

Name: **DR. RANJAN K. SENAPATI**

Designation: Professor

Department: ECE

Mail ID: ranjan\_ks@vnrvjiet.in

Experience (in years): Teaching: 19 Research: 8 Others (If any, Specify):



### 1. Educational / Technical qualifications:

S.No	Level (UG / PG / Ph.D)	Year of passing	Specialization
1	Ph.D (NIT Rourkela)	2013	Image Processing
2	M.Tech (NIT Warangal)	2004	Electronics and Instrumentation
3	AMIETE	2000	Electronics & Communication Engineering

### 2. Teaching and Learning:

2.1. Teaching Interests: Digital Signal Processing, Image/Video Processing, Signals and Systems, CMOS VLSI design, Digital design through VHDL/Verilog, Microcontrollers and Microprocessors.

2.2. Novel Teaching & Learning Techniques adopted: Lab taken to class, Practical applications of the theory taught in the class room.

2.3. Involvement in curriculum updating / Design: Member Boards of studies and Academic council

### 3. Co-curricular and Extra-Curricular Activities

3.1. Interests and Hobbies: Interest in Teaching and Research, Helping students who are weak yet interested, and encourage students to work smart.

3.2. Counseling and Mentoring Activity: Counseled many students related to their personal and professional problems.

3.3. Committees involved in:

Department level:

- Handled DSP, MPMC, ECAD and VLSI Laboratories.
- Chairman for departmental development committee.
- Academic coordinator for III year (ECE-1 and ECE-2) B.Tech.
- Academic coordinator for 1<sup>st</sup> year ECE-1
- SPOC- Admission process
- NBA coordinator (Criterion-9)
- Member Project review Committee (M. Tech ES)
- Research coordinator (Signal Processing Group)

Institute Level:

- Departmental coordinator for ED cell.
- Nodal coordinator for virtual lab, (Nodal center: IIIT Hyderabad)
- Proctor coordinator for FDP on “ICT Tools for Teaching, Learning Process & Institutes” from 15<sup>th</sup> to 26<sup>th</sup> March 2021. (Mentor Institute: NIT Patna)

### 4. Conference / Workshop / Seminar / Guest Lectures:

4.1. Conducted:

- Advanced Optimization Techniques in Engineering and Management” (AOTEM) from 5<sup>th</sup>-7<sup>th</sup> April 2013 at GMR Institute of Techniques.
- IEEE Int Conf of Signal Processing and Communication Engineering Systems form 2-3 Jan 2015 at K L University.

- Organised 2 days National workshop on ‘Real time signal processing using TMS 320C6713’ in coordination with Signal Processing research group and Real time signal processing tech, Bangalore on 12-13<sup>th</sup> sept 2014.

#### 4.2. Attended:

- “Sensor N/Ws and IoT”, E & ICT academy NIT Warangal and VNRVJIET, from 26<sup>th</sup> - 31<sup>st</sup> Aug 2019.
- “Deep learning”, Benett University, Noida, from 4<sup>th</sup>-9<sup>th</sup> May 2020.
- “Artificial Intelligence” ATAL MSME, Bhopal, from 29<sup>th</sup>-4<sup>th</sup> July 2020.
- “3D printing for industrial and biomedical applications”, E & ICT, NIT Patna, from 2<sup>nd</sup>-6<sup>th</sup> Dec 2019.
- “Effective online teaching using ICT tools”, VNR VJIET, Hyderabad, form 29<sup>th</sup>-4<sup>th</sup> July 2020.
- “Human Values” at KL University, Vijayawada during 26-05-2014 to 31-05-2014.
- “Professors workshop on FPGA based system design using Altera tools” sponsored by Altera University programme and Enixs Technology on 19-09-2009 at NIT Rourkela.
- “A two day national workshop on applications of microprocessors and microcontrollers” at GMR Institute of technology-Rajam from 18.02.2008 to 19.02.2008.
- “Advances in DSP” at GMR Institute of Technology-Rajam from 26-03-2007 to 30-03-2007.
- “Design of Sensor based Embedded System using 8051” at MVSR Engineering College-Hyderabad from 04-12-2006 to 05-12-2006.
- “Recent Trends in Nanoelectronics” at GMR Institute of Technology-Rajam from 08-09-2006 to 09-09-2006.
- “Embedded Systems” at Deccan College of Engineering-Hyderabad from 09-01-2006 to 10-01-2006.
- “Faculty development programme” at Vasavicollege of engineering conducted by Technical teachers training institute (TTTI) from 1-11-2004 to 9.11.2004.
- “Probability theory and Stochastic Processes” at CVR College of Engineering-Hyderabad from 23-05-2003 to 28-05-2003.
- “Effective teaching methodology” at CBIT Gandipet, Hyderabad from 24-11-2003 to 29-11-2003.

### 5. Academic Contribution and Research & Consultancy:

5.1. Invited Lectures: Delivered a guest lecture “Embedded Image Compression for Low memory devices” on Dec’ 2016 at VNR VJIET.

#### 5.2. Articles/Chapters published in Books:--

S. No.	Authors	Title of the book chapter, vol, pages, year	Book title/Publisher	ISSN/ISBN
1	Lavanya M., Ranjan K. Senapati, JVR Ravindra	Image multiplication with a power-efficient approximate multiplier using a 4: 2 compressor, vol.1, pp.1-13, 2021	Advances in Image and Data Processing using VLSI Design/ IOP Publishing Ltd.	750339179
2	Amir Usman W., Ranjan K.	A secure video watermarking approach using CRT theorem in	LNEE Springer	1876-1100

	Senapati, S. Ekkeli	DCT domain, vol. 521, pp. 597-606, 2018		
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5.3. Books published as single author or as editor:--

5.4. Projects Guided:

a) UG: Guided 50 in the areas of Digital Signal Processing,  
Image/Video Processing

Sl. No.	Title of Dissertation/Project	Name of the student/s		Year
		Institute		
1	Real time driver monitoring system using open CV	Hari Prasad H., Laxminarasimha B., Vatsal A.	VNR VJIET	2021
2	Design of safety helmet for for deep mining applications using Arduino	Shravya K., Yamini M., Keerthi D., Harika K.	VNR VJIET	2019
3	Feature based image watermarking algorithm using DWT and SVD for copyright protection	Sajeed Md. et al.	VNR VJIET	2018
4	Content based image retrieval using Zernike moments	Pooja A., Anand V.	VNR VJIET	2019
5	Stationary vending machine	Harshitha B.S., Sravya Chowdary, Vishnu	VNR VJIET	2020
6	Compression and denoising of medical images using Autoencoders	Rohit B, Anudeep K, Nithin M, Suraj S.	VNR VJIET	2022
7	Content based image retrieval for medical images	Nikitha B., Srikar B., Prasanna M., Sowmyasree M., Prashanth Kumar V.	VNR VJIET	2022
8	An optimised DA architecture for 4x4 DTT	Prasad P., Shabnam S., Jagadeesh Ch, K Srinath K.	K L University	2015
9	A low complexity 4x4 transform for h.265 video codec	Srikanth G, Sujeeth K, Balaji GSVV, Prasad SJ.	K L University	2015
10	Medical compression using 3D listless block partitioning	Harshitha I., Jyothirmayee K., Shanmukha Sai, Vinni Krishna	K L University	2015
11	Image compression using DTT and Fuzzy-SPIHT	Nagasri Borra et al.	K L University	2014

b) PG:

S. No.	Name of the student	Title of the M. Tech thesis	Year
1	P.V. Ram Prathap	An efficient VLSI architecture for lifting based flipping DWT	2013
2	Aparna Lakshmi Mooragondi	Design and Implementation of Skein cryptographic hash function using verilog HDL	2016
3	P. Venkat Laxman	Design of a high-performance ternary multiplier using CNTFET	2019

5.5. Research Interests:

DigitalSignalProcessing, Wavelet/Curvelet/Non-decimated

Wavelet/Anisotropic/DCT/DTT/DHT and Low complexity (integer) Transforms, Image and Video Compression International Standards, Watermarking, Classification and Pattern recognition problems, ROM less Distributed Arithmetic (DA) VLSI architecture design for transform kernels, 3D Medical Image Processing using Deep Learning.

5.6. Ph.D students:

S. No.	Name of the Scholar	Title of the Doctoral thesis	Status	Year of award
1	G. Sucharitha	Development of novel image retrieval algorithms for multimedia applications	Awarded	2019
2	J.L. Divya Shivani	On the development and analysis of blind image watermarking algorithms for digital still images	Awarded	2019
3	Santosh Nagnath Randive	Development of computer aided diagnostic techniques for detection and classification of diabetic retinopathy	Awarded	2021
4	M. Lavanya	Low-Power High-Speed Resilient Architectures for Highly Sensitive Arithmetic Circuits	Submitted	2022
5	Amir Usman Wagdirkar	Optimised interesting region identification for robust video watermarking	On-going	-

5.7. Papers published in National / International Journals: (8 Journal papers in SCI/SCIE)

S.No	Title of the Paper	Journal Name Vol No. PP	ISBN/ISSN No.	Impact Factor/ Citation Index	National/ International
1	Listless Block-Tree Set Partitioning Algorithm for Very Low Bit Rate Embedded Image Compression	Int. J. of Electronics and Communication, Elsevier Science, vol. 66, issue 12, pp. 985-995. 2012	1434-8411	2.115 [SCI/SCIE]	Int.

2	A Reduced Memory, Low Complexity Embedded Image Coding Algorithm Using Hierarchical Listless DTT	IET Image Processing Vol. 8, Issue. 4, pp-213-238, 2014.	1751-9667	1.401 [SCI/Scopus]	Int.
3	Low bit rate image compression using hierarchical listless DTT algorithm	Image and Graphics World scientific, vol. 13, no. 1, pp. 1450020-1:32.	1793-6756	0.3 [WoS/ESCI]	Int.
4	An Efficient Sparse 8×8 Orthogonal Transform Matrix for Color Image Compression	Int. J. of Signal and Imaging System Engineering, vol. 6, no.1, pp. 16-23, Inderscience Pub.	1748-0701	0.418 [Scopus]	Int.
5	A Fast Zigzag Prune 4×4 DTT Algorithm for Image Compression	WSEAS Transaction on Signal Processing, Vol. 7, issue 1, pp. 34-43, 2012.	1790-5052	0.781 [Scopus]	National
6	Improved listless embedded block partitioning algorithm for image compression	Image and Graphics, vol. 14, issue. 4, pp. 1450020-1450051, World Scientific	1793-6756	0.3 [WoS/ESCI]	Int.
7	An optimized distributed arithmetic architecture for 8x8 DTT	IJET, vol. 7, no. 4, pp. 1278-1290, 2015.	0975-4024	0.481 [Scopus]	Int.
8	Bright Lesion Detection in Color Fundus Images Based	Research J. of applied sciences, Engineering and Technology, Vol.	2040-7467	0.47 Google Sc	Int.

	on Texture Features	12, Issue. 3, pp. 345-360.			
9	Assessment of diabetic retinopathy grading by the identification of lesions in optic color fundus images using curvelet, thresholding and SVM classifier methods	Far East J. of Electronics and communication, Vol. 16, Issue 2, pp. 325-341.	0973-7006	0.2 [Scopus]	Int.
10	Improving authentication of an Iris recognition system by digital signature via elliptic curve cryptosystem	Int. J. of computer science and information security, vol. 14, no.5	1947-5500	0.519 [WoS, Scopus]	Int.
11	Design and implementation of the lighter version of skin cryptographic hash function using verilog HDL	J. of engineering and applied sciences, Medwell Journals, vol. 11, issue 1, pp. 162-166,	1819-6608	0.7 [Scopus]	Int.
12	Prototype design using internet of things for motion detection in security rooms	J. of theoretical and applied information technology (JATIT), vol. 88, no.2, pp. 231-237, 2016.	2319-8613	0.5 [Scopus]	Int.
13	Intrusion detection system in Manets with Elgamal digital signature	Far East J. of Electronics and communication, Vol. 16, Issue 3, pp. 471-474, 2016.	0973-7006	0.2 [Scopus]	Int.
14	Video compression on H.264/AVC baseline profile using 4x4	ARNP journal of applied sciences, vol. 11, no. 17, sept 2016.	1819-6608	0.4 [Scopus]	Int.

	integer transform				
15	Volumetric medical image compression using 3D listless embedded partitioning	SpringerPlus, Springer, Vol. 5, pp. 2100-2114, 2016.	2193-1801	0.981 [SCIE ]	Int.
16	Computerized diabetic Patients Fundus image screening for lesion region detection and grading	Journal of Biomedical Research, vol. 28, issue 3, pp. 1-7, 2016.	0970-938X	0.228 [SCIE]	Int.
17	Curvelet Fusion Enhancement Based Evaluation of Diabetic Retinopathy by the identification of Exudates in Optic Color Fundus Images	Biomedical Engineering: Applications, Basis & Communications, vol. 28, issue 5, pp. 1650046-1:10.	1016-2372	0.5 [WoS/Scopus]	Int.
18	Study and performance analysis of different MRI brain tumour segmentation methodologies for medical applications	IJCTA, Vol. 10, issue 5, pp. 967-975, 2017.	0974-5572	0.53 Google Scholar/UGC	Int.
19	An Efficient VLSI Architecture for Lifting-Based Flipping Discrete Wavelet Transform	IJERT, 2(11), pp. 4233-4240, 2013	2278-0181	2.85 Google Scholar	Int.

20	Survey on multigrained reconfigurable architecture using parallel mapping metod	INDJST, Vol. 10, issue 6, pp. 1-6. 2017	0974-6846	0.564[WoS/Scopus]	National
21	Face recognition of illuminated images using DWT and PCA	Int. J. of Computer Science and Information Tech, vol. 3, issue 2, pp. 1-5. 2015.	2278-9669	1.315 Google Scholar	Int.
22	A CRT based robust image watermarking using DTT	ARPJ. of engineering and applied sciences, vol.12, no.11, pp. 3600-3606, Jun 2017.	1819-6608	0.4 [Scopus]	Int.
23	Robust image embedded watermarking using DCT and Listless SPIHT	Future Internet-MDPI, vol.9, no.3, pp.1-16, July 2017.	1999-5903	0.789 [WoS/Scopus]	Int.
24	Shape based image retrieval using lower order Zernike moments	Int. J. on electrical and computer engineering, vol. 7, issue 3, pp. 1144-1153, 2017	2088-8708	1.09 [Scopus]	Int.
25	Design of multiobjective cost function for robust video watermarking using wavelet transform	J. of intelligent systems, In press. doi:10.1515/jisys-2017-0264	0334-2860	0.206 [Scopus]	Int.
26	Optimized image retrieval using HSV color space, Local edge binary patterns and	J of engineering and applied sciences. vol. 13, issue 16, 6777-6786, 2018	1818-7803	0.7 [Scopus]	Int.

	Zernike moments				
27	LVP extraction and triplet-based segmentation for diabetic retinopathy recognition	Evolutionary Intelligence-Springer, vol. 11, no.1, 28 June 2018	1864-5909	0.991 [Scopus, WoS]	Int.
28	Intelligent model for diabetic retinopathy diagnosis	Int. J. of bioinformatics research and applications, Inderscience, 2018. (Special Issue on: Parallel Computing Methodologies for E-Medicine)	1744-5493	0.5 [Scopus]	Int.
29	A review on computer-aided recent developments doe automatic detection of diabetic retinopathy	J. of medical engineering and technology, Taylor and Francis, 2018. (In press)	0309-1902	1.438 [Scopus]	Int.
30	Feature based robust image watermarking using DTT and SVD for copyright protection	Int. J. of Systems, Science and Technology, vol. 19, no.6, pp.7.1-7.12	1743-804x	0.04 [Scopus]	Int.
31	Local quantized edge binary patterns for color texture image retrieval	J. of theoretical and applied information technology (JATIT), vol. 96, no.2, Jan 2018.	1817-3195	0.382 [Scopus]	Int.

32	Geometrically invariant watermarking scheme based on DTT and SVD	Multimedia tools and applications- Springer, 2018. (Under minor revision)	1380-7501	1.541 [Scopus, SCIE]	Int.
33	Optimised image retrieval using HSV color space, Local edge binary patterns and Zernike moments	J. of engg and applied sciences. Medwell Journal, 2018. vol. 13, issue 16, 6777-6786	1818-7803	0.31 [Scopus]	Int.
34	A Self Adaptive Optimization for Diabetic Retinopathy Detection with Neural Classification.	Int. J. of nano and biomaterials, Inderscience Pub. 2018. (Special Issue on: Intelligence in Applications of Bio and Nano Materials)	1752-8941	0.342 [Scopus]	Int.
35	Optimization based interesting region identification for video watermarking	Journal of Information Security and Applications- Elsevier, vol. 49, pp. 1-17, 2019	2214-2126	2.327 [Scopus, SCIE]	Int.
36	Biomedical image retrieval using local directional edge binary pattern and Zernike moments	Multimedia Tools and Applications- Springer, vol. 79, pages,1847–1864, 2020	1380-7501	2.313 [Scopus, SCIE]	Int.
37	Design of a high performance 4-bit ternary multiplier using CNTFET	IJITEE, vol. 9, issue 2, pp.3106-3111, 2020	2278-3075	Cite value: 6.03 Scopus	Int.
38	Tri-concomitant local feature learning for diabetic retinopathy classification	IJEAT, vol. 9, issue 2, dec 2019	2249-8958	Scopus	Int.
39	Training NN as approximate 4:2compressor	IJATCSE, vol. 8, no. 2, Mar-Apr 2019.	278-3091	Scopus	Int.

	applying M/L for accuracy comparison				
40	A secure communication approach in OFDM using Optimized interesting region based Video Watermarking.	International Journal of Pervasive Computing and Communications-emerald publisher (in press), 2020.	1742-7371	0.97 Scopus, WoS	Int.
41	Accuracy evaluation of trained NN by energy efficient 4:2 approximate compressor	Computers and Electrical Engineering-Science Direct, Vol. 92, April 2021	0045-7906	2.663, [SCIE, WoS, Scopus]	Int.

5.8. Papers presented at National / International Conferences:

S.No	Title of the Paper	Names of the Conference/ Seminars	National/ International	Period
1	Image compression using discrete Tchebichef transform algorithm	IEEE international conference on Communication Network and Computing (CNC), Calicut, Kerala, India, pp. 104-108.	Int.	Oct. 2010
2	A novel zigzag prune discrete Tchebichef moment based image compression algorithm	IEEE international conference on Computational Intelligence and Communication Network (CICN), Bhopal, India, pp. 73-78.	Int.	Nov. 2010.
3	A low complexity orthogonal 8x8 transform matrix for fast image compression	IEEE annual India international conference (INDICON), Kolkata, India, pp. 1-4. (citation 8)	Int.	Dec. 2010
4	An efficient sparse 8x8 orthogonal transform matrix for color image compression	International conference on electronics systems (ICES), NIT Rourkela, India	Int.	7-9 <sup>th</sup> Jan. 2011.
5	A novel hybrid HVS based embedded image coding algorithm using DTT and SPIHT	IEEE International conference on devices and communication (ICDeCom), Mesra, Ranchi. (citation 8)	Int.	Feb. 2011

6	A low complexity embedded image coding algorithm using hierarchical listless DTT	8 <sup>th</sup> IEEE International conference on information, communications and signal processing (ICICS), NTU, Singapore (citation 6)	Int.	Dec. 2011.
7	A review on region based image retrieval in CBIR	ICIEEE at GNITC Hyderabad	Int.	5-6 <sup>th</sup> September 2014
8	Novel and robust watermarking scheme for H.264 videos	IEEE SPACES, KLU Vijayawada,	Int.	Jan. 2015
9	Color Image Coding Using a Novel Embedded Block Partitioning Algorithm	IEEE INDICON Pune section	Int.	11-13 Dec.2014, Pune
10	A secure video watermarking scheme using CRT theorem in DCT domain	ICMEET-2018 GVP College of Engineering, Vizag	Int	3-4 Feb 2018 GVPCE, Vizag
11	Local extreme co-occurrence edge binary pattern for bio medical image retrieval	IEEE-ICACCP-2019 Sikkim Manipal University, Sikkim	Int.	25-28 Feb 2019.
12	Smart Helmet for Safe Driving	SaFet-2019, GRIET-Hyderabad	Int.	14-16 Feb. 2019.
13	Spherical directional feature extraction with neural network for diabetic retinopathy classification	13 <sup>th</sup> IICIIS 2018 at IIT Rooper	Int.	1-2 <sup>nd</sup> Dec 2018.
14	A NN trained to perform an imprecise 4:2 compressor using ML algorithm	IOP conference series: Material Science and Engineering	Int.	2021
15	Robust watermarking in presence of noise	AITA 2021 proceedings – published in J. of biological engg. Research and review, 8(2), pp. 66-70, Apr 2022.	Int.	2022

16	Improvement in accuracy of BNN based 4:2 compressor using denoising techniques	AITA 2021 proceedings – published in J. of biological engg. Research and review, 8(2), pp. 66-70, Apr 2022.	Int.	2022
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5.9. Sponsored research Projects:

- Applied 2 projects to DST and ISRO.

5.10. Consultancy Projects: Nil

## 6. Awards / Honors received:

- Secured AIR 641 with 91.69 percentile on GATE 2001.
- Reviewer of IET Image Processing, Int. J. of image and graphics (World scientific), Hindawi, J. of Electronic Imaging-SPIE.
- Session Chair in Int. Conf on IEEE (ICIEEE) conducted by GNITC, Hyderabad during 5<sup>th</sup>-6<sup>th</sup> Sept. 2014.
- Resource person for LATEX tool at ‘LATEX workshop’ organized by GMRIT Rajam, 2012.
- Resource person at ‘Embedded Systems and its Applications’ workshop organized by GMRIT Rajam, 2007.
- Received 3<sup>rd</sup> prize as Institute level coordinator (VNR VJIET) for virtual lab mentored by IIIT Hyderabad.
- Published Indian patent titled ‘Intelligent caregiver wireless monitor and motion sensor for safe home system applicable for elderly people’, Application No. 202241008796, on 03/2022.
- Published Indian patent titled ‘An Algorithm Based on Deep Learning for the Detection of COVID-19 Infections’, Application No. 202241000074, on 14/01/2022.
- Filed one Canadian patent titled ‘AI & Image processing-based system for concocation proportion verification for Pharmaceutical industry’.
- Invited and conducted project viva-voce practical external examination for B.E. VIII-Sem ECE-B (Main) at Vasavi College of Engineering, Ibrahimbagh, Hyderabad on 9-10<sup>th</sup> June 2022
- Editor of Journal of engineering design and computational science.
- Scopus link: Senapati, R. K. - Author details - Scopus Preview

7. **Motto:** Will power is the basis of perseverance.