uttara Kumari and K Padmaraju," A Comparative Analysis of Turbo wavelet and Turbo DRNL SSB for speech processing in Cochlear Implants" published in International Journal of Pure and Applied Mathematics Volume 120, No. 6, August 2018.
28. Sujata Badiger, Uttara kumari M, "Tree Copula Theory based fusion and Compressive Sensing for Activity Detection using multi-modal data" International Journal of Innovative Technology and Exploring Engineering" ISSN: 2278-3075, Volume-8, Issue- 7C2, May 2019

Conference Papers

1. Sidelobe reduction technique for range resolution radar, in Proc of 8th IEEE international conference on communication systems, ICCS-2002, Singapore, Vol 2, 784 – 789, Nov-2002.
2. Sidelobe reduction of radar signals by overlaying technique, IEEE Sponsored International Radar symposium IRSI 2005, India, Dec – 2005.
3. Performance evaluation of different complementary sequences, IEEE Sponsored International Radar symposium IRSI 2007, India, Dec – 2007.
4. Reversible data hiding using Increased Peak Histogram, IEEE conference on DMAI'08, Dec, 25-27, 2008, Khulna, Bangladesh.
5. Waveform design for MIMO Radar using Genetic and ANTs algorithm, IEEE Sponsored International Radar symposium IRSI 2009, India, Dec – 2009.
6. New Polynomial Transform Algorithm for 2-D DCT using Ramanujan Ordered Numbers, IEEE conference SPCOM 2010 at IISC Bangalore, India July 2010.
7. Multidimensional Fast multiplierless DCT Algorithm using Ramanujan Ordered Numbers, IEEE sponsored conference ICSAP 2011 at Singapore, Feb 2011
8. Polyphase Orthogonal Waveform Using Modified Particle Swarm Optimization Algorithm for MIMO Radar, in IEEE International Conference on Signal Processing, Computing and Control (ISPCC'12). March 2012, Wagnaghat.
9. A new polyphase code for low sidelobe auto correlation function, Proceedings of the International conference on Systematics, Cybernetics and Informatics ICSCI-2005, Hyderabad, Vol.1, 568 – 570, Jan – 2005.
10. A New Pulse Compression Technique for Sidelobe Reduction, Proceedings of the International Conference on Biomedical and Telecommunication, BET – 04, 66-67, Vishakhapatnam, Dec-2004.
11. Performance analysis of Radar signals, International conference on Systematics, Cybernetics and Informatics ICSCI-2006, Hyderabad.
12. A new sidelobe reduction technique for range resolution radar, 7th WSEAS International Conference on Multimedia and Signal Processing, Dallas Texas, USA, pg 152, March 22-24, 2007

13. Merit measure analysis of Extended Polyphase code, International conference on Systematics, Cybernetics and Informatics, 2007 Hyderabad.
14. Sidelobe Reduction using modified LMS algorithm, ICSCI-2008, Hyderabad
15. Reversible Data Hiding using Increased Peak Histogram, IEEE sponsored 11th International Conference on Computer and Information Technology (ICCIT 2008) & Workshops, Dec. 24-27, 2008, pp.44-47, Khulna, Bangladesh.
16. Invertible Data Hiding in Color Images using Multiple Peaks Histogram, 2009 International conference on Signal Processing Systems (ICSPS 2009), May 15-17, 2009, Singapore. pp 52-55.
17. Reversible data hiding in gray scale images using multi-level embedding, International conference on Mechanical and Electronics Engineering, 24-27 July 2009, Chennai, India pp. 121-126.
18. Watermarking using integer DCT and increased peak histogram technique, International conference on Mechanical and Electronics Engineering, 24-27 July 2009, Chennai, India, pp.157-161.
19. Robust video watermarking scheme for copyright protection, International Conference on Signal and Image Processing (ICSIP), 12-14 Aug. 2009, Mysore, pp.239-243.
20. A Novel Recursive Multiplierless Algorithm for 2-D DCT, Proc ICSPCN 2009, Singapore August 2009.
21. Optimization of orthogonal Discrete- Frequency Coding waveform using ACO algorithm, International Radar Symposium India, Dec 2009, Bangalore.
22. Generation of Orthogonal Discrete Frequency Waveform Using Accelerated Particle Swarm Optimization algorithm for MIMO Radar, International Conference on Signal, Image Processing and Pattern Recognition, May 2012, Delhi.
23. Single Sideband Encoder with nonlinear Filter Bank Using Denoising for Cochlear Implant Speech Processor, ICCSEA 2012. May 2012.
24. Study of Track Before Detect Algorithms for multiple Target detection at International Conference on Recent Trends in Computer Science and Engineering held at Bangalore, May 2013.
25. Signal Enhancement Using Turbo Iterative Kalman Filter and DRNL with SSB Technique", International Conference on Advances in Recent Technologies in Electrical and Electronics ARTEE 2013, Bangalore, India, September 2013.
26. Signal Enhancement Using Turbo Iterative Kalman Filter and DRNL with SSB Technique, International Conference on Advances in Recent Technologies in Electrical and Electronics ARTEE 2013, Bangalore, India, September 2013
27. Enhancement of Speech Signals corrupted by Impulsive Noise Using Wavelets and Adaptive Median Filtering, 2013, IEEE International Conference on Signal Processing, Computing and Control, Shimla, Himachal Pradesh, India September 2013

28. Orthogonal Discrete Frequency Coding Space Time Waveform for MIMO Radar Detection in compound Gaussian Clutter, in third International Conference on Signal, Image Processing and Pattern Recognition-2014, Chennai, July 26-27, pp no. 59-66.
29. Optimization of Discrete Frequency Coding Waveform for MIMO Radar using Modified Ant Colony Optimization Algorithm, Proceedings of IEEE International Conference on Networks & soft Computing (ICNSC), Guntur, pp. no. 15-19.19-20 Aug, 2014. .
30. Design of Orthogonal Waveform for MIMO Radar using Modified Ant Colony Optimization Algorithm, The International conference on advances on computing, communication and information on 24-27 sept. 2014.
31. AWGN and Impulsive Noise Removal by Turbo Audio Enhancement Technique, IEEE International Conference on Control, Instrumentation, Communication and Computational Technologies (ICCICCT 2014), 10-11 July 2014, The Noorul Islam University, Kumaracoil, Kanyakumari District, Tamilnadu.
32. Design and Implementation of Multichannel Piezoelectric Acoustic Sensor, COMSOL Conference Pune, India, October 2015.
33. Measurement of Thickness and Roughness using Gwyddion, 2016 International Conference on Advanced Computing and Communication Systems (ICACCS -2016), IAN- 16359485, IEEE Conference.
34. Characterization of TFT Sensors for Chemical Sensing Applications, in International Conference on Nano electronics, Circuits & Communication Systems organized jointly by Institution of Electronics & Telecommunication Engineers (IETE) & Indian Society For VLSI Education (ISVE) on 9-10 May 2015.
35. Signal Processing of Motor Imagery EEG Waves Using Empirical Mode Decomposition, Fourth International Conference on Emerging Research in Computing, Information, Communication and Applications, ERCICA 2016, 29th-30th July 2016, Bangalore
36. Identification of Objects using Data Fusion of LiDAR and Hyperspectral Data, Computing, Communication and Automation (ICCCA), 2017 International Conference on, 2017, Noida
37. Vehicle Classification Using Compressive Sensing, presented in IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT-2017) " on May 19-20, 2017.
38. Footstep Detection using Laplacian Distribution in International Conference on Energy, Communication, Data Analytics and Soft Computing (ICECDS 2017).
39. Modified Turbo and SDROM method for speech processing for Cochlear Implants, International Conference On Recent Trends In Engineering & Sciences (ICRTES-2018),
40. Design and analysis of adaptive waveform for Cognitive Radar, International Radar Conference 2017, Dec 2017, Bengaluru

41. Rohini S.Hallikar, M.Uttarakumari and K Padmaraju,” Modified Turbo and SDRM Method for Speech Processing for Cochlear Implants”, International Conference on Recent Trends in Engineering and Sciences (ICRTES)-2018 organised by Confer Professional Group of Conferences, Andhra Pradesh, India , 20-21 February 2018
42. M Uttara Kumari, Sujatha D B. “Implementation of Vehicle Classification System on OMAP L138 DSP Processor” International Conference on New trends in Engineering & Technology, GRT Institute of Engg & Technology, Tirupathi Highway, Chennai, Sep 07-08, 2018
43. M Uttara Kumari, Sujatha D B. “Target Classification and Tracking Using Symbolic Dynamic Filtering” 9th International Conference on Computing, Communication and Networking Technologies, July 10-12, 2018, IISc, Bengaluru
44. Dr. M. Uttrakumari, Mrs. Sujatha B. “Identification of Objects using Data Fusion of LiDAR and Hyperspectral Data” International Conference on Innovation in Electrical , Electronics & Communication Engineering, July 27-28 ,2018, Bhubaneshwar , Orissa.
45. An Improved Radar target tracking system using fusion algorithm of Kalman and Particle filters, 2018 International Conference on Recent Innovations in Electrical, Electronics & Communication Engineering (ICRIEECE), 27-28 July 2018, DOI:10.1109/ICRIEECE44171.2018.9009181
46. Sujatha D B, M Uttara Kumari, et. al, “Copula based moving vehicle classification in compressive domain without signal reconstruction”, The 10th International Conference On Computing, Communication And Networking Technologies (ICCCNT), IIT Kanpur, July 6-8 2019.
47. Effect of Ultrasonication and Centrifuge on the pore size of PVDF/CNT Nanocomposites”, 5th International Conference on Nanoelectronics, Circuits & Communication Systems(NCCS-2019) , 9-10 Nov 2019,Ranchi with proceeding in Lecture Notes in Electrical Engineering, Springer
48. “Optimization, Design and Analysis of MEMS microphone with PVDF as a structural layer for Cochlear Implant applications”, 5th International Conference on Nanoelectronics, Circuits & Communication Systems(NCCS-2019) , 9-10 Nov 2019,Ranchi with proceeding in Lecture Notes in Electrical Engineering, Springer.
49. Cyber security in vehicle communication, IEEE International Conference for Innovation in technology 2020 INOCON
50. Cognitive Load Detection on Drivers by Pupillary analysis, International Conference on Electronics, Computing and Communication Technologies, CONECCT 2020, 2nd -4th July 2020
51. Design and simulation of stacked PVDF layers with ZnO for piezoelectric nanodevices,, First IEEE International Conference on Advances in Electrical, Computing, Communications and Sustainable Technologies (ICAECT 2021), 19-20 Feb 2021
52. Sound Localisation of an Acoustic Source Using Time Delay and Distance Estimation in 2022 International Conference on Smart Generation Computing, Communication and Networking (SMART GENCON) during 23rd to 25th December 2022.

53. Meow: Memory Evaluation through Optimized Workloads - Synthesizing Litmus Tests for Memory Consistency Verification, INDICON-2023 (20th India Council International Conference): 15th to 17th Dec , Hyderabad
54. License Plate Detection and Privacy-Aware Masking in Surveillance Imagery Authors:Adarsh U, 2023 7th International Conference on Computation System and Information Technology for Sustainable Solutions (CSITSS)
55. Android Dashboard App development for Autonomous Vehicle Using Firebase 2023 7th International Conference on Computation System and Information Technology for Sustainable Solutions (CSITSS)
56. A Hybrid FAST-LIO 2 and SC ALOAM SLAM Algorithms for Autonomous Vehicles” SMARTCOM - 2024 and accepted paper of the conference as proceedings with Springer in their prestigious LNNS (Lecture Notes in Networks and Systems) series. Pune on 11th and 12th of January 2024.
57. Implementation of Lane Detection Algorithms for Autonomous Vehicle using Lidar Point Cloud Data, in 7th International Conference on Computational Systems and Information Technology for Sustainable Solutions, 2nd - 4th November 2023, Benagluru, 2023.
58. Cognitive Load Detection on Drivers by Pupillary Analysis ", 2020 IEEE International Conference on Electronics, Computing and Communication Technologies (CONECCT)
59. "Map-based Localization for Autonomous Vehicles " has been ACCEPTED for the presentation at the 2nd IEEE Technology and Engineering Management Society Conference: Asia-Pacific, TEMSCON ASPAC (A flagship TEMS Asia Pacific conference, first time in India at Bengaluru), to be held on 15th & 16th of December 2023 at Sheraton Grand Hotel, Bengaluru, India
60. State-of-Charge Estimation Methodology for Lithium-Ion Batteries Utilizing Extended Kalman Filtering, in 7th International Conference on Computational Systems and Information Technology for Sustainable Solutions, 2nd - 4th November 2023, Benagluru, 2023.
61. Object detection and depth estimation using deep learning, 13th International Advanced Computing Conference on 15th & 16th Dec'23 @ Sharad Institute of Technology, College of Engineering, Kolhapur, Maharashtra
62. Implementation of Object Detection for Autonomous Vehicles by LiDAR and Camera Fusion, 2nd IEEE International Conference on Interdisciplinary Approaches in Technology and Management for Social Innovation (IATMSI-2024), 14 to 16th March 2024

Professional Memberships

- Senior Member IEEE, IETE, ISTE

Awards & Recognitions

- Recognition award from ARMEB, DRDO on 6th April 2022. Received award from Dr. Satheesh Reddy, Chairman DRDO.

- Star Achiever Award on 21st September 2016 for Academic Excellence by Accenture
- Best Researcher award from Cognizant RVCE-ISTE 2017
- Best achiever award from Rashtreeya Sikshna Samitha Trust (RSST), for 2012, 2016, 2017,2019
- Best Mentor Recognition from Samsung, 2019
- Excellent award from RVCE 2024
- 2nd place in Tata Innovant competition for autonomous vehicle design, mentored this project.

Student Supervision

- Ph.D. Candidates: 8 completed, 3 pursuing

Teaching

Core Courses: **[Current semester]**

- **Signals and Systems**
- **Digital signal processing and machine learning**
- **Computer vision with AI**

Responsibilities

- **Academic:** Dean R&D, BoS, BoE
- **Administrative:** Coordinator for IP cell

External Connect

- Member of BoS - VTU Nominee -PES Mandya