

Volume 4 Issue 5, May 2016

International Journal of Innovative Science and Modern Engineering

ISSN : 2319 - 6386 (Online)

Website: www.ijisme.org



Blue Eyes Intelligence Engineering & Sciences Publication Pvt. Ltd.

Exploring Innovation: A Key for Dedicated Services

Address:

22, First Floor, ShivLoka Phase-IV,

Khajuri Kala, BHEL-Piplani, Bhopal (M.P.)-462021, India

Website: www.blueeyesintelligence.org

Email: director@blueeyesintelligence.org, blueeyes@gmail.com

Cell #: +91-9669981618, WhatsApp #: +91-9669981618, Viber #: +91-9669981618

Skype #: beiesp, Twitter #: beiesp

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, Gauridada, 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, Mullana, 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 Bhomrah

Director, Department of Profit Oriented Technique, 1 – B Crystal Gold, Vijalpore Road, Navsari 396445, Gujarat. India

Technical Advisory Board

Dr. Mohd. Husain

Director MG Institute of Management & Technology, Banthara, Lucknow (U.P.), India

Dr. T. Jayanthi

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. Mohd. Ali Hussain

Professor, Department of Computer Science and Engineering, Sri Sai Madhavi Institute of Science & Technology, Rajahmundry (A.P.), India

Dr. Mohd. Nazri Ismail

Professor, System and Networking Department, Jalan Sultan Ismail, Kuala Lumpur, MALAYSIA

Dr. Sunil Mishra

Associate Professor, Department of Communication Skills (English), Dronacharya College of Engineering, Farrukhnagar, Gurgaon (Haryana), India

Dr. Labib Francis Gergis Rofaiel

Associate Professor, Department of Digital Communications and Electronics, Misr Academy for Engineering and Technology, Mansoura City, Egypt

Dr. Pavol Tanuska

Associate Professor, Department of Applied Informatics, Automation, and Mathematics, Trnava, Slovakia

Dr. VS Giridhar Akula

Professor, Avanthi's Research & Technological Academy, Gunthapally, Hyderabad, Andhra Pradesh, India

Dr. S. Satyanarayana

Associate Professor, Department of Computer Science and Engineering, KL University, Guntur, Andhra Pradesh, India

Dr. Bhupendra Kumar Sharma

Associate Professor, Department of Mathematics, KL University, BITS, Pilani, India

Dr. Praveen Agarwal

Associate Professor & Head, Department of Mathematics, Anand International College of Engineering, Jaipur (Rajasthan), India

Dr. Manoj Kumar

Professor, Department of Mathematics, Rashtriya Kishan Post Graduate Degree, College, Shamli, Prabudh Nagar, (U.P.), India

Dr. Shaikh Abdul Hannan

Associate Professor, Department of Computer Science, Vivekanand Arts Sardar Dalipsing Arts and Science College, Aurangabad (Maharashtra), India

Dr. K.M. Pandey

Professor, Department of Mechanical Engineering, National Institute of Technology, Silchar, India

Prof. Pranav Parashar

Technical Advisor, International Journal of Soft Computing and Engineering (IJSCE), Bhopal (M.P.), India

Dr. Biswajit Chakraborty

MECON Limited, Research and Development Division (A Govt. of India Enterprise), Ranchi-834002, Jharkhand, India

Dr. D.V. Ashoka

Professor & Head, Department of Information Science & Engineering, SJB Institute of Technology, Kengeri, Bangalore, India

Dr. Sasidhar Babu Suvanam

Professor & Academic Coordinator, Department of Computer Science & Engineering, Sree Narayana Gurukulam College of Engineering, Kadayiuruppu, Kolenchery, Kerala, India

Dr. C. Venkatesh

Professor & Dean, Faculty of Engineering, EBET Group of Institutions, Kangayam, Erode, Caimbatore (Tamil Nadu), India

Dr. Nilay Khare

Assoc. Professor & Head, Department of Computer Science, MANIT, Bhopal (M.P.), India

Dr. Sandra De Iaco

Professor, Dip.to Di Scienze Dell'Economia-Sez. Matematico-Statistica, Italy

Dr. Yaduvir Singh

Associate Professor, Department of Computer Science & Engineering, Ideal Institute of Technology, Govindpuram Ghaziabad, Lucknow (U.P.), India

Dr. Angela Amphawan

Head of Optical Technology, School of Computing, School Of Computing, Universiti Utara Malaysia, 06010 Sintok, Kedah, Malaysia

Dr. Ashwini Kumar Arya

Associate Professor, Department of Electronics & Communication Engineering, Faculty of Engineering and Technology, Graphic Era University, Dehradun (U.K.), India

Dr. Yash Pal Singh

Professor, Department of Electronics & Communication Engg, Director, KLS Institute Of Engg.& Technology, Director, KLSIET, Chandok, Bijnor, (U.P.), India

Dr. Ashish Jain

Associate Professor, Department of Computer Science & Engineering, Accurate Institute of Management & Technology, Gr. Noida (U.P.), India

Dr. Abhay Saxena

Associate Professor & Head, Department of Computer Science, Dev Sanskriti University, Haridwar, Uttarakhand, India

Dr. Judy. M.V

Associate Professor, Head of the Department CS &IT, Amrita School of Arts and Sciences, Amrita Vishwa Vidyapeetham, Brahmasthanam, Edapally, Cochin, Kerala, India

Dr. Sangkyun Kim

Professor, Department of Industrial Engineering, Kangwon National University, Hyoja 2 dong, Chuncheon, Gangwondo, Korea

Dr. Sanjay M. Gulhane

Professor, Department of Electronics & Telecommunication Engineering, Jawaharlal Darda Institute of Engineering & Technology, Yavatmal, Maharashtra, India

Dr. K.K. Thyagarajan

Principal & Professor, Department of Information Technology, RMK College of Engineering & Technology, RSM Nagar, Thiruvallur, Tamil Nadu, India

Dr. P. Subashini

Assoc. Professor, Department of Computer Science, Coimbatore, India

Dr. G. Srinivasrao

Professor, Department of Mechanical Engineering, RVR & JC, College of Engineering, Chowdavaram, Guntur, India

Dr. Rajesh Verma

Professor, Department of Computer Science & Engg. and Deptt. of Information Technology, Kurukshetra Institute of Technology & Management, Bhor Sadian, Pehowa, Kurukshetra (Haryana), India

Dr. Pawan Kumar Shukla

Associate Professor, Satya College of Engineering & Technology, Haryana, India

Dr. U C Srivastava

Associate Professor, Department of Applied Physics, Amity Institute of Applied Sciences, Amity University, Noida, India

Dr. Reena Dadhich

Prof. & Head, Department of Computer Science and Informatics, MBS MArg, Near Kabir Circle, University of Kota, Rajasthan, India

Dr. Aashis. S. Roy

Department of Materials Engineering, Indian Institute of Science, Bangalore Karnataka, India

Dr. Sudhir Nigam

Professor Department of Civil Engineering, Principal, Lakshmi Narain College of Technology and Science, Raisen, Road, Bhopal, (M.P.), India

Dr. S. Senthil Kumar

Doctorate, Department of Center for Advanced Image and Information Technology, Division of Computer Science and Engineering, Graduate School of Electronics and Information Engineering, Chon Buk National University Deok Jin-Dong, Jeonju, Chon Buk, 561-756, South Korea Tamilnadu, India

Dr. Gufran Ahmad Ansari

Associate Professor, Department of Information Technology, College of Computer, Qassim University, Al-Qassim, Kingdom of Saudi Arabia (KSA)

Dr. R. Navaneetha krishnan

Associate Professor, Department of MCA, Bharathiyar College of Engg & Tech, Karaikal Puducherry, India

Dr. Hossein Rajabalipour Cheshmejjaz

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 Mukin Street, Jindalee-4074, Queensland, Australia

Dr. Neelam Ruhil

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 Manipal 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 Giriya 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.

Managing Editor

Mr. Jitendra Kumar Sen

International Journal of Innovative Science and Modern Engineering (IJISME)

Editorial Board

Dr. Saeed Balochian

Associate Professor, Gonaabad Branch, Islamic Azad University, Gonabad, Iratan

Dr. Mongey Ram

Associate Professor, Department of Mathematics, Graphics Era University, Dehradun, India

Dr. Arupratan Santra

Sr. Project Manager, Infosys Technologies Ltd, Hyderabad (A.P.)-500005, India

Dr. Ashish Jolly

Dean, Department of Computer Applications, Guru Nanak Khalsa Institute & Management Studies, Yamuna Nagar (Haryana), India

Dr. Israel Gonzalez Carrasco

Associate Professor, Department of Computer Science, Universidad Carlos III de Madrid, Leganes, Madrid, Spain

Dr. Guoxiang Liu

Member of IEEE, University of North Dakota, Grand Forks, N.D., USA

Dr. Khushali Menaria

Associate Professor, Department of Bio-Informatics, Maulana Azad National Institute of Technology (MANIT), Bhopal (M.P.), India

Dr. R. Sukumar

Professor, Sethu Institute of Technology, Pulloor, Kariapatti, Virudhunagar, Tamilnadu, India

Dr. Cherouat Abel

Professor, University of Technology of Troyes, France

Dr. Rinkle Aggrawal

Associate Professor, Department of Computer Science and Engineering, Thapar University, Patiala (Punjab), India

Dr. Parteek Bhatia

Associate Professor, Department of Computer Science & Engineering, Thapar University, Patiala (Punjab), India

Dr. Manish Srivastava

Professor & Head, Computer Science and Engineering, Guru Ghasidas Central University, Bilaspur (C.G.), India

Dr. B. P. Ladgaonkar

Assoc. Professor&Head, Department of Electronics, Shankarrao Mohite Mahavidyalaya, Akulj, Maharashtra, India

Dr. E. Mohan

Professor & Head, Department of Computer Science and Engineering, Pallavan College of Engineering, Kanchipuram, Tamilnadu, India

Dr. M. Shanmuga Priya

Assoc. Professor, Department of Biotechnology, MVJ College of Engineering, Bangalore Karnataka, India

Dr. Leena Jain

Assoc. Professor & Head, Dept. of Computer Applications, Global Institute of Management & Emerging Technologies, Amritsar, India

Dr. S.S.S.V Gopala Raju

Professor, Department of Civil Engineering, GITAM School of Technology, GITAM, University, Hyderabad, Andhra Pradesh, India

Dr. Ani Grubisic

Department of Computer Science, Teslina 12, 21000 split, Croatia

Dr. Ashish Paul

Associate Professor, Department of Basic Sciences (Mathematics), Assam Don Bosco University, Guwahati, India

Dr. Sivakumar Durairaj

Professor, Department of Civil Engineering, Vel Tech High Tech Dr.Rangarajan Dr.Sakunthala Engineering College, Avadi, Chennai Tamil Nadu, India

Dr. Rashmi Nigam

Associate Professor, Department of Applied Mathematics, UTI, RGPV, Airport Road, Bhopal, (M.P.), India

Dr. Mu-Song Chen

Associate Professor, Department of Electrical Engineering, Da-Yeh University, Rd., Dacun, Changhua 51591, Taiwan R.O.C., Taiwan, Republic of China

Dr. Ramesh S

Associate Professor, Department of Electronics & Communication Engineering, Dr. Ambedkar Institute of Technology, Bangalore, India

Dr. Nor Hayati Abdul Hamid

Associate Professor, Department of Civil Engineering, Universiti Teknologi Mara, Selangor, Malaysia

Dr. C.Nagarajan

Professor & Head, Department of Electrical & Electronic Engineering Muthayammal Engineering College, Rasipuram, Tamilnadu, India

Dr. Ilaria Cacciotti

Department of Industrial Engineering, University of Rome Tor Vergata Via del Politecnico Rome-Italy

Dr. V.Balaji

Principal Cum Professor, Department of EEE & E&I, Lord Ayyappa Institute of Engg & Tech, Uthukadu, Walajabad, Kanchipuram, Tamil Nadu, India

Dr. G. Anjan Babu

Assoc. Professor, Department of Computer Science, S V University, Tirupati, Andhra Pradesh, India

Dr. Damodar Reddy Edla

Assoc. Professor, Department of Computer Science & Engineering, National Institute of Technology, Goa, India

Dr. D.Arumuga Perumal

Professor, Department of Mechanical Engg, Noorul Islam University, Kanyakumari (Dist), Tamilnadu, India

Dr. Roshdy A. AbdelRassoul

Professor, Department of Electronics and Communications Engineering, Arab Academy for Science and Technology, Electronics and Communications Engineering Dept., POBox 1029, Abu-Qir, Alexandria, Egypt

Dr. Aniruddha Bhattacharya

Assoc. Professor & Head, Department of Computer Science & Engineering, Amrita School of Engineering, Bangalore, India

Dr. P Venkateswara Rao

Professor, Department of Mechanical Engineering, KITS, Warangal, Andhra Pradesh, India

Dr. V.Mahalakshmi M.L

Assoc. Professor & Head, Institute of Management Studies, Chennai CID Quarters, V.K.Iyer Road, Mandaveli, Chennai

S. No	Volume-4 Issue-5, May 2016, ISSN: 2319-6386 (Online) Published By: Blue Eyes Intelligence Engineering & Sciences Publication Pvt. Ltd.		Page No.
1.	Authors:	Devesh Singh, Manish Kumar Singh, Rakesh Sharma	
	Paper Title:	An Overview and Issues of Smart Grid and its Integration with Renewable Energy	
	<p>Abstract: Global Energy Sector largely relies on combustion of energy sources viz. fuel-oil and natural gas. However, these energy sources are becoming scarce day by day. On the other hand, global energy consumption is at its verge and is believed to triplicate by 2050. Hence, transformation of power networks into intelligent system is a viable option that can save energy, utilize renewable energy and ensure supply security. The energy sector encourages the use of renewable energy sources as it aims at reducing carbon footprint and promoting clean energy. Keeping these facts together with the issues of climate change and socio-economic challenges of current century, the need of hour is to use electric network as a Smart Grid. This paper highlights various Smart grid initiatives and their implications along with the issues involved with the development of Smart Grid Technology.</p> <p>Keywords: Smart grid, Wind energy, Solar energy, Power quality, Renewable energy integration.</p> <p>References:</p> <ol style="list-style-type: none"> Eric Miller, "Renewables and the smart grid", Renewable Energy Focus, Volume 10, Issue 2, pp. 67-69, March-April 2009. IRENA- Smart Grids and Renewables. http://www.irena.org/documentdownloads/publications/smart_grids.pdf European Technology Platform, "SMART GRIDS"— Strategic Deployment Document for Europe's Electricity Networks of the Future, September 2008. http://www.smartgrids.eu/documents/SmartGrids_SDD_FINAL_APRIL2010.pdf http://www.powergridindia.com/_layouts/PowerGrid/User/ContentPage.aspx?Pid=154&LangID=English Adam Brown, et al: Renewable Energy: Markets and Prospects by Technology, International Energy Agency Information Paper, 2011. N. Miller, C. Loutan, M. Shao, and K. Clark, "Emergency Response: U.S. System Frequency with High Wind Penetration", IEEE Power and Energy Magazine, Vol.11, Issue- 6, pp.-63-71, Nov.-Dec. 2013. http://www.altenergy.org/renewables/renewables.html http://science.howstuffworks.com/environmental/energy/solar-cell1.html Perez-Arriaga: Managing Large Scale Penetration of Intermittent Renewables, MITEI Symposium on Managing Large-Scale Penetration of Intermittent Renewables, Cambridge/U.S.A, 20 April 2011. IEC white paper - Grid integration of large-capacity Renewable Energy sources and use of large-capacity Electrical Energy Storage http://www.iec.ch/whitepaper/pdf/iecWP-gridintegrationlargecapacity-LR-en.pdf F. Blaabjerg, R. Teodorescu, M. Liserre and A.V. Timbus, " Overview of control and grid synchronization for distributed power generation systems", IEEE Trans. On Industrial Electronics, vol. 53, no. 5, pp.-1398-1409, Oct. 2006. J.He, Y. W. Li, and M. S. Munir, "A flexible harmonic control approach through voltage controlled DG-grid interfacing converters," IEEE Trans. Ind. Electron., vol. 59, no. 1, pp. 444-455, Jan.2012. J. M. Carrasco, L. G. Franquelo, Jan T. Bialasiewicz, E. Galván, R. C. P. Guisado, Ma. Á. M. Prats, J. I. León, and N. Moreno-Alfonso, "Power-Electronic Systems for the Grid Integration of Renewable Energy Sources: A Survey", IEEE Trans. On Industrial Electronics, vol. 53, no. 4, pp. 1002-1016, Aug. 2006. F. Blaabjerg, Z.Chen, S.B.Kjaer, "Power Electronics as efficient interface in dispersed power generation System."IEEE Trans. On Power Electron. Vol.19, No.5, pp.1184-1194., Sept.2004. Fu. Sheng Pai, Shyh-Iier Hung, "Design and Operation of Power Converter for Microturbine Powered Distributed Generator with Capacity Expansion Capability."IEEE Trans. on Energy Conversion, Vol. 3, No.1, pp.110-116, March 2008. P. Siemes, H.-J. Haubrich, H. Vennegeerts, S. Ohrem, "Concepts for the improved integration of wind power into the German interconnected system", IET Renew. Power Gener., 2008, Vol. 2, No. 1, pp. 26– 33. M.I. Milands, E.R. Cadavai and F.B.Gonzalez, "Comparison of control strategies for shunt active power filters in three phase four wire system", IEEE Trans. Power lectron., Vol.22, No.1, pp.229-236, Jan 2007. Sung-Hun, Seong R Lee, Hooman Dehbonei, Chemmangot V. Nayar, "Application Of Voltage-and Current-Controlled Voltage Source Inverters for Distributed Generation System.," IEEE Trans. On Energy Conversion, Vol.21, No.3, pp. 782-788, Sept. 2006. Tatsuto Kinjo, Tomonobu Senjyu, "Output Leveling of Renewable Energy by Electric Double – Layer Capacitor Applied for Energy Storage System", IEEE Trans on Energy Conversion, Vol.21, No.1, March 2006. S.W.Mohod, M.V.Aware, "A STATCOM-Control Scheme for Grid Connected Wind Energy System for Power Quality Improvement", IEEE System Journal , Vol.4, Issue-3, pp.-346-352,Sept-2010. Sadhana A. Bhonde, Sanjay B. Bodkhe, "Integration of Renewable Energy - Challenges in Smart Grid", International Journal of Innovative Science and Modern Engineering, Vol.3 Issue-1, pp.-11-15, Dec. 2014. S.A. Bhonde, S.B. Bodkhe, S.W.Mohod, "Smart Grid Integration for Power Quality in Grid system", International Journal of Innovative research in Electrical, Electronic, Instrumentation,Control Engineering, Vol.1, Issue 6, Sept.2013 . http://www.nrel.gov/electricity/transmission/energy_management.html http://www.nrel.gov/electricity/transmission/variability.html 		1-6
2.	Authors:	Kumar Kartikeya, Manish Kumar Singh, Devesh Singh	
	Paper Title:	Analysis of Inter-Area Oscillations and A Case Study of Two Area System	
	<p>Abstract: The inter-area oscillations are highly non-linear and complex in nature. They are not easily damped by the conventional Power System Stabilizers. They cause the interruptions in the flow of bulk power in between two areas and sometimes they may cause the breaking of power system, if not damped sufficiently. Inter-Area oscillations contribute significant importance because they involve various units belonging to different areas in power system. They may cause greater oscillations in the tie line connecting various units. To analyse these inter-area oscillations, the entire power system has to be represented in detail. The analysis has also be done on how the certain quantity of power is transferred from one area to another which are interconnected by tie- line.</p> <p>Keywords: Inter-Area Oscillations, Oscilltions, Power System Stabilizer (PSS), Static Var Compensator (SVC), Unified Power Flow Controller (UPFC).</p> <p>References:</p> <ol style="list-style-type: none"> Aboul Ela, M.E., A.A. Sallam, J.D. McCalley and A.A. Fouad " Damping Controller Design for Power System Oscillations using Global 		7-11

Signals”, IEEE Transactions on Power Systems, vol.11, Issue pp 767, May 1996.

2. P. Kundur, M. Klein, G.J. Rogers and M. Zwyno, “ Application of Power System Stabilizers for Enhancement of Overall System Stability”, IEEE Trans., Volume: 4, Issue: 2, PS-4, pp614-621, May 1989.
3. Y. Mansour, “ Application of Eigenvalue Analysis to the Western North American Power System”, Eigenanalysis and Frequency Domain Methods for System Dynamic Performance, IEEE 90TH0292-3PWR, 1989.
4. J. Paserba, P. Kundur, J. Sanchez –Gasca and E. Larsen, “Small Signal Stability and Power System Oscillations”, Article 11.3 “The Electric Power Engineering Handbook”, Florida: CRC Press LLC and IEEE Press, 2001.
5. Md. Jan-E-Alam “A Study on the Presence of Inter-Area Oscillation Mode in Bangladesh Power System Network”, Journal of Electrical Engineering, The Institution of Engineers, Bangladesh, Vol. EE-36, No.II, December 2009.
6. W. Fairney, A. Miles, T.M. Whitelegg and N.S. Murray, “Low Frequency Oscillations on the 275 kv Interconnected System between Scotland and England”, CIGRE Paper 31-08, September 1982, Paris.
7. R.L. Cressap and J.F. Hauer, “Emergence of a New Swing Mode in the Western Power System”, IEEE Trans, Volume: PER-1, Issue: 4 PAS-100, pp 2037-2043, 1981.
8. G.J. Rogers and P. Kundur, “Small Signal Stability Analysis of Power System”, in Eigen Analysis and Frequency Methods for System Dynamic Performance, IEEE 90TH0292-3PWR, 1989.
9. Cai, Deyu ; Yang, Dechang ; Ding, Lei and Terzija, Vladimir “The application of SVC and TCSC for damping Inter-Area Oscillations.” <http://ipsitransactions.org/journals/papers/tir/2015july>
10. R.D. Saxena, K.D. Joshi, “Application of Unified Power Flow Controller (UPFC) for Damping Power System Oscillations- A Review”, International Journal of Engineering Research and Technology, Vol.1 - Issue 4, June- 2012, ISSN:2278-0181.
11. S.A. Nabavi Niaki, M. Reza Irvani “Application of Unified Power Flow Controller (UPFC) for damping Inter-Area Oscillations”, Volume :1, IEEE Transactions, 2001.
12. H. Behbehani, Z. Lubosny and J.W. Bialek “Survey of Supervisory Power System Stabilizers For Enhancement of Power System Stability” Universities Power Engineering Conference, IEEE Publications Conference, 2007 (DOI:10.1109/UPEC.2007.4468985).
13. P. Kundur, “Power System Stability And Control”, pg no. 769, McGraw-Hill, 1994.

Authors: Abdisalam M Issa-Salwe

Paper Title: Survey of Information Systems Undergraduate Programmes Taught at Saudi Arabian Universities

Abstract: This paper is the result of a survey of 25 Saudi Arabian university's colleges teaching undergraduate programmes in Information Systems (IS). Many of these universities are in the process of making their courses accredited by external creditors, such as ABET. This paper attempts to examine the common characteristics of these ABET accredited-oriented Information Systems (IS) undergraduate programmes. The paper also looks at the common trends in the courses of the Information Systems programmes of these universities. As a result of this analysis, the paper will also briefly explore how Information Systems design in many Saudi Arabian is designed to be more science-oriented than business-oriented programmes because of ABET accreditation influence.

Keywords: ABET, Computing Accreditation Commission (CAC), Association for Information Systems (AIS), NCAAA, accreditation, information systems, and curriculum.

References:

1. ABET Computing Accreditation Commission (2004), Criteria for Accrediting Computing Programs, November 1, 2004.
2. ABET Computing Accreditation Commission, Criteria for Accrediting Computing Programs, Effective for Evaluations During the 2015-2016 Accreditation Cycle.
3. Gill, G., & Hu, Q. (1999) The evolving undergraduate information systems education: A survey of U.S. institutions. Journal of Education for Business. 74, 1-13.
4. Gorgone J.T., P. Gray, E. A. Stohr, J.S. Valacich, and R. T. Wigand, MSIS 2006 (January 2006): Model Curriculum and Guidelines for Graduate Degree Programs in Information Systems, ACM, AIS.
5. Jeffrey S. Babb and Amjad Abdulla (2013): Communicating the Value of Program-Level Accreditation for Information Systems in a College of Business. 2013 Proceedings of the Information Systems Educators Conference. Volume 30, Number 2570. San Antonio, Texas, USA.
6. King Abdulaziz City for Science and Technology (KACST): The Strategic Bases, [WWW Document] URL <http://www.kacst.edu.sa/en/about/stnp/pages/strategicbases.aspx>, [20 June 2015].
7. Kohum, F. G., & Wood, D. F. (2003). The ABET CAC Accreditation Experience – Intent and Reality – the Information Systems Perspective. Information Systems Education Journal, 1 (43), 3-11.
8. Lee, D., Trauth, E., & Farwell, D. (1995). Critical skills and knowledge requirements of IS professionals: A joint academic/industry investigation. MIS Quarterly 19, 313-340.
9. Lending, D. and Mathieu, R.G. (2010). "Workforce preparation and ABET assessment". Proceedings of the 2010 Special Interest Group on Management Information System's 48th annual conference on Computer personnel research on Computer personnel research ACM, New York, NY, USA, 136-14
10. M. Basel Al Mourad (January 2014): On the Design of a Curriculum that Meets ABET and AIS Requirements: Case of Web Design and Development Program, International Journal of Computer and Communication Engineering, Vol. 3, No. 1.
11. Stephen Larson and Maria C. R. Harrington (2012): A Survey of ABET Accredited Information Systems Undergraduate Programs in the USA. 2012 Proceedings of the Information Systems Educators Conference. New Orleans Louisiana, USA. Vol 29 , 1961.
12. Stevens, G. E. (2000). The art of running a business school in the new millennium: A dean's perspective. SAM Advanced Management Journal, Summer: 21–28.
13. Sundaram Nataraja, Abdullah M. Alharbi and Waleed Idirs (February 2014): Challenges and Benefits of Accreditation for Business Colleges in the Middle East. 1st Conference of the Consortium of Business Schools in the Gulf Cooperation Council (GCC) Region, February 16 - 18, 2014.
14. Szanto, T. R. (2005). Evaluations of the third kind: external evaluations of external quality assurance agencies. Quality in Higher Education, 11, 183–193. Retrieved from www.un.org
15. Topi Heikki, Joseph S. Valacich, Kate Kaiser, J.F. Nunamaker, Janice C. Sipiior, GJ de Vreede and Ryan T. Wright, “IS 2010: Curriculum Guidelines for Undergraduate Degree Programs in Information Systems”, Association for Computing Machinery (ACM) and Association for Information Systems (AIS).
16. Zammuto, R. (2008). Accreditation and the Globalization of Business. Academy of Management Education and Learning, 7 (2), 252-268.

Authors: Devesh Singh, Manish Kumar Singh, Rakesh Sharma

Paper Title: Performance Study of Integrated Solar/Wind Energy Conversion System into Smart Grid

Abstract: The limited global stock of fossil and nuclear fuel resources has coerced an urgency for alternative sources of energy. The utilization of distributed energy resources is accrediting day by day and is being pursued as a supplement and an alternative to large conventional central power stations. Hybrid renewable energy systems

such as wind-solar energy based sources are feasible and reliable options. Smart grid system embodies three key characteristics namely: performance optimization, system reliability and operational efficiency. In the present communication a novel model of smart grid-connected PV/WT hybrid system has been developed. It consists of photovoltaic array, DFIG wind turbine, controller and converters. The proposed model has been executed using MATLAB/SIMULINK software package. Perturb and Observe (P&O) algorithm has been applied for maximizing the generated power based on maximum power point tracker (MPPT) implementation. The proposed model and its control strategy offer a proper tool for smart grid performance optimization.

Keywords: Solar Photovoltaic systems, Smart grids, Wind power generation, Maximum power point tracking (MPPT), dc/dc converter, dc/ac converter, doubly fed induction machine(DFIG), hybrid system.

References:

1. J. Carrasco, L. Franquelo, J. Bialasiewicz, E. Galvan, R. Guisado, Ma. A. M. Prats, J. Leon, and N. Moreno-Alfonso, "Power-electronic systems for the grid integration of renewable energy sources: A survey," *IEEE Trans. Ind. Electron.*, vol. 53, no. 4, pp. 1002–1016, Aug. 2006.
2. E. M. Natsheh, A. Albarbar and J. Yazdani, "Modeling and Control for Smart Grid Integration of Solar/Wind Energy Conversion System," *IEEE PES International Conference and Exhibition on Innovative Smart Grid Technologies*, Manchester, 5-7 December 2011, pp. 1-8.
3. Giordano, V. and Bossart, S. (2012) *Assessing Smart Grid Benefits and Impacts: EU and U.S Initiatives*.
4. Emodi Nnaemeka Vincent, Samson D. Yusuf, "Integrating Renewable Energy and Smart Grid Technology into the Nigerian Electricity Grid System," *Smart Grid and Renewable Energy*, 2014, vol. 5, pp. 220-238
5. E. Miller, "Smart grids – a smart idea?," *Renewable Energy Focus Magazine*, vol. 10, pp. 62-67, Sep.-Oct. 2009.
6. J. Yao, H. Li, Y. Liao, and Z. Chen, "An improved control strategy of limiting the DC-link voltage fluctuation for a doubly fed induction wind generator," *IEEE Trans. Power Electron.*, vol. 23, no. 3, pp. 1205–1213, May 2008.
7. G. Tapia, A. Tapia, and J. Ostolaza, "Proportional-integral regulator-based approach to wind farm reactive power management for secondary voltage control," *IEEE Trans. Energy Convers.*, vol. 22, no. 2, pp. 488–498, Jun. 2007.
8. J. Costa, H. Pinheiro, T. Degner, and G. Arnold, "Robust controller for DFIGs of grid-connected wind turbines," *IEEE Trans. Ind. Electron.*, vol. 58, no. 9, pp. 4023–4038, Sep. 2011.
9. C. Liu, F. Blaabjerg, W. Chen, and D. Xu, "Stator current harmonic control with resonant controller for doubly fed induction generator," *IEEE Trans. Power Electron.*, vol. 27, no. 7, pp. 3207–3220, Jul. 2012.
10. H. Xu, J. Hu, and Y. He, "Operation of wind-turbine-driven DFIG systems under distorted grid voltage conditions: Analysis and experimental validations," *IEEE Trans. Power Electron.*, vol. 27, no. 5, pp. 2354–2366, May 2012.
11. H. Nian and Y. Song, "Direct power control of doubly fed induction generator under distorted grid voltage," *IEEE Trans. Power Electron.*, vol. 29, no. 2, pp. 894–905, Feb. 2014.
12. Yazdani, A. Di Fazio, H. Ghoddami, M. Russo, M. Kazerani, J. Jatskevich, K. Strunz, S. Leva, and J. Martinez, "Modeling guidelines and a benchmark for power system simulation studies of three-phase singlestage photovoltaic systems," *IEEE Trans. Power Del.*, vol. 26, no. 2, pp. 1247–1264, Apr. 2011.
13. Z. Dejjia, Z. Zhengming, M. Eltawil, and Y. Liqiang, "Design and control of a three-phase grid-connected photovoltaic system with developed maximum power point tracking," in *Proc. Appl. Power Electron. Conf.*, Austin, Feb. 2008, pp. 973–979.
14. H. Yang, Z. Wei, and L. Chengzh, "Optimal design and technoeconomic analysis of a hybrid solar-wind power generation system," *Applied Energy*, vol. 86, pp. 163-169, Feb. 2009.
15. J.P. Reichling, and F.A. Kulacki, "Utility scale hybrid wind-solar thermal electrical generation: a case study for Minnesota," *Energy*, vol. 33, pp.626-638, Apr. 2008.
16. S. Dhrab, and K. Sopian, "Electricity generation of hybrid PV/wind systems in Iraq," *Renewable Energy*, vol. 35, pp. 1303-1307, Jun. 2010.
17. O. Ekren, B.Y. Ekren, and B. Ozerdem, "Break-even analysis and size optimization of a PV/wind hybrid energy conversion system with battery storage – A case study" *Applied Energy*, vol.86, pp. 1043-1054, July-August 2009.
18. S.K. Kim, J.H. Jeon, C.H. Cho, E.S. Kim, and J.B. Ahn, "Modeling and simulation of a grid-connected PV generation system for electromagnetic transient analysis," *Solar Energy*, vol.83, pp. 664 - 678, May 2009.
19. H.L Tsai, "Insolation-oriented model of photovoltaic module using Matlab/Simulink," *Solar Energy*, vol. 84, pp. 1318-1326, July 2010.
20. J.A. Gow, and C.D. Manning, "Development of a photovoltaic array model for use in power-electronics simulation studies," *IEE Proceedings- Electric Power Applications*, vol. 146, pp. 193-199, Mar. 1999.
21. M.J. Khan, and M.T. Iqbal, "Dynamic modeling and simulation of a small wind fuel cell hybrid energy system," *Renewable Energy*, vol. 30, pp. 421-439, Mar. 2005.
22. N. Chayawatto, K. Kirtikara, V. Monyakul, C. Jivacate, and D. Chenvidhya, "DC-AC switching converter modelings of a PV grid-connected system under islanding phenomena," *Renewable Energy*, vol. 34, pp. 2536-2544, Dec. 2009.
23. O.C. Onara, M. Uzunoglua, and M.S. Alam, "Dynamic modeling, design and simulation of a wind/fuel cell/ultra-capacitor-based hybrid power generation system," *Journal of Power Sources*, vol. 161, pp. 707-722, Oct. 2006.
24. J.C.H. Phang, D.S.H. Chan, and J.R. Philips, "Accurate analytical method for the extraction of solar cell model parameter," *IEEE Electronics Letters*, vol. 20, pp.406-408, May 1984.
25. M.G. Villalva, J.R. Gazoli, and E.R. Filho, "Comprehensive approach to modeling and simulation of photovoltaic arrays," *IEEE Transactions on Power Electronics*, vol. 24, pp 1198 - 1208, May 2009.
26. H. De Battista, R.J. Mantz, F. Garelli, "Power conditioning for a wind-hydrogen energy system," *Journal of Power Sources*, vol. 155, pp. 478-486, Apr. 2006.
27. E. Muljadi, C.P. Butterfield, "Pitch-controlled variable-speed wind turbine generation," *IEEE Trans. Industry Appl.*, vol. 37, pp. 240–246, Jan.-Feb. 2001.
28. W. Qiao, W. Zhou, J. M. Aller, and R. G. Harley, "Wind speed estimation based sensorless output maximization control for a wind turbine driving a DFIG," *IEEE Trans. Power Electron.*, vol. 23, no. 3, pp. 1156–1169, May 2008.
29. W. Qiao, G. K. Venayagamoorthy, and R. G. Harley, "Real-time implementation of a STATCOM on a wind farm equipped with doubly fed induction generators," *IEEE Trans. Ind. Appl.*, vol. 45, no. 1, pp. 98–107, Jan./Feb. 2009.