Editor In Chief
Dr. Shiv K Sahu
Ph.D. (CSE), M.Tech. (IT, Honors), B.Tech. (IT)
Director, Blue Eyes Intelligence Engineering & Sciences Publication Pvt. Ltd., Bhopal (M.P.), India

Dr. Shachi Sahu
Ph.D. (Chemistry), M.Sc. (Organic Chemistry)
Additional Director, Blue Eyes Intelligence Engineering & Sciences Publication Pvt. Ltd., Bhopal (M.P.), India

Vice Editor In Chief
Dr. Vahid Nourani
Professor, Faculty of Civil Engineering, University of Tabriz, Iran

Prof.(Dr.) Anuranjan Misra
Professor & Head, Computer Science & Engineering and Information Technology & Engineering, Noida International University, Noida (U.P.), India

Chief Advisory Board
Prof. (Dr.) Hamid Saremi
Vice Chancellor of Islamic Azad University of Iran, Quchan Branch, Quchan-Iran

Dr. Uma Shanker
Professor & Head, Department of Mathematics, CEC, Bilaspur(C.G.), India

Dr. Rama Shanker
Professor & Head, Department of Statistics, Eritrea Institute of Technology, Asmara, Eritrea

Dr. Vinita Kumari
Blue Eyes Intelligence Engineering & Sciences Publication Pvt. Ltd., India

Dr. Kapil Kumar Bansal
Head (Research and Publication), SRM University, Gaziabad (U.P.), India

Dr. Deepak Garg
Professor, Department of Computer Science and Engineering, Thapar University, Patiala (Punjab), India, Senior Member of IEEE, Secretary of IEEE Computer Society (Delhi Section), Life Member of Computer Society of India (CSI), Indian Society of Technical Education (ISTE), Indian Science Congress Association Kolkata.

Dr. Vijay Anant Athavale
Director of SVS Group of Institutions, Mawana, Meerut (U.P.) India/ U.P. Technical University, India

Dr. T.C. Manjunath
Principal & Professor, HKBK College of Engg, Nagawara, Arabic College Road, Bengaluru-560045, Karnataka, India

Dr. Kosta Yogeshwar Prasad
Director, Technical Campus, Marwadi Education Foundation’s Group of Institutions, Rajkot-Morbi Highway, Gauridad, Rajkot, Gujarat, India

Dr. Dinesh Varshney
Director of College Development Counseling, Devi Ahilya University, Indore (M.P.), Professor, School of Physics, Devi Ahilya University, Indore (M.P.), and Regional Director, Madhya Pradesh Bhoj (Open) University, Indore (M.P.), India

Dr. P. Dananjayan
Professor, Department of Department of ECE, Pondicherry Engineering College, Pondicherry, India

Dr. Sadhana Vishwakarma
Associate Professor, Department of Engineering Chemistry, Technocrat Institute of Technology, Bhopal(M.P.), India

Dr. Kamal Mehta
Associate Professor, Deptment of Computer Engineering, Institute of Technology, NIRMA University, Ahmedabad (Gujarat), India

Dr. CheeFai Tan
Faculty of Mechanical Engineering, University Technical, Malaysia Melaka, Malaysia

Dr. Suresh Babu Perli
Professor & Head, Department of Electrical and Electronic Engineering, Narasaraopeta Engineering College, Guntur, A.P., India
Dr. Binod Kumar  
Associate Professor, School of Engineering and Computer Technology, Faculty of Integrative Sciences and Technology, Quest International University, Ipoh, Perak, Malaysia

Dr. Chiladze George  
Professor, Faculty of Law, Akhaltsikhe State University, Tbilisi University, Georgia

Dr. Kavita Khare  
Professor, Department of Electronics & Communication Engineering, MANIT, Bhopal (M.P.), INDIA

Dr. C. Saravanan  
Associate Professor (System Manager) & Head, Computer Center, NIT, Durgapur, W.B. India

Dr. S. Saravanan  
Professor, Department of Electrical and Electronics Engineering, Muthayamal Engineering College, Resipuram, Tamilnadu, India

Dr. Amit Kumar Garg  
Professor & Head, Department of Electronics and Communication Engineering, Maharishi Markandeshwar University, Mulllana, Ambala (Haryana), India

Dr. T.C.Manjunath  
Principal & Professor, HKBK College of Engg, Nagawara, Arabic College Road, Bengaluru-560045, Karnataka, India

Dr. P. Dananjayan  
Professor, Department of Department of ECE, Pondicherry Engineering College, Pondicherry, India

Dr. Kamal K Mehta  
Associate Professor, Department of Computer Engineering, Institute of Technology, NIRMA University, Ahmedabad (Gujarat), India

Dr. Rajiv Srivastava  
Director, Department of Computer Science & Engineering, Sagar Institute of Research & Technology, Bhopal (M.P.), India

Dr. Chakunta Venkata Guru Rao  
Professor, Department of Computer Science & Engineering, SR Engineering College, Ananthasagar, Warangal, Andhra Pradesh, India

Dr. Anuranjan Misra  
Professor, Department of Computer Science & Engineering, Bhagwant Institute of Technology, NH-24, Jindal Nagar, Ghaziabad, India

Dr. Robert Brian Smith  
International Development Assistance Consultant, Department of AEC Consultants Pty Ltd, AEC Consultants Pty Ltd, Macquarie Centre, North Ryde, New South Wales, Australia

Dr. Saber Mohamed Abd-Allah  
Associate Professor, Department of Biochemistry, Shanghai Institute of Biochemistry and Cell Biology, Yue Yang Road, Shanghai, China

Dr. Himani Sharma  
Professor & Dean, Department of Electronics & Communication Engineering, MLR Institute of Technology, Laxman Reddy Avenue, Dundigal, Hyderabad, India

Dr. Sahab Singh  
Associate Professor, Department of Management Studies, Dronacharya Group of Institutions, Knowledge Park-III, Greater Noida, India

Dr. Umesh Kumar  
Principal: Govt Women Poly, Ranchi, India

Dr. Syed Zaheer Hasan  
Scientist-G Petroleum Research Wing, Gujarat Energy Research and Management Institute, Energy Building, Pandit Deendayal Petroleum University Campus, Raisan, Gandhinagar-382007, Gujarat, India.

Dr. Jaswant Singh Bhmorah  
Director, Department of Profit Oriented Technique, 1 – B Crystal Gold, Vimalpore Road, Navsari 396445, Gujarat, India

**Technical Advisory Board**

Dr. Mohd. Husain  
Director, MG Institute of Management & Technology, Banthara, Lucknow (U.P.), India
Dr. T. Jayanthy  
Principal, Panimalar Institute of Technology, Chennai (TN), India

Dr. Umesh A.S.  
Director, Technocrats Institute of Technology & Science, Bhopal (M.P.), India

Dr. B. Kanagasabapathi  
Infosys Labs, Infosys Limited, Center for Advance Modeling and Simulation, Infosys Labs, Infosys Limited, Electronics City, Bangalore, India

Dr. C.B. Gupta  
Professor, Department of Mathematics, Birla Institute of Technology & Sciences, Pilani (Rajasthan), India

Dr. Sunandan Bhunia  
Associate Professor & Head, Dept. of Electronics & Communication Engineering, Haldia Institute of Technology, Haldia, West Bengal, India

Dr. Jaydeb Bhaumik  
Associate Professor, Dept. of Electronics & Communication Engineering, Haldia Institute of Technology, Haldia, West Bengal, India

Dr. Rajesh Das  
Associate Professor, School of Applied Sciences, Haldia Institute of Technology, Haldia, West Bengal, India

Dr. Mrutyunjaya Panda  
Professor & Head, Department of EEE, Gandhi Institute for Technological Development, Bhubaneswar, Odisha, India

Dr. Mohd. Nazri Ismail  
Associate Professor, Department of System and Networking, University of Kuala (UniKL), Kuala Lumpur, Malaysia

Dr. Haw Su Cheng  
Faculty of Information Technology, Multimedia University (MMU), Jalan Multimedia, 63100 Cyberjaya

Dr. Hossein Rajabalipour Cheshmehgaz  
Industrial Modeling and Computing Department, Faculty of Computer Science and Information Systems, Universiti Teknologi Malaysia (UTM) 81310, Skudai, Malaysia

Dr. Sudhinder Singh Chowhan  
Associate Professor, Institute of Management and Computer Science, NIMS University, Jaipur (Rajasthan), India

Dr. Neeta Sharma  
Professor & Head, Department of Communication Skills, Technocrat Institute of Technology, Bhopal (M.P.), India

Dr. Ashish Rastogi  
Associate Professor, Department of CSIT, Guru Ghansi Das University, Bilaspur (C.G.), India

Dr. Santosh Kumar Nanda  
Professor, Department of Computer Science and Engineering, Eastern Academy of Science and Technology (EAST), Khurda (Orisa), India

Dr. Hai Shanker Hota  
Associate Professor, Department of CSIT, Guru Ghansi Das University, Bilaspur (C.G.), India

Dr. Sunil Kumar Singla  
Professor, Department of Electrical and Instrumentation Engineering, Thapar University, Patiala (Punjab), India

Dr. A. K. Verma  
Professor, Department of Computer Science and Engineering, Thapar University, Patiala (Punjab), India

Dr. Durgesh Mishra  
Chairman, IEEE Computer Society Chapter Bombay Section, Chairman IEEE MP Subsection, Professor & Dean (R&D), Acropolis Institute of Technology, Indore (M.P.), India

Dr. Xiaoguang Yue  
Associate Professor, College of Computer and Information, Southwest Forestry University, Kunming (Yunnan), China

Dr. Veronica Mc Gowan  
Associate Professor, Department of Computer and Business Information Systems, Delaware Valley College, Doylestown, PA, Allman China
Dr. Hossein Rajabalipour Cheshmejgaz  
Industrial Modeling and Computing Department, Faculty of Computer Science and Information Systems, Universiti Teknologi Skudai, Malaysia

Dr. Veronica McGowan  
Associate Professor, Department of Computer and Business Information Systems, Delaware Valley College, Doylestown, PA, Allman China

Dr. Sanjay Sharma  
Associate Professor, Department of Mathematics, Bhilai Institute of Technology, Durg, Chhattisgarh, India

Dr. Taghreed Hashim Al-Noor  
Professor, Department of Chemistry, Ibn-Al-Haitham Education for pure Science College, University of Baghdad, Iraq

Dr. Madhumita Dash  
Professor, Department of Electronics & Telecommunication, Orissa Engineering College , Bhubaneswar, Odisha, India

Dr. Anita Sagadevan Ethiraj  
Associate Professor, Department of Centre for Nanotechnology Research (CNR), School of Electronics Engineering (Sense), Vellore Institute of Technology (VIT) University, Tamilnadu, India

Dr. Sibasis Acharya  
Project Consultant, Department of Metallurgy & Mineral Processing, Midas Tech International, 30 Mukiin Street, Jindalee-4074, Queensland, Australia

Dr. Neelam Ruhl  
Professor, Department of Electronics & Computer Engineering, Dronacharya College of Engineering, Gurgaon, Haryana, India

Dr. Faizullah Mahar  
Professor, Department of Electrical Engineering, Balochistan University of Engineering and Technology, Pakistan

Dr. K. Selvaraju  
Head, PG & Research, Department of Physics, Kandaswami Kandars College (Govt. Aided), Velur (PO), Namakkal DT. Tamil Nadu, India

Dr. M. K. Bhanarkar  
Associate Professor, Department of Electronics, Shivaji University, Kolhapur, Maharashtra, India

Dr. Sanjay Hari Sawant  
Professor, Department of Mechanical Engineering, Dr. J. J. Magdum College of Engineering, Jaysingpur, India

Dr. Arindam Ghosal  
Professor, Department of Mechanical Engineering, Dronacharya Group of Institutions, B-27, Part-III, Knowledge Park, Greater Noida, India

Dr. M. Chithirai Pon Selvan  
Associate Professor, Department of Mechanical Engineering, School of Engineering & Information Technology, Amity University, Dubai, UAE

Dr. S. Sambhu Prasad  
Professor & Principal, Department of Mechanical Engineering, Pragati College of Engineering, Andhra Pradesh, India.

Dr. Muhammad Attique Khan Shahid  
Professor of Physics & Chairman, Department of Physics, Advisor (SAAP) at Government Post Graduate College of Science, Faisalabad.

Dr. Kuldeep Pareta  
Professor & Head, Department of Remote Sensing/GIS & NRM, B-30 Kailash Colony, New Delhi 110 048, India

Dr. Th. Kiranbala Devi  
Associate Professor, Department of Civil Engineering, Manipur Institute of Technology, Takyelpat, Imphal, Manipur, India

Dr. Nirmala Mungamuru  
Associate Professor, Department of Computing, School of Engineering, Adama Science and Technology University, Ethiopia

Dr. Srilalitha Girija Kumari Sagi  
Associate Professor, Department of Management, Gandhi Institute of Technology and Management, India
Dr. Vishnu Narayan Mishra  
Associate Professor, Department of Mathematics, Sardar Vallabhbhai National Institute of Technology, Ichchhanath Mahadev Dumas Road, Surat (Gujarat), India

Dr. Yash Pal Singh  
Director/Principal, Somany (P.G.) Institute of Technology & Management, Garhi Bolni Road, Rewari Haryana, India.

Dr. Sripada Rama Sree  
Vice Principal, Associate Professor, Department of Computer Science and Engineering, Aditya Engineering College, Surampalem, Andhra Pradesh, India.

Dr. Rustom Mamlook  
Associate Professor, Department of Electrical and Computer Engineering, Dhofar University, Salalah, Oman. Middle East.

Dr. Ramzi Raphael Ibraheem Al Barwari  
Assistant Professor, Department of Mechanical Engineering, College of Engineering, Salahaddin University – Hawler (SUH) Erbil – Kurdistan, Erbil Iraq.

Dr. Kapil Chandra Agarwal  
H.O.D. & Professor, Department of Applied Sciences & Humanities, Radha Govind Engineering College, U. P. Technical University, Jai Bheem Nagar, Meerut, (U.P.), India.

Dr. Anil Kumar Tripathy  
Associate Professor, Department of Environmental Science & Engineering, Ghanashyama Hemalata Institute of Technology and Management, Puri Odisha, India.

Managing Editor  
Mr. Jitendra Kumar Sen  
International Journal of Engineering and Advanced Technology (IJEAT)

Editorial Board  
Dr. Soni Changlani  
Professor, Department of Electronics & Communication, Lakshmi Narain College of Technology & Science, Bhopal (M.P.), India

Dr. M.M. Manyuchi  
Professor, Department Chemical and Process Systems Engineering, Lecturer-Harare Institute of Technology, Zimbabwe

Dr. John Kaiser S. Calautit  
Professor, Department Civil Engineering, School of Civil Engineering, University of Leeds, LS2 9JT, Leeds, United Kingdom

Dr. Audai Hussein Al-Abbas  
Deputy Head, Department AL-Musaiib Technical College/ Foundation of Technical Education/Babylon, Iraq

Dr. Şeref Doğuşcan Akbaş  
Professor, Department Civil Engineering, Şehit Muhtar Mah. Öğüt Sok. No:2/37 Beyoğlu Istanbul, Turkey

Dr. H S Behera  
Associate Professor, Department Computer Science & Engineering, Veer Surendra Sai University of Technology (VSSUT) A Unitary Technical University Established by the Government of Odisha, India

Dr. Rajeev Tiwari  
Associate Professor, Department Computer Science & Engineering, University of Petroleum & Energy Studies (UPES), Bidholi, Uttrakhand, India

Dr. Piyush Kumar Shukla  
Assoc. Professor, Department of Computer Science and Engineering, University Institute of Technology, RGPV, Bhopal (M.P.), India

Dr. Piyush Lotia  
Assoc.Professor, Department of Electronics and Instrumentation, Shankaracharya College of Engineering and Technology, Bhilai (C.G.), India

Dr. Asha Rai  
Assoc. Professor, Department of Communication Skills, Technocrat Institute of Technology, Bhopal (M.P.), India

Dr. Vahid Nourani  
Assoc. Professor, Department of Civil Engineering, University of Minnesota, USA
Dr. Hung-Wei Wu
Assoc. Professor, Department of Computer and Communication, Kun Shan University, Taiwan

Dr. Vuda Sreenivasarao
Associate Professor, Department of Computer And Information Technology, Defence University College, Debrezeit Ethiopia, India

Dr. Sanjay Bhargava
Assoc. Professor, Department of Computer Science, Banasthali University, Jaipur, India

Dr. Sanjoy Deb
Assoc. Professor, Department of ECE, BIT Sathy, Sathyamangalam, Tamilnadu, India

Dr. Papita Das (Saha)
Assoc. Professor, Department of Biotechnology, National Institute of Technology, Duragpur, India

Dr. Waail Mahmood Lafta Al-waely
Assoc. Professor, Department of Mechatronics Engineering, Al-Mustafa University College – Plastain Street near AL-SAAKKRA square, Baghdad, Iraq

Dr. P. P. Satya Paul Kumar
Assoc. Professor, Department of Physical Education & Sports Sciences, University College of Physical Education & Sports Sciences, Guntur

Dr. Sohrab Mirsaeidi
Associate Professor, Department of Electrical Engineering, Universiti Teknologi Malaysia (UTM), Skudai, Johor, Malaysia

Dr. Ehsan Noroozinejad Farsangi
Associate Professor, Department of Civil Engineering, International Institute of Earthquake Engineering and Seismology (IIEES), Farmanieh, Tehran, Iran

Dr. Omed Ghereb Abdullah
Associate Professor, Department of Physics, School of Science, University of Sulaimani, Iraq

Dr. Khaled Eskaf
Associate Professor, Department of Computer Engineering, College of Computing and Information Technology, Alexandria, Egypt

Dr. Nitin W. Ingole
Associate Professor & Head, Department of Civil Engineering, Prof Ram Meghe Institute of Technology and Research, Badnera Amravati

Dr. P. K. Gupta
Associate Professor, Department of Computer Science and Engineering, Jaypee University of Information Technology, P.O. Dumehar Bani, Solan, India

Dr. P. Ganesh Kumar
Associate Professor, Department of Electronics & Communication, Sri Krishna College of Engineering and Technology, Linyi Top Network Co Ltd Linyi, Shandong Province, China

Dr. Santhosh K V
Associate Professor, Department of Instrumentation and Control Engineering, Manipal Institute of Technology, Manipal, Karnataka, India

Dr. Subhendu Kumar Pani
Assoc. Professor, Department of Computer Science and Engineering, Orissa Engineering College, India

Dr. Syed Asif Ali
Professor/ Chairman, Department of Computer Science, SMI University, Karachi, Pakistan

Dr. Vilas Warudkar
Assoc. Professor, Department of Mechanical Engineering, Maulana Azad National Institute of Technology, Bhopal, India

Dr. S. Chandra Mohan Reddy
Associate Professor & Head, Department of Electronics & Communication Engineering, JNTUA College of Engineering (Autonomous), Cuddapah, Andhra Pradesh, India

Dr. V. Chittaranjan Das
Associate Professor, Department of Mechanical Engineering, R.V.R. & J.C. College of Engineering, Guntur, Andhra Pradesh, India
Dr. Farshad Zahedi
Associate Professor, Department of Mechanical Engineering, University of Texas at Arlington, Tehran, Iran

Dr. Atishey Mittal
Associate Professor, Department of Mechanical Engineering, SRM University NCR Campus Meerut Delhi Road Modinagar, Aligarh, India

Dr. Hussein Togun
Associate Professor, Department of Mechanical Engineering, University of Thiqar, Iraq

Dr. Shrikaant Kulkarni
Associate Professor, Department of Senior faculty V.I.T., Pune (M.S.), India

Dr. Mukesh Negi
Project Manager, Department of Computer Science & IT, Mukesh Negi, Project Manager, Noida, India

Dr. Sachin Madhavrao Kanawade
Associate Professor, Department Chemical Engineering, Pravara Rural Education Society’s,Sir Visvesvaraya Institute of Technology, Nashik, India

Dr. Ganesh S Sable
Professor, Department of Electronics and Telecommunication, Maharashtra Institute of Technology Satara Parisar, Aurangabad, Maharashtra, India

Dr. T.V. Rajini Kanth
Professor, Department of Computer Science Engineering, Sreenidhi Institute of Science and Technology, Hyderabad, India

Dr. Anuj Kumar Gupta
Associate Professor, Department of Computer Science & Engineering, RIMT Institute of Engineering & Technology, NH-1, Mandi Godindgarh, Punjab, India

Dr. Hasan Ashrafi- Rizi
Associate Professor, Medical Library and Information Science Department of Health Information Technology Research Center, Isfahan University of Medical Sciences, Isfahan, Iran

Dr. Golam Kibria
Associate Professor, Department of Mechanical Engineering, Aliah University, Kolkata, India

Dr. Mohammad Jannati
Professor, Department of Energy Conversion, UTM-PROTON Future Drive Laboratory, Faculty of Electrical Engineering, Universiti Teknologi Malaysia,

Dr. Mohammed Saber Mohammed Gad
Professor, Department of Mechanical Engineering, National Research Centre- El Behoos Street, El Dokki, Giza, Cairo, Egypt,

Dr. V. Balaji
Professor, Department of EEE, Sathagiri College of Engineering Periyanaahalli,(P.O) Palacode (Taluk) Dharmapuri,

Dr. Naveen Beri
Associate Professor, Department of Mechanical Engineering, Beant College of Engg. & Tech., Gurdaspur - 143 521, Punjab, India

Dr. Abdel-Baset H. Mekky
Associate Professor, Department of Physics, Buraydah Colleges Al Qassim / Saudi Arabia

Dr. T. Abdul Razak
Associate Professor, Department of Computer Science Jamal Mohamed College (Autonomous), Tiruchirappalli – 620 020 India

Dr. Preeti Singh Bahadur
Associate Professor, Department of Applied Physics Amity University, Greater Noida (U.P.) India

Dr. Ramadan Elaiss
Associate Professor, Department of Information Studies, Faculty of Arts University of Benghazi, Libya

Dr. R. Emmaniel
Professor & Head, Department of Business Administration ST, ANN, College of Engineering & Technology Vetapaliem. Po, Chirala, Prakasam. DT, AP, India
Dr. C. Phani Ramesh
Director cum Associate Professor, Department of Computer Science Engineering, PRIST University, Manamai, Chennai Campus, India

Dr. Rachna Goswami
Associate Professor, Department of Faculty in Bio-Science, Rajiv Gandhi University of Knowledge Technologies (RGUKT) District-Krishna, Andhra Pradesh, India

Dr. Sudhakar Singh
Assoc. Prof. & Head, Department of Physics and Computer Science, Sardar Patel College of Technology, Balaghat (M.P.), India

Dr. Xiaolin Qin
Associate Professor & Assistant Director of Laboratory for Automated Reasoning and Programming, Chengdu Institute of Computer Applications, Chinese Academy of Sciences, China

Dr. Maddila Lakshmi Chaitanya
Assoc. Prof. Department of Mechanical, Pragati Engineering College 1-378, ADB Road, Surampalem, Near Peddapuram, East Godavari District, A.P., India

Dr. Jyoti Anand
Assistant Professor, Department of Mathematics, Dronacharya College of Engineering, Gurgaon, Haryana, India

Dr. Nasser Fegh-hi Farahmand
Assoc. Professor, Department of Industrial Management, College of Management, Economy and Accounting, Tabriz Branch, Islamic Azad University, Tabriz, Iran

Dr. Ravindra Jilte
Assist. Prof. & Head, Department of Mechanical Engineering, VCET Vasai, University of Mumbai , Thane, Maharashtra 401202, India

Dr. Sarita Gajbhiye Meshram
Research Scholar, Department of Water Resources Development & Management Indian Institute of Technology, Roorkee, India

Dr. G. Komarasamy
Associate Professor, Senior Grade, Department of Computer Science & Engineering, Bannari Amman Institute of Technology, Sathyamangalam,Tamil Nadu, India

Dr. P. Raman
Professor, Department of Management Studies, Panimalar Engineering College Chennai, India

Dr. M. Anto Bennet
Professor, Department of Electronics & Communication Engineering, Veltech Engineering College, Chennai, India

Dr. P. Keerthika
Associate Professor, Department of Computer Science & Engineering, Kongu Engineering College Perundurai, Tamilnadu, India

Dr. Santosh Kumar Behera
Associate Professor, Department of Education, Sidho-Kanho-Birsha University, Ranchi Road, P.O. Sainik School, Dist-Purulia, West Bengal, India

Dr. P. Suresh
Associate Professor, Department of Information Technology, Kongu Engineering College Perundurai, Tamilnadu, India

Dr. Santosh Shivajirao Lomte
Associate Professor, Department of Computer Science and Information Technology, Radhai Mahavidyalaya, N-2 J sector, opp. Aurangabad Gymkhana, Jalna Road Aurangabad, India

Dr. Altaf Ali Siyal
Professor, Department of Land and Water Management, Sindh Agriculture University Tandojam, Pakistan

Dr. Mohammad Valipour
Associate Professor, Sari Agricultural Sciences and Natural Resources University, Sari, Iran

Dr. Prakash H. Patil
Professor and Head, Department of Electronics and Tele Communication, Indira College of Engineering and Management Pune, India

Dr. Smolarek Małgorzata
Associate Professor, Department of Institute of Management and Economics, High School of Humanitas in Sosnowiec, Wyższa Szkoła Humanitas Instytut Zarządzania i Ekonomii ul. Kilińskiego Sosnowiec Poland, India
Dr. Umakant Vyankatesh Kongre  
Associate Professor, Department of Mechanical Engineering, Jawaharlal Darda Institute of Engineering and Technology, Yavatmal, Maharashtra, India

Dr. Niranjana S  
Associate Professor, Department of Biomedical Engineering, Manipal Institute of Technology (MIT) Manipal University, Manipal, Karnataka, India

Dr. Naseema Khatoon  
Associate Professor, Department of Chemistry, Integral University Lucknow (U.P), India

Dr. P. Samuel  
Associate Professor, Department of English, KSR College of Engineering Tiruchengode – 637 215 Namakkal Dt. Tamilnadu, India

Dr. Mohammad Sajid  
Associate Professor, Department of Mathematics, College of Engineering Qassim University Buraidah 51452, Al-Qassim Saudi Arabia

Dr. Sanjay Pachauri  
Associate Professor, Department of Computer Science & Engineering, IMS Unison University Makkawala Greens Dehradun-248009 (UK)

Dr. S. Kishore Reddy  
Professor, Department of School of Electrical & Computer Engineering, Adama Science & Technology University, Adama

Dr. Muthukumar Subramanyam  
Professor, Department of Computer Science & Engineering, National Institute of Technology, Puducherry, India

Dr. Latika Kharb  
Associate Professor, Faculty of Information Technology, Jagan Institute of Management Studies (JIMS), Rohini, Delhi, India

Dr. Kusum Yadav  
Associate Professor, Department of Information Systems, College of Computer Engineering & Science Salman bin Abdulaziz University, Saudi Arabia

Dr. Preeti Gera  
Assoc. Professor, Department of Computer Science & Engineering, Savera Group of Institutions, Farrukh Nagar, Gurgaon, India

Dr. Ajeet Kumar  
Associate Professor, Department of Chemistry and Biomolecular Science, Clarkson University 8 Clarkson Avenue, New York

Dr. M. Jinnah S Mohamed  
Associate Professor, Department of Mechanical Engineering, National College of Engineering, Maruthakulam.Tirunelveli, Tamil Nadu, India

Dr. Mostafa Eslami  
Assistant Professor, Department of Mathematics, University of Mazandaran Babolsar, Iran

Dr. Akram Mohammad Hassan Elentably  
Professor, Department of Economics of Maritime Transport, Faculty of Maritime Studies, Ports & Maritime Transport, King Abdul-Aziz University

Dr. Ebrahim Nohani  
Associate Professor, Department of Hydraulic Structures, Dezful Branch, Islamic Azad University, Dezful, Iran

Dr. Aarti Tolia  
Faculty, Pradahdhbai Dalmia Lions College of Commerce & Economics, Mumbai, India

Dr. Ramachandra C G  
Professor & Head, Department of Marine Engineering, Srinivas Institute of Technology, Valachil, Mangalore-574143, India

Dr. G. Anandharaj  
Associate Professor, Department of M.C.A, Ganadipathy Tulsi's Jain Engineering College, Chittoor- Cuddalore Road, Kaniyambadi, Vellore, Tamil Nadu, India
Abstract: This study aims to investigate the effects of rib configuration on cooling gas turbine blades. Three-dimensional ribbed square-channel of gas turbine blades are simulated with the Reynolds averaged Navier-Stokes equations. Air flow in periodic transverse and 45º inclined rib arrays, mounted in inline and staggered arrangements on the lower and upper walls of the channel. The governing equations are discretized by the second order upwind differencing scheme, decoupling with the SIMPLE algorithm. The turbulence effect is modeled with the RNG k-ε model. The present numerical results show excellent agreement with published experimental data. The presented results are streamtraces, velocities, local and area-averaged Nusselt numbers over ribbed walls for the Reynolds numbers ranging from 2×10^4 to 4×10^4.

Keywords: heat transfer, numerical simulation, ribbed channel, turbine blade.

References:

Abstract: In this paper a color segmentation based resolution enhancement of depth image is proposed. The resolution enhancement technique is combined with depth image based rendering (DIBR) method to generate stereo images. The major problem in transmission of stereo images is bandwidth. By using DIBR the transmission efficiency can be increased. Also if we are using low resolution depth map for transmission, the bandwidth for transmission can be further reduced. A color segmentation based interpolation procedure is used to enhance the resolution of the depth map. This depth resolution enhancement method sharpens depth image using the color information from the high resolution color image. From this resolution enhanced depth image the stereoscopic images are synthesized using DIBR method. For more textured region, we are using an edge-guided image interpolation algorithm to enhance the performance of the color segmentation based interpolation algorithm.
Keywords: DIBR, depth image, enhanced depth map, color segmentation

References:

Authors: Harirahan,S, Parvathy,B.H, Aruna,N.S

Paper Title: A Pictorial Review and an Algorithm for the Determination of Sickle Cell Anemia

Abstract: Sickle cell anemia (SCA) is a heritable blood disorder which is caused by lack of red blood cells in the blood. In sickle cell anemia, red blood cell shape is changed to sickle shape or moon shape, which blocks the flow of blood in small blood vessels in the body. In this disease the characteristics of red blood cell will change and they become sticky and bind together. In some cases it elongates and becomes elliptical in shape. In this paper a brief pictorial review of sickle cell anemia is presented to attract the attention among researchers to work with a common goal for the elimination of this disease from this world. We have collected few SCA affected blood images and an effort is made for the analysis of these images. An algorithm is proposed to detect the presence of SCA.

Keywords: Computer processing of Red blood corpuscles, Image processing of red blood cells, Cell image analysis, Sickle cell anemia.

References:

Authors: Abdulnaser M. Alshoaibi

Paper Title: Adaptive Finite Element Simulation of Fatigue Crack Propagation

Abstract: An adaptive finite element interactive program has been developed for fatigue crack propagation simulation under constant amplitude loading condition. The purpose of this model is on the determination of 2D
crack paths and surfaces as well as on the evaluation of components Lifetimes as a part of the damage tolerant assessment. As part of a linear elastic fracture mechanics analysis, the determination of the stress intensity factor distribution is a crucial point. The fatigue crack direction and the corresponding stress-intensity factors are estimated at each small crack increment by employing the J-integral technique. The propagation is modeled by successive linear extensions, which are determined by the stress intensity factors under linear elastic fracture mechanics assumption. The stress intensity factors range history has to be recorded along the small crack increments. Upon completion of the stress intensity factors range history recording, fatigue crack propagation life of the examined specimen is predicted. Verification of the predicted fatigue life is validated with relevant experimental data and numerical results obtained by other researchers. The comparisons show that this model is capable of demonstrating the fatigue life prediction results as well as the fatigue crack path satisfactorily.

**Keywords:** Finite element, Fatigue, Crack growth, Stress intensity factor, Adaptive mesh

**References:**


**Authors:** Yamuna K. Moorthy, Sakuntala S. Pillai

**Paper Title:** Performance Analysis of Cooperative Spectrum Sensing for Cognitive Radios in Nakagami-m Fading Channels

**Abstract:** This paper studies and presents the effect of different hard fusion schemes applied to a cooperative cognitive radio system. The fading channel considered is the Nakagami-m channel. The hard fusion rules are the OR rule, AND rule and the majority fusion rule. Receiver Operating Characteristic (ROC) curves for cooperative sensing using the abovementioned fusion rules are plotted. The simulation results show that the OR fusion scheme gives superior performance compared to other fusion schemes. The paper also studies the effect of different number of co-operating users.

**Keywords:** spectrum sensing, data fusion, cooperative sensing

**References:**

Authors: J. Thirumaran, Nethra

Paper Title: Role of Digital Marketing in Innovative Business Practices

Abstract: Digital marketing is an umbrella term for the targeted, measurable, and interactive marketing of products or services using digital technologies to reach and convert leads into customers. The key objective is to promote brands, build preference and increase sales through various digital marketing techniques. It is embodied by an extensive selection of service, product and brand marketing tactics, which mainly use the Internet as a core promotional medium, in addition to mobile and traditional TV and radio.

Keywords: Digital marketing, Mobile marketing, Facebook, Twitter, LinkedIn

References:

Authors: Shazeeda, Monika Sharma D

Paper Title: Design and Implementation of an N bit Vedic Multiplier using DCT

Abstract: One of the basic and fundamental functions in arithmetic operation is multiplication. Many of the application such as convolution and Fourier transform in digital signal processing, in microprocessors multiplication is very frequently used operation. In this paper we propose a fast multiplication method based on ancient Indian Vedic mathematics. The Vedic mathematics demonstrate the unified structure of mathematics by the 16 formulas. The generalized multiplication formula which is applicable in all cases is called Urdhva Triyakbhyam. In this paper we designed a Vedic multiplier in VHDL (Very High Speed Integrated circuit Design and Implementation of an N bit Vedic Multiplier using DCT). The Vedic multiplier showed a propagation delay of 10.295 ns and 25.236 ns for 4 and 8 bit multiplication, respectively.

Keywords: Vedic multiplier, Wallace tree multiplier, Urdhva Triyakbhyam, Discrete cosine transform.

References:
### Authors: Moayyad M. Al-Nasra

**Paper Title:** The Use of Recycled Steel Bars as Shear Reinforcement Swimmer Bars in Reinforced Concrete Beams

**Abstract:** The discarded steel reinforcement bars can be either sent to steel plant to be melted and reproduced, or reused as steel reinforcement again. The main sources of the recycled steel bars are the demolished structures, damaged bars or collapsed structures. There is little evidence to trust the use of the recycled steel bars as a replacement of new steel bars. Engineers often question the safety of the structures built with recycled steel bars. In order to address the concern of the engineers, the recycled bars must be evaluated and categorized and eventually given an equivalent new bar label. Additional factor of safety could be used for uncertainty. In this study the recycled steel bars are used as spliced swimmer bars for shear reinforcement in reinforced concrete beams. The used bars in this study are classified as class-A recycled bars. There are several alternatives to the traditional stirrups in reinforced concrete beams. This study focuses on providing other options other than the stirrups. Due to the unsafe mode of shear failure in reinforced concrete beams, designers may find themselves reluctant to use higher factor of safety. Shear failure in reinforced concrete beams is one of the most undesirable modes of failure due to its rapid progression. This sudden type of failure made it necessary to explore more effective ways to design these beams for shear. The cost and safety of shear reinforcement in reinforced concrete beams led to the study of other alternatives. In this study two different types of shear reinforcements are used to study the effect of each type of shear reinforcement on the shear performance of reinforced concrete beams. The first type is reinforced by traditional stirrups, while the other type is reinforced by spliced swimmer bars. Two beams were prepared with spliced swimmer bars; the first is made from recycled steel bars, and the other is made from brand new bars. The beam made from recycled spliced swimmers is compared with the other two beams. Beam shear strength as well as beam deflection are the main two parameters considered in this study. The swimmer bar system is a new type of shear reinforcement. Splicing swimmer bars concept is a solution to the welding problem associated with old types of shear reinforcement in reinforced concrete beams. Special shapes of swimmer bars are used for in this study such that the swimmer bars are spliced with the longitudinal flexural bars. Regardless of the number of swimmer bars used in each inclined plane, the swimmer bars form plane-crack interceptor system instead of bar-crack interceptor system when stirrups are used. The results of the three tested beams will be presented and discussed in this study. Also the deflection of the beams due to the gradual applied load is monitored and discussed. Cracks will be monitored and recorded during the beam test as the applied load increases.

**Keywords:** Deflection, Shear, Stirrup, swimmer bars

**References:**

### Authors: Muthana Najim Abdullehe

**Paper Title:** A Review of Network Virtualization (NV): A Brief Description of the Requirements, Objectives and Technology of Network Virtualization

**Abstract:** In the past few years, network virtualization (NV) has been growing steadily among other network communities. NV offers an alternative advancement of the future internet by utilizing protocols and architectures through shared physical infrastructure and control architectures in the network. The frequent usage of NV demands new requirements that focus on the control and management of the given network. The existing process that combines software network resources and network functionality and hardware has even made NV more important in the network field (e.g., virtual networks have become important resources in information technology). Virtual network has taken the importance of NV from the original hardware while server virtualization superseded virtual machines from the original server hardware. Therefore, the aim of the current paper is to provide a review of related studies on virtualization and NV concepts as well as aims or objectives and the requirements of such NV. It provides a brief description of technology and outlines its current and future applications. Finally, the study discusses the difficulties in implementing this technology.

**Keywords:** Network Virtualization, virtualization, Software-Defined Networks, Virtual Private Network
Keywords: Liquid Resin Infusion (LRI), Numerical model, Polymer concrete, Saturation

References:

Authors: Geeta, Puja Kumari Singh

Paper Title: Electromagnetic Frequency Induced Stress Responses in Vernonina Cinerea

Abstract: The Electromagnetic frequency (EMF) pollution around the living world has gripped it to such an extreme that it has potentially become unavoidable to live without it. As the development of mankind has become a slave of technology, it has to bear the brunt also. The stress created by the exposure of electromagnetic pollution on plants is a completely novice field. The stress expression in plants may be live without it. As the development of mankind has become a slave of technology, it has to bear the brunt also. The stress created by the exposure of electromagnetic pollution on plants is a completely novice field. The stress expression in plants may be displayed by their developmental and biochemical responses. Since chlorophyll is one of the strong antioxidants known, variation in its amount has been taken up as an established symptom of oxidative stress. The initiation of stress responses on Vernonina cinerea at different distances from cell towers having ascending number of antennae has been evaluated and found to be positively correlated with the cumulative intensities of Electromagnetic frequencies. In all the cases perceived it was decreasing significantly with increasing distances.

Keywords: antioxidants, antennae, chlorophyll, EMF, Pollution.

References:
2. Hiscox, J.D., Israelstam, G.F., a method for the extraction of chlorophyll from leaf tissue without maceration , Canadian journal of botany;57:1334-1334,(1979).

Authors: S. Santhosh Kumar, Monisha Menon A

Paper Title: NEC2 Based Optimum Design of Circularly Polarized Axial Mode Helical Antenna with Non-linear Pitch Profile Modeled using Catmull–Rom Spline and Particle Swarm Optimization

Abstract: This paper presents a novel method for design of circularly polarized axial mode helical antenna with maximum directive gain. In this work helical antenna is modeled by eight parameters - helix radius (a), number of turns (N) and nonlinear pitch profile represented by a Catmull-Rom spline curve. This spline curve consists of six pitch angles, 9, 9, 9, 9, 9, and 9 at six equidistant points along the axial length of the helix. For a given number of turns optimum value of radius and pitch profile is determined for maximizing the gain subject to unity axial ratio. The gain and axial ratio are determined using NEC2 (Numerical
Electromagnetics Code) simulation and optimization is performed using Particle Swarm Optimization (PSO). The original NEC2++ source code has been modified to incorporate Catmull-Rom spline modeling and PSO to suite the requirement of this work. Simulated and experimental results show that there is significant improvement in gain characteristics compared to design based on Kraus method which uses constant pitch profile.

**Keywords:** Helical Antenna, Axial mode, Catmull-Rom spline, Method of Moments, Particle Swarm Optimization, NEC2.

**References:**
5. www.nec2.org
6. www.swarmintelligence.org

**Authors:** Wilander Testone Pereira da Silva and João Viana da Fonseca Neto

**Paper Title:** On the LMS Algorithm Performance for Interference Elimination in Smart Antennas Array

**Abstract:** The efficient use of limited radio frequency spectrum is possible due to the smart antenna arrays. These arrays incorporate adaptive algorithms, such as: Least Mean Square (LMS) algorithm, which finds the spatial temporal filter gains or weights according to the signal environment behavior. In terms of the mean error and mean squared error convergences of the LMS algorithm, the performance evaluation of the algorithm is oriented by its convergence properties and the improvements in the mobile communication systems. In this paper is presented the LMS algorithm to solve the beamforming problem and antenna array concepts, as well as, it is presented general performance analysis in terms of the LMS beamformer to eliminate interference in the antenna array. The potentialities of adaptive design are verified in models of smart linear antenna arrays. These antenna arrays models are connected to the beamformer model. The integration of these models allows to design the adaptive beamformer. The results obtained from simulations of the models show that the LMS algorithm is a good alternative for smart antenna design in mobile communication environment, due to the directivity improvement promoted in the antenna array.

13. **Keywords:** Smart Antenna Array, Adaptive Filter, LMS Algorithm, Algorithm Convergence, Beamforming, Interference Elimination, Mobile Communication, Wireless communications.

**References:**

**Authors:** Sheetal Shelke, Mangal Patil, J. S. Chitode

**Paper Title:** DWT-FFT Based Audio Watermarking Algorithm for Copyright Protection

**Abstract:** In this proposed method a new technique is introduced to secure audio communication. Discrete Wavelet Transforms (DWT) and Fast Fourier Transform (FFT) are used in this proposed method. Separation of high frequency component and low frequency component from original audio signal is performed by applying DWT. High frequency component is then passed through Fourier Transform (FFT). Digital watermark is generated using PN sequence. The digital watermark is embedded in low amplitude high frequency region of magnitude spectrum of FFT. DWT-FFT based proposed algorithm can be used for Copyright protection of audio signals. Proposed algorithm is evaluated using SNR and NC parameters with various attacks including volume scaling, low pass filter, resampling, requantization, MP3 compression, Echo addition, time stretching and additive noise.

**Keywords:** Audio watermarking, Discrete Wavelet Transforms, Fast Fourier Transform

14. **Keywords:** DWT-FFT Based Audio Watermarking Algorithm for Copyright Protection
References:

Authors: K. Rani Hepsiba, S. M. Shariff, P. Saileshababu

Paper Title: Analysis of UPQC under Unbalanced and Distorted Load Conditions using Synchronous-Reference-Frame Method

Abstract: This paper presents a new synchronous reference-frame (SRF)-based control method to compensate power-quality (PQ) problems through a three-phase four-wire unified PQ conditioner (UPQC) under unbalanced and distorted load conditions. The proposed UPQC system can improve the power quality at the point of common coupling on power distribution systems under unbalanced and distorted load conditions. The simulation results based on Matlab/Simulink are discussed in detail to support the SRF-based control method presented in this paper.

Keywords: Active power filter (APF), harmonics, phase-locked loop (PLL), power quality (PQ), synchronous reference frame (SRF), unified power-quality (PQ) conditioner (UPQC).

References:
Abstract: Instrumented drop weight impact tests at different impact energies were performed to investigate the effect of ply stacking sequence and thickness in plain weave glass fiber reinforced composite laminates with 0º and 0/90º ply orientations. Post impact tensile tests were performed to predict the residual strength of the material. It was found that the stacking sequence did not significantly affect the impact behavior of the composite laminates. The peak load increased with increase in the number of plies. Residual tensile strength, strain at failure and elastic modulus of the laminates decreased with the increase in the impact energy due to increase in the impact damage area.

Keywords: GFRP laminates, Low velocity impact, post impact tensile properties

References:
ties over all stations showed significant temporal (seasonal)...


18. Triplen Harmonics in Electrical Distribution Systems

Abstract: In an AC circuit, a resistance behaves in exactly the same way as it does in a DC circuit. That is, the current flowing through the resistance is proportional to the voltage across it. This is because a resistor is a linear device and if the voltage applied to it is a sine wave, the current flowing through it is also a sine wave. But most electronic power supply switching circuits such as rectifiers, silicon controlled rectifier (SCR’s), power transistors, power converters and other such solid state switches which cut and chop the power supplies sinusoidal waveform to control motor power, or to convert the sinusoidal AC supply to DC. These switching circuits tend to draw current only at the peak values of the AC supply and since the switching current waveform is non-sinusoidal the resulting load current is said to contain Harmonics. We can say that “harmonics” are multiples of the fundamental frequency and can therefore be expressed as: 2f, 3f, 4f, etc. Positive sequence harmonics (4th, 7th, 10th, …) causes overheating of transformer, conductor power lines whereas negative sequence harmonics (2nd, 5th, 8th, …) circulates between phases producing additional problems in motor as opposite phaser rotation weakens rotating magnetic field required by the motor. There is another harmonics set called triplen means odd multiple of third harmonics (3rd, 6th, 9th, …), etc zero rotational sequence hence therefore zero sequence harmonics circulates between phase and neutral or ground.

Keywords: AC circuit, DC circuit, (SCR’s), AC supply to DC, “harmonics”, as: 2f, 3f, 4f, (2nd, 5th, 8th, …), (3rd, 6th, 9th, …)

References:
2. “Harmonics Made Simple” by R.Fehr, P.E.

19. Direct Aerosol Radiative Forcing Over Three Different Environments

Abstract: In the present report, we have utilised the inversion products of AERONET to study the aerosol optical properties and to estimate their direct radiative forcings over three different environments (Re Union, Nainital and Pune). Derived aerosol optical properties over all stations showed significant temporal (seasonal) and spatial variation. These properties have been used in SBDART model for the assesment of direct aerosol radiative forcing. The estimated averaged radiative forcings at top of the atmosphere are -2 ± 1, -7 ± 4 and -8 ± 2 Wm-2, and the surface aerosol radiative forcings are -6 ± 3, -18 ±14 and -36 ± 8 Wm-2 over Re Union, Nainital and Pune respectively. Subsequently the atmospheric forcings are 3 ± 2, 11 ± 11 and 28 ± 7 Wm-2 over Re Union, Nainital and Pune respectively. Moreover, we found that higher the aerosol loading or aerosol optical depth the more aerosol radiative forcing. The estimated atmospheric aerosol radiative forcing will heats the lower atmosphere and leads modification of the thermal structure of the atmosphere. Hence, our study emphasized the importance of optical properties of aerosols in the estimation of direct aerosol radiative forcing.

Keywords: optical properties of aerosols; radiative transfer.

References:


6. DEVARA, P. C. S., VIJAYA KUMAR, K., PRAMOD, D., SAFAI, M., RAJU, P., RAO, P. S. P, Celebration-induced air quality over a tropical urban station, Pune, India, Atmospheric Pollution Research, 6, 511-520


Authors: Th. Kiranbala Devi, S. Elizabeth

Paper Title: Seismic Protection of Non-Engineered Building in North East India

Abstract: Northeast India is regarded as one of the most seismically six active regions worldwide. Moreover, rapid urbanization in the region has provided a higher level of man-made constructions deviating from the typical traditional houses to multistoried structures but most of these structures are non-engineered construction. Even though engineered, more emphasis is given to architectural concept than the structural design, which is indeed very important. So the implementation of earthquake resistant building design and construction code at the local level has been more of an exception than the rule, thereby implicate increased vulnerability to earthquake disasters. That’s why there is a need for the construction of a simple construction practices for use by the community. This paper deals with the different types of non engineering building construction that are practiced in Northeast India and the ways for strengthening these building to make them a low cost earthquake resistant building.

Keywords: Community, Construction code, Disaster resistant, Non- engineered building, Strengthening technique.

References:
7. IAEE Committee (1986), “Guidelines for Earthquake Resistant Non-Engineered Construction."The International Association for Earthquake Engineering, Tokyo
Abstract: Heat transfer enhancement using artificial roughness attached to the surface of duct is an effective technique in many application. This study presents the comparative change in flow characteristics between trapezoidal shaped of different top face tapered angle artificial roughness in a duct by using CFD. A commercial finite volume package ANSYS FLUENT 12.1 is used to visualize and analyze the nature of the heat transfer and flow phenomenon. The simulations were performed with transversely trapezoidal ribs placed periodically with downstream top face tapered angle of 00, 50, 100, 150 and 200. Different profile of transverse ribs are compared at fixed p/e, p/d and Reynolds Number(45000). Different profile of the transverse ribs are compared on the basis of pumping power requirement, hot spot region, Nusselt number ratio, friction factor ratio. It is found that Nusselt number ratio is increased on increasing the top face tapered angle from 100 to 150. Friction factor ratio is decreased on increasing the top face tapered angle. Finally, It is investigated that Performance evaluation parameter is maximum for trapezoidal rib with top face tapered angle of 200.

Keywords: Artificial roughness, CFD, Heat transfer enhancement, Rectangular Duct

References: