

**Dr. Muthukumar. M Ph.D.,**  
**IEEE Senior Member, Member IEEE SPS, MACM, MISNT**

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### **Profile summary**

Muthukumar. M is currently working as an Associate Professor in the Department of Computer Science and Engineering at Hindustan Institute of Technology & Science (Deemed to be University), Chennai, India. He is having 18+ years of experience it includes information technology industry, teaching and rich research experience. He has obtained PhD in Digital Image Processing and awarded Senior Research Fellowship (SRF) under the funded project of Board of Research in Nuclear Sciences (BRNS), Government of India. He published more than 25 research articles indexed in SCI, SCIE and SCOPUS journals and conferences. He has edited 3 books in Taylor & Francis and John Wiley publications. He is an editor and reviewer of reputed journals. He has filed 3 patents in Intellectual property India and 1 Australian Patent, and received two national and one international patent grants. His research interests include digital image processing, machine vision systems, image statistical analysis & feature extraction, pattern recognition, and machine learning techniques.

### **Research interest**

#### **➤ Digital Image Processing**

- Industrial X-radiography and Thermography image processing.
- Medical image processing.
- Remote Sensing imaging
- Image assessment, enhancement, noise reduction and smoothing.
- Image quality and quantitative metrics.
- Image segmentation and classification.
- Developing image processing tools

- **Pattern Recognition**
- **Deep Learning**
- **Developing machine vision inspection tools**
- **Radiography, thermography, medical, remote sensing image processing.**

### **Journal publications, Conferences and Chapters**

- DimpleNagpal, S.N.Panda, Muthukumaran Malarvel, Priyadarshini A Pattanaik, Mohammad Zubair Khan, A review of diabetic retinopathy: Datasets, approaches, evaluation metrics and future trends, Journal of King Saud University - Computer and Information Sciences, 2021 (**SCIE- Published – IF 13.473**).
- Muthukumaran Malarvel, Harjeet Singh, An autonomous technique for weld defects detection and classification using multi-class support vector machine in X-radiography image, Optik, Elsevier, Vol 231, 166342 2021 (**SCI- Published – IF 2.187**)
- Harjeet Singh, R. K Sharma, Muthukumaran Malarvel, Post-processing algorithms for the formation of online handwritten Gurmukhi character/akshara, Journal of Intelligent and fuzzy systems, IOS Press.vol 40, no 3, pp 4799-4809, 2021 (**SCI-E Published IF 1.851**)
- Muthukumaran Malarvel and Soumya Ranjan Nayak, Edge and Region Segmentation in High-Resolution Aerial Images using Improved Kernel Density Estimation: A Hybrid Approach, Journal of Intelligent & Fuzzy Systems, Vol 39 No 1, pp 543-560, (2020). (**SCI-E Indexed- IF 1.851**)
- Jagalingam Pushparaj and Muthukumaran Malarvel, Panchromatic image denoising by a log-normal-distribution-based anisotropic diffusion model, Journal of Applied Remote Sensing, SPIE, 13(1), 0414515 (2019). (**SCI-E Indexed – IF 1.360**)
- Muthukumaran Malarvel, Gopalakrishnan Sethumadhavan, Purna Chandra Rao Bhagi, Soumitra Kar, Thangavel Saravanan, Arunmuthu Krishnan, Anisotropic diffusion based denoising on X-radiography images to detect weld defects, Digital Signal Processing 68 (2017) 112–126. (**SCI Indexed- IF 2.871**)
- Muthukumaran Malarvel, Gopalakrishnan Sethumadhavan, Purna Chandra Rao Bhagi, Soumitra Kar, Thangavel Saravanan, An improved version of Otsu’s method for segmentation of weld defects on X-radiography images, Optik 142 (2017) 109–118. (**SCI Indexed – IF 2.187**)

- Srinivasan Sankaran, Muthukumar Malarvel, Gopalakrishnan Sethumadhavana, Dinkar Sahal, Quantitation of Malarial parasitemia in Giemsa stained thin blood smears using Six Sigma threshold as preprocessor, *Optik* 145 (2017) 225–239. (**SCI Indexed IF: 2.187**)
- M. Muthukumar, A. Sivapathi, L. Prabakaran and S. Gopalakrishnan, Discovery of noise existence and noise level estimation in weld x-radiography images using anisotropic diffusion model, *Far East Journal of Electronics and Communications*, 17(2017) 351-359. (**SCOPUS Indexed**)
- M. Muthukumar, L. Prabakaran, A. Sivapathi and S. Gopalakrishnan, A comparative analysis of an anisotropic diffusion image denoising methods on weld x-radiography images, *Far East Journal of Electronics and Communications*, 17(2017) 267-281. (**SCOPUS Indexed**)
- M. Muthukumar, A. Sivapathi, L. Prabakaran and S. Gopalakrishnan, Performance analysis of thresholding techniques on weld x-radiography images, *ARPN Journal of Engineering and Applied Sciences*, 11(2016) 12836- 12842. (**SCOPUS Indexed**)
- Muthukumar Malarvel, Harjeet Singh, Varsha Singh, Detection and diagnosis of malaria through computer vision methods: A systematic review and meta-analysis, *Current Infectious Disease Reports*, Springer (**SCI-Under Review**)
- Harjeet Singh, R. K Sharma, Muthukumar Malarvel, Strokes clustering based segmentation of online handwritten words for Gurmukhi script, *Pattern Recognition Letters*, Elsevier (**SCI-Under Review**)

#### **Conference publications:**

- Shivani Sood, Harjeet Singh, Muthukumar Malarvel, Rakesh Ahuja, Significance and Limitations of Deep Neural Networks for Image Classification and Object Detection, 2021 2nd International Conference on Smart Electronics and Communication (ICOSEC 2021), 1453-1460 (**SCOPUS INDEXED**)
- Muthukumar Malarvel, Harjeet Singh, Soumya Ranjan Nayak, An Improved Kernel Density Estimation with adaptive bandwidth selection for Edge detection, 3rd International Conference on Intelligent Communication Technologies and Virtual Mobile Networks (ICICV 2021)-IEEE Explore (**SCOPUS Indexed**)
- Dimple Nagpal, Surya Narayan Panda, Muthukumar Malarvel, Hypertensive Retinopathy Screening through Fundus Images A Review, 6th International Conference on Inventive Computation Technologies ICICT 2021-IEEE Explore (**SCOPUS Indexed**).

- Muthukumaran Malarvel and Harjeet Singh, An automatic assessment of histogram mode on X-radiography weld image using non-maxima suppression, 3<sup>rd</sup> International conference on smart systems and inventive technology (ICSSIT 2020)- IEEEExplore, (**SCOPUS Indexed**)
- Muthukumaran Malarvel and Soumya Ranjan Nayak, Region grow using fuzzy automated seed selection for weld defect segmentation in X-radiography image, The International Conference on Artificial Intelligence in Manufacturing & Renewable Energy (ICAIMRE – 2019). (**SCOPUS Indexed**)
- Muthukumaran Malarvel, Gopalakrishnan Sethumadhavan, Purna Chandra Rao Bhagi, Thangavel Saravanan, Arunmuthu Krishnan, Region growing based segmentation with automatic seed selection using threshold techniques on X-radiography images, 2016 IEEE International Conference on Computational Intelligence and Computing Research. (**SCOPUS Indexed**)
- Presented a paper in the proceedings **KEYNOTE 2013** National Conference organized by CARE Group of Institutions, Trichy on 7<sup>th</sup> Feb'2013.
- Presented a paper at the National Level Conference on the Information Computing **NIC'13** organized by Shri Angalamman College of Eng and Tech, Trichy held on 28<sup>th</sup> March'2013.
- Presented a paper at the National Conference On Emerging Trends In Engineering, Technology & Management **ETETM'13** organized by Oxford Engineering College, Trichy held on 6<sup>th</sup> April'2013.

#### **Chapter publications:**

- Ankita Tiwari, Bhawana Sahu, Jagalingam Pushaparaj, Muthukumaran Malarvel, A Comparative Study of Different Classifiers to Propose a GONN for Breast Cancer Detection, Machine Vision Inspection Systems Volume 2: Machine Learning-Based Approaches, pp 155-170, Wiley-Scrivener Publishing LLC, 2021. DOI:10.1002/9781119786122.
- Muthukumaran Malarvel, S Sivakumar, A Performance Study of Image Quality Attributes on Smoothened Image Obtained by Anisotropic Diffusion-Based Models: A Comparative Study and Performance Evaluation, IGI-Global, 2019. (**SCOPUS Indexed**).
- Sankaran S., Hagerty J.R., Muthukumaran Malarvel, Sethumadhavan G., Stoecker W.V. (2019) A Comparative Assessment of Segmentations on Skin Lesion Through Various Entropy and Six Sigma Thresholds. In: Proceedings of the International Conference on ISMAC in Computational Vision and Bio-Engineering 2018 (ISMAC-CVB). ISMAC 2018. vol 30. Springer, Cham (**SCOPUS Indexed**).

#### **Book**

- Soumya Ranjan Nayak, Biswa Mohan Sahoo, Muthukumaran Malarvel, Jibitesh Mishra, titled: Smart Sensor Networks using AI for industry 4.0: Applications and new opportunities, **Taylor & Francis- CRC Press, Oct 2021, ISBN 9780367702120.**
- Muthukumaran Malarvel, Soumya Ranjan Nayak , Prasant Kumar Pattnaik, Surya Narayan Panda. Titled: Machine vision inspection systems, Volume 2: Machine learning-based approaches, **John-Wiley Publications, Jan 2021,**  
**<https://onlinelibrary.wiley.com/doi/book/10.1002/9781119786122>**
- Muthukumaran Malarvel, Soumya Ranjan Nayak , Surya Narayan Panda, Prasant Kumar Pattnaik , N. Muangnak, Titled: Machine vision inspection systems: Image Processing, Concepts, Methodologies and Applications, **John-Wiley Publications (May-2020),**  
**<https://onlinelibrary.wiley.com/doi/book/10.1002/9781119682042>.**

### Patents

- Muthukumaran Malarvel, M Kathiravan, A Device For Conversion Of Visual Gestures Into Handwritten Of Deaf /Physically Challenged People, Australian Patent, August 2021, No 2021105337 (**Granted**)
- Harjeet Singh, Muthukumaran Malarvel, Partha Khanra, System and method for transcription, IP 202011031195, July 2020.
- Muthukumaran Malarvel and Soumya Ranjan Nayak, Device for segregating objects in limited illumination, IP 201911041599, October-2019 (**Granted #354455 dt: 24<sup>th</sup> Dec 2020**).
- Soumya Ranjan Nayak and Muthukumaran Malarvel, Device For Surface Roughness Measurement Of An Object, IP 201911043717, October-2019 (**Granted**).

### Fellowship and awards

- Senior Research Fellowship, Board of Research in Nuclear Sciences (BRNS) grant no.2013/36/40-BRNS at SASTRA University, Thanjavur, India.
- IEEE senior member

### Editor and reviewer role

- Editorial member in International Journal of Medical Imaging.
- Reviewer of IEEE Access, Soft Computing, Journal of Intelligent and Fuzzy Systems-IOS Press, IET Image Processing, Abstract and Applied Analysis-Hindawi, Abstract and Applied Mathematics, IGI Global, International Journal of computer vision and image processing.

## **Memberships**

- **IEEE Senior Member.**
- **Member IEEE Signal Processing Society.**
- **Member of Indian Society for non-destructive testing (ISNT), Chennai, India.**
- **Professional Member of Association for Computing Machinery (ACM)**
- Member of International Association of Engineers (IAENG) No. 220962.
- Member in the computer science teachers association (CSTA) in partnership with ACM.
- Elsevier publishing campus.
- Research Gate (current RG score 15.96)