

Supporting Statement

Mission and Vision: I am a self-motivated researcher; strive for quality research with minimal supervision. I am eager to learn new things, explore beyond my PhD work and aim to contribute to society and mankind.

People Management: Overall 23 years of work experience in industry and academia. Before joining academics, I had long association of 8 years with software industry in India and abroad. I worked with reputed organizations in USA as a software consultant. I have worked with a team of an average of ten and more people from different nationalities with diversified nature. This helped me to become an effective team player. Possess 9.5 years in teaching field as well as 5.5 years in research field as full-time research scholar in University of Hyderabad. Presently working as Professor in Department of Information Technology at Vasavi College of Engineering(A), Hyderabad. Worked as Head of R&D Cell and R&D Coordinator at department and institute level in my previous institutions, where I represented and proposed research collaborations in the area of image processing and computer vision to various delegates from universities, research organizations from India and abroad. I am associated with Hyderabad Deccan ACM Chapter as Chairperson (2021-23), past WIE-Chair. I have long association as Senior IEEE member served as Treasurer and Executive council member in IEEE Hyderabad Region, CIS/GRSS Society.

Technical Competence: I completed my PhD. in Computer Science from School of Computer and Information Sciences, University of Hyderabad (2010-16), M.S (Computer Science) from Rivier University, NH, USA (1998-2000) with High Distinction, B.E (Computer Science & Engg.) from R.E.C (presently N.I.T) Durgapur, (1991-1995) with Honors. Prior to academics, I have worked on various technologies in the software industry, such as C++, Java, SQL Server, Oracle etc. As a research scholar, my PhD work was implemented using MATLAB, mainly on Image Processing Toolbox. My PhD work is closely related to image segmentation based on Orthogonal Polynomial based texture understanding and proposed new Hybrid Color Space (HCS) which is domain independent. Texture characterization is done using machine learning based on ANOVA inferential statistics and evaluating hypotheses. Involved in teaching various core computer science courses and electives such as Image Processing, Machine Learning, Artificial Intelligence, Data Mining, Data Wrangling & Visualization, Predictive Analytics using R programming, Python Programming, C Programming etc. Worked on research projects in academic collaboration with National Remote Sensing Centre, Indian Space Research Organization (ISRO), Hyderabad. One of the projects is road network extraction from satellite imagery which is closely related to semantic segmentation using machine learning. Another project is to build a framework for scenic interpretation from crowd sourced images based on deep learning model. The environment used is UbuntuOS with Python, scikit-learn, OpenCV, Tensorflow, Geospatial Data Abstraction Library (GDAL).

As an active Senior IEEE member and Hyderabad Deccan ACM Chair, conduct various workshops and deliver lectures in AI, ML, CV topics, contribute as reviewer for peer reviewed journals and international conferences. Presently am looking forward to continue my journey in the field of computer vision and machine learning and like to conduct advanced scientific research as a research scientist in near future. My PhD and recent works have been published in reputed journal and conference proceedings.

Curriculum Vitae

Tilottama Goswami

Ph.D., Computer Science, University of Hyderabad
Senior Member IEEE Hyderabad Section, CIS/GRSS Member
Chair, Hyderabad Deccan ACM Professional Chapter
Professor, Department of Information Technology
Vasavi College of Engineering (A), Hyderabad,
Telangana, INDIA

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Orcid ID <https://orcid.org/0000-0003-0665-5190>, Scopus Author ID 57072960000, Google Scholar ID: FHjwRaYAAAAJ

Date of Birth: August 26, 1972; Place of Birth: Bhilai (Chhattisgarh), India



Qualification

- PhD: Computer Science and Engineering, University of Hyderabad, Telangana State, INDIA. 2010 Registered, Thesis awarded in April 2016; Specialization: Image Processing. [UGC-Basic Scientific Research Fellowship, INCOIS Funded Project under Ministry of Earth Science, BBL Fellowship from University of Hyderabad]
- Master of Science: High Distinction (A+), Computer Science, Rivier University, New Hampshire, USA, 1998-2000
- Bachelor of Engineering: First Class Honors (77.5%), Computer Science and Engineering, Regional Engineering College (National Institute of Technology), Durgapur, INDIA, 1991-1995[SAIL-BSP Scholarship]
- Class XII: Central Board of Secondary Education, First Division 72.5 % , Maths, Physics, Chemistry, English, Computer Science, Senior Secondary School Sector 10, Bhilai, Dist Durg, Chhattisgarh
- Class X: Central Board of Secondary Education, First Division 80 % , English, Sanskrit, Maths, General Science, Social Science, Senior Secondary School Sector 10, Bhilai, Dist Durg, Chhattisgarh

Experience: 23 Years - Teaching: 9.5 Years, Research: 5.5 Years, Industry: 8 Years

Areas of Research: Computer Vision, Machine Learning, Image Processing

Recognized as Ph.D. Supervisor, Department of AI, Anurag University

Academics (Post PhD)

Sept 2022 – Till Date: Professor, Department of Information Technology, Vasavi College of Engineering (A), Hyderabad, Telangana State, INDIA

Dec 2020 – Sep 2022: Professor, Department of Artificial Intelligence, Anurag University, Hyderabad, Telangana State, INDIA

June 2019 – Dec 2020: Professor, Department of CSE, Anurag Group of Institutions, Hyderabad, Telangana State, INDIA

July 2018 – Apr 2019: Professor, Department of CSE, BVRIT Hyderabad, JNTU Affiliated, Telangana State, INDIA

July 2016 – July 2018: Associate Professor, Department of CSE, BVRIT Hyderabad, JNTU Affiliated, Telangana State, INDIA

Research (PhD) Aug 2010 – Apr 2016: **Full-time Research Scholar**, School of Computer and Information Sciences, **University of Hyderabad**, Telangana State, INDIA

Academics (Pre PhD)

Sep 2009 – Aug 2010: Associate Professor at Swami Vivekananda Institute of Technology, JNTU Affiliated, Hyderabad, INDIA

Sep 2006– May 2009: Faculty Member at the ICFAI University, Institute of Science and Technology, Hyderabad, INDIA

Jun 2002–Sep 2002: Visiting Faculty at ICFAI Business School

Industry

Oct 2005 – Jul 2006: Software Consultant to industries in Hyderabad at Merit Scholar IT Solutions Pvt. Ltd.

Apr 2005–Sep 2005: Software Consultant at Frontech Services Pvt. Ltd, Hyderabad

Dec 2003–Dec 2004: System Analyst at TMI Networks, Hyderabad

Aug 2000–Apr 2001: Software Consultant at GIS group in Intergraph India Ltd, Hyd, INDIA

Mar 1999–May 2000: Senior Software Engineer at Kronos Incorporation, MA, USA

Sep 1997–Mar 1999: Software Consultant at Software Technology International NH, USA

July 1995– Aug 1997: Software Engineer, Larsen and Toubro Infotech, Chennai, INDIA

(Industrial Project Details in Annexure – I)

III. Awards and Honors

1. Invited as Chief Guest for inaugural of ACM SIGAI Student Chapter at Anil Neerukonda Institute of Technology and Science (ANITS), Vishakapatnam, A.P., December 2022
2. Received Distinguished Scientist Award from IJIEMR Elsevier SSRN Research Awards (IESRA-2022), Vijayawada, A.P., Sep 2022
3. Received inSIG2022 Fellowship by Internet Society India Hyderabad Chapter (ISoC), at Seventh Edition of the India School on Internet Governance at IIIT Hyderabad, Aug 2022
4. Invited as Guest of Honor, for Inaugural of ACM Student Chapter, Institute of Aeronautical Engineering, Hyderabad, April 2022
5. Appointed as ACM India Professional Engagement Committee Member 2022-24
6. Elected as the Chair for the Hyderabad Deccan ACM Chapter for consecutive two years, Mar 2021-Mar 2023
7. Elected as the WiE-Chair for the Hyderabad Deccan ACM Chapter, Mar 2020-21
8. Recognized as Ph.D. Supervisor, Department of AI, Anurag University, 2020
9. Received Women Researcher Award from REST Society for Research International (RSRI), Tamil Nadu, June 2020
10. Appointed as Treasurer- CIS/GRSS Joint Society Chapter Hyderabad Section 2019
11. Received University Grants Commission-Basic Scientific Research (UGC-BSR) Fellowship (under Govt. of India) during 2014-15.
12. Appointed as Software Engineer to assist in the project leadership for a funded project titled, "Grid Fabric/Middleware Technologies for Developing Ocean Related Applications and Services" by Indian National Centre for Ocean Information Services (under the Ministry of Earth Sciences, Govt. of India) during 2012-13.
13. Basic Boarding and Lodging (BBL) Scholarship from University of Hyderabad for 2010-12.
14. Received Star Team Award for developing efficient software for GeoMedia (GIS), leading to complete customer satisfaction at Hexagon (Intergraph), Hyderabad in 2001
15. Steel Authority of India Ltd., Bhilai Steel Plant Scholarship for BE(CS), NIT Durgapur during 1991-1995

IV. Research

Research in computer vision depends mainly on low level image processing, such as image segmentation, to identify the object regions present in the image and mid-level image analysis tasks, such as texture characterization for global and local knowledge representation. There are various associations of image segmentation and texture analysis with computer vision and pattern recognition related high level tasks, like classification, retrieval, recognition and scene understanding. Motivated in continuing my journey in the

field of image processing, computer vision and machine learning, programming with MATLAB, Python, R, OpenCV, GDAL, scikit-learn, Tensorflow. As an active IEEE and ACM member, conduct workshops and deliver guest lectures.

Patent Filed & Granted

International Patent: **Australian Patent**

Application Number: 2021105815

Applicant Name: Dr. Tilottama Goswami, Dr Arun Agarwal, Dr. C Raghavendra Rao

Title of Invention: A Multi-Faceted Hierarchical Image Segmentation Taxonomy (MFHIST) System for Categorization of An Image Segmentation Algorithms

Filing Date: 18-8-2021

Industry Consultancy Projects

- A. Principal Investigator for TMI Group, project titled “Video Recommendation based on AI”, Jan 2022-June 2022
- B. Research Consultant for DataVedik, Texas, USA, project titled “Machine Learning and Image Processing for Well Log Digitization”, April 2021-July 2021

Projects Executed

- A. Research projects in academic collaboration with National Remote Sensing Centre (NRSC), Indian Space Research Organization (ISRO), Hyderabad in the field of deep learning model, machine learning and image processing from Dec 2017– Apr 2019

List of projects

1. A framework for scenic interpretation of crowd-sourced geo-tagged photographs based on image analysis and deep learning model, Co-Principal Investigator
 2. Road Extraction from satellite images using deep learning models, Principal Investigator
- B. Appointed as Assistant Software Engineer in Funded project titled 'Grid Fabric/Middleware Technologies for developing Ocean Related Applications and Services' sponsored by Indian National Centre for Ocean Information Services (INCOIS)., under Department of CIS, University of Hyderabad, Feb 2012 – Dec 2012

Projects Proposals

- C. Dr. Tilottama Goswami as PI, submitted DST project proposal in collaboration with University of Salerno, University of Pisa, University of Basilicata, IIT Hyderabad,

NIRD, Osmania University titled ‘Leveraging Industry 4.0 Emerging Technologies for Predicting Quality of Life using Human Development Index’ applied for Indo-Italian call for proposals for the Network of Excellence, 30 April 2021

- D. Dr Tilottama Goswami (Co-PI) in technical collaboration with Dept of Chemistry, submitted proposal for SERB-POWER Grant, Applying Machine Learning Techniques for Forecasting of Crop Yield using Reclaimed Food Industry Wastewater, 6 Jan 2021
- E. Project proposal submitted on ‘Assessing the Impact of Integrated Child Development Services (ICDS) intervention in Tribal Populations using Predictive Analytics: a Study of Gudur Mandal, Mahabubabad District, Telangana’ for TSCOST – Department of Science and Technology (DST), GoI funded program, 29 Jan 2020
- F. Project proposal submitted on ‘Intelligence based Hardware and Software solution for Automatic detection and classification of objects in satellite images’ Innovations for Defence Excellence (iDEX), Artificial Defence India Startup Challenge launched by Ministry in partnership with Atal Innovation Mission, 3 Dec 2020
- G. Project proposal submitted on ‘Statistical Modelling to set up hypothesis test to formulate and establish the inferences drawn from John Holland psychometric responses and English Numeracy Pattern Test responses for evaluation of youth’s area of interest’ for DDU-GKY Skill Development Programme under Ministry of Rural Development, NIRD, Hyderabad, 1 Dec 2020

IV. 1) PhD Thesis: A Framework for Color-Texture Segmentation and Characterization of Natural Outdoor Images

An abundance of various automated and semi-automated segmentation techniques can be found in literature that caters to wide range of image analysis and understanding applications. To cater such a wide coverage of algorithms, we have proposed Multi- Faceted Hierarchical Image Segmentation Taxonomy (MFHIST). We also proposed a computationally inexpensive generic hybrid color-texture feature integration methodology applied to natural color image segmentation. Automatic and proper segmentation along with texture characterization generates informative knowledge representations, which inspired the present study, and hence have come up with a framework for providing meaningful representation of the given image objectively. The proposed framework is expected to be useful in the field of computer vision for cases, where prior knowledge about the scene is unknown.

IV. 2) Research interests:

Image Processing, Computer Vision, Machine Learning, Remote Sensing

IV. 3) Research Publications:

Books Authored/Edited

Editors - Dr Tilottama Goswami, Dr G. R. Sinha, “Statistical Modelling in Machine Learning: Concepts and Applications”, Publisher- Elsevier USA, Nov 2022, eBook ISBN: 9780323972529 (<https://www.elsevier.com/books/statistical-modeling-in-machine-learning/goswami/978-0-323-91776-6>)

Journal / Book Chapter Publications

Authors	Title of the paper	Journal/Book Chapter	Publisher/ Indexing
Sonal Mobar Roy Tilottama Goswami Charan Kumar Nara	Impact of Mid-Day Meal Scheme in Primary Schools in India using Exploratory Data Analysis and Data Visualization	Book Chapter: Statistical Modeling in Machine Learning Concepts and Applications, Elsevier. (https://www.elsevier.com/books/statistical-modeling-in-machine-learning/goswami/978-0-323-91776-6)	Publisher- Elsevier USA, Nov 2022, eBook ISBN: 9780323972529
Sapna Singh Kshatri,Deepak Singh TilottamaGoswami, G R Sinha	Introduction to Statistical Modelling in Machine Learning - A Case Study	Book Chapter: Statistical Modeling in Machine Learning Concepts and Applications, Elsevier (https://www.elsevier.com/books/statistical-modeling-in-machine-learning/goswami/978-0-323-91776-6)	Publisher- Elsevier USA, Nov 2022, eBook ISBN: 9780323972529

Tilottama Goswami, Divya, Prakriti Goswami	Soil Classification and Crop Prediction using Machine Learning Techniques	Book Chapter: Intelligent Computing in Drones and Robotics Technologies for Precision Agriculture, Nova Science Publishers	Accepted Oct 2022, Yet to be published
Tilottama Goswami, Arun Agarwal, C.Raghavendra Rao	A Unified Approach for Representing Outdoor Scenes	IEEE Access 10. 1-1. 10.1109/ACCESS.2022.3192870.	WoS, SCIE, DOAJ, SCOPUS, Jan 2022
Tilottama Goswami	Editorial: Human Intelligence and Machines	Medicon Engineering Themes 2.6 (2022): 63-65, May 2022	OEJ, IF: 0.868
Nagwanshi, Amit Kumar Gupta,	Human Footprint Biometrics for Personal Identification using	International Journal of Biometrics,	SCOPUS
Tilottama Goswami, Sunil Pathak, Maleika Heenaye Mamode Khan	Artificial Neural Networks	Inderscience Enterprises Ltd. DOI: 10.1504/IJBM.2023.10043092, Sept 2021	
Tilottama Goswami, Uponika Roy, G Sinha	Natural Disaster Analysis for Relief Management using Deep Learning	Turkish Journal of Computer and Mathematics Education, May 2021	SCOPUS Accepted
Tilottama Goswami, Arun Agarwal, C.Raghavendra Rao	Multi-Faceted Hierarchical Image Segmentation Taxonomy (MFHIST)	IEEE Access Journal, pg: 33543-33556, Print ISSN: 2169-3536, Online ISSN: 2169-3536, 10.1109/ACCESS.2021.3055678, Jan 2021	WoS, SCIE, DOAJ, SCOPUS

Tilottama Goswami	Chapter in Edited Book Chapter 16 - Machine learning behind classification tasks in various engineering and science domains https://www.sciencedirect.com/science/article/pii/B9780128194430000167	Cognitive Informatics, Computer Modelling and Cognitive Science, Volume 1: Theory, Case Studies, and Applications 2020, ISBN: 978-01-12-819443-0 https://doi.org/10.1016/B978-0-12-819443-0.00016-7 Pages 339-356 April, 2020	SCOPUS Academic Press, Elsevier Inc.
Tilottama Goswami, Arun Agarwal, C.Raghavendra Rao	Hybrid Region and Edge Based Unsupervised Color-Texture Segmentation for Natural Images http://www.ijipbangalore.org/abstracts_9(1)/p8.pdf	International Journal of Information Processing, 9 (1), pp 77-92 ISSN : 0973-8215, 2015	SCOPUS
Tilottama Goswami	Role of Metaheuristics Optimization Approach in Image Segmentation Techniques, http://www.iupindia.in/309/IJST_Metaheuristics_Optimization_27.html	The IUP Journal of Science & Technology, Vol 5, No. 21, pp 21-34, Mar 2009	IUP Publication Indexed on Cabell's Directory

Conference Publications/ Conference Proceedings as Book Chapter

Authors	Title of the paper	Conference Proceedings	Publisher/ Indexing
Tilottama Goswami, Shashidhar Reddy Javaji, Kapil Kumar Nagwanshi	Voice-controlled AI Teaching Assistant for Visually Impaired and Specially-abled	3rd International Conference on Artificial Intelligence and Signal Processing	Accepted to be published in IEEE Explore, SCOPUS

Tilottama Goswami, Uponika Barman Roy	Classification Accuracy Comparison for Imbalanced Datasets with its Balanced Counterparts Obtained by Different Sampling Techniques	In: Kumar A., Mozar S. (eds) ICCCE 2020. Lecture Notes in Electrical Engineering, vol 698. Springer, Singapore. Pg 45-54 https://doi.org/10.1007/978-981-15-7961-5_5 , Online ISBN: 978-981-15-7961-5, Oct 2020	SCOPUS LNEE, Springer
Tilottama Goswami, Shashidhar Reddy Javaji	CNN Model for American Sign Language Recognition	In: Kumar A., Mozar S. (eds) ICCCE 2020. Lecture Notes in Electrical Engineering, vol 698. Springer, Singapore. Pg 55-61 https://doi.org/10.1007/978-981-15-7961-5_6 , Online ISBN: 978-981-15-7961-5, Oct 2020	SCOPUS LNEE, Springer
Tilottama Goswami, Yerrapothu Vaishnavi	A Case Study on Correctness Evaluation of Content based Recommender System based on Text, Semantic text	ICDSMLA 2019. Lecture Notes in Electrical Engineering, vol 601. International Conference on Data Science, Machine Learning & Applications, ICDSMLA 2019, 29-30 Mar 2019, CMRIT Hyderabad DOI: https://doi.org/10.1007/978-981-15-1420-3_59 , Online ISBN 978-981-15-1420-3, 19 May 2020	SCOPUS Springer, Singapore
Tilottama Goswami, Hitendra Sarma	Intelligent Computing for Air Pollution Monitoring Using GIS, Remote Sensing and Machine Learning	Book Series LNEE, Emerging Trends in Electrical, Communications, and Information Technologies Proceedings of ICECIT, Volume 569 DOI: https://doi.org/10.1007/978-981-13-8942-9_12 , January 2020	SCOPUS Springer, Singapore
Tilottama Goswami, Uponika Barman Roy	Prediction Model for Classification of Power System Faults using Machine Learning	TENCON - 2019 IEEE Region 10 Conference (TENCON), Kochi, Kerala, pg 1881-1885 ISBN: 978-1-7281-1895-6, DOI: 10.1109/TENCON.2019.8929264, December 2019	SCOPUS, DBLP IEEE Xplore Digital Library

Tilottama Goswami	Impact of Deep Learning in Image Processing and Computer Vision	International Conference on Micro-Electronics, Electromagnetics and Telecommunications, ICMEET-2017, Hyderabad, vol 471, DOI:10.1007/978-981-10-7329-8_48, 2018	SCOPUS Springer, Singapore
Chandana Gogineni Tilottama Goswami	Review of publicly available image forensic tools	6 th IEEE International Conference on Communication and Signal Processing, ICCSP-2017, Tamil Nadu	SCOPUS IEEE Xplore
Tilottama Goswami, Arun Agarwal, C.Raghavendra Rao	Statistical Learning for Texture Characterization http://dl.acm.org/citation.cfm?id=2683494	Proceedings of the 2014 Indian Conference on Computer Vision, Graphics and Image Processing, ICVGIP-2014, Bangalore, India, December 14-18, 2014. ACM 2014, ISBN 978-1-4503-3061-9, 11:1-11:8 IISc, Bangalore	ACM (online) SCOPUS DBLP
Tilottama Goswami, Arun Agarwal, C.Raghavendra Rao	Color Texture features Integration for Unsupervised Image Segmentation based on Orthogonal Polynomial Operators and Hybrid Color Space	Eighth International Conference on Image and Signal Processing ICISP-2014, July 25-27, Bangalore, India, pp 52-59, (Eds) K. R. Venugopal, K. B. Raja and L. M. Patnaik, ISBN: 9789351072522.	SCOPUS Elsevier
Tilottama Goswami	Edge Detection in Image - An Overview	National Conference on Emerging Trends In Soft Computing, in association with Indian Society for Rough Sets (ISRS) and Computer Society of India (CSI) Pune, Feb 2, 2011, ISBN: 9789380697567	Excel India
Tilottama Goswami, ManeshKokare	Advancements in Content Based Image Retrieval towards ACO Metaheuristic Approach	Indian Conference on Computer Vision, Graphics, Image and Video Processing (ICCVGIP-2009) Nagpur, March 13, 2009	RKNEC Nagpur
Tilottama Goswami Sudepto Bhattacharya	Overview of Pattern Classifiers and their Application Areas	IEEE International Conference on Recent applications of Soft Computing in Engineering and Tech Dec 22, 2007	IET, Alwar

(Publication Details in Annexure – II)

IV. 4) Certifications FDP/Workshop Attended/MOOC

1. Participated in 3 days 5th **Annual Compute Conference**, organized at Manipal University Jaipur, Nov 9-11, 2022
2. 5 Days FDP on **Data Analytics: Tools and Techniques**, organized by AICTE Training and Learning (ATAL) Academy, University of Hyderabad, 22-26 Nov 2021
3. 5 Days FDP on **Advanced Data Science and Deep Learning**, organized by AICTE Training and Learning (ATAL) Academy, IIIT Naya Raipur, 16-20 Sept 2021
4. 3 Days Certification Series on **Journal Citation Reports**, organized by Clarivate, 8 July 2021
5. One Week STTP on **Advanced Deep Learning Techniques with Python**, 27 July – August 1 2020 (Online Mode), AGI, Hyderabad, India
6. One Week STTP on **Data Analysis in R**, 20-25 July 2020 (Online Mode), organized by REST Society for Research International (RSRI), Tamil Nadu, India
7. Faculty Development Program on **Computer Vision using Convolutional Neural Networks**, 8-10 June 2020 (Online Mode), organized by Anurag University and Blackbuck Engineers, Hyderabad
8. One Week STTP on **Statistical Analysis in SPSS Software**, 18-22 May 2020 (Online Mode), organized by REST Society for Research International (RSRI), Tamil Nadu, India
9. Three-Day Online Workshop on **Online Course Design, Development and Delivery** organized by Human Resource Development Centre, University of Hyderabad during 29-31 May 2020
10. **Basic Data Descriptors, Statistical Distributions, and Application to Business Decisions**, MOOC from Rice University, Texas, USA, offered through Coursera, completed on 28 May 2020
11. **Introduction to Data Analysis using Tool**, MOOC from Rice University, Texas, USA, offered through Coursera, completed on 2 May 2020
12. **Linear Regression for Business Statistics**, MOOC from Rice University, Texas, USA, offered through Coursera, completed on 22 April 2020
13. Two-Days Workshop on **Harnessing Artificial Intelligence and Cognitive Computing to Power Military Technology**, conducted by MCEME and IIIT Hyderabad at Military College of EME (MCEME) Hyderabad, 3-4 August 2018
14. Two-day Workshop on **Topics in Linear Algebra & Machine Learning**, SCIS, University of Hyderabad, 12-13 Oct 2017
15. **Bhuvan Overview**, organized by National Remote Sensing Centre, ISRO, Hyderabad, Aug 31-Sep 1, 2017
16. Faculty Development Programme On **Ruby** offered by Spoken Tutorial Project, IIT Bombay, funded by MHRD, BVRIT Hyderabad, 29th June– 5th July, 2017

17. Workshop on **Hadoop Basics**, a part of Machine Learning for Big Data Analytics Series, organized by IEEE CIS/GRSS Jt. Chapter at IIIT Hyderabad on 8-9th April 2017
18. **Coursera Mentor Community and Training Course**, MOOC from Coursera Community Team March 2017
19. Workshop on **Scientific Educational Practices** held at Vishnu Educational Development and Innovation Center (VEDIC), Hyderabad during 7-9th December 2016
20. Faculty Development Programme on Open Source Software – **Python, Scilab** offered by Spoken Tutorial Project, IIT Bombay, funded by MHRD, BVRIT Hyderabad, November 2016
21. **Machine Learning Foundations : A Case Study Approach**, MOOC from University of Washington offered through Coursera, October 2016
22. **Latex** Training, offered by Spoken Tutorial Project, IIT Bombay, funded by MHRD, BVRIT Hyderabad, September 2016
23. National Workshop on **Rough Sets and Knowledge Technologies**, Indian Society for Rough Sets (ISRS), JNTU Hyderabad, November 2013
24. Participation in Multi-Disciplinary International Workshop on **Artificial Intelligence** (MIWAI), University of Hyderabad in collaboration with Mahasarakham University, Thailand, University of Hyderabad, December 2011
25. Workshop on **MATLAB and Simulink**, ICFAI University, Hyderabad, 2008

IV. 5) Reviewer/ Outreach

Editorial Board Member

1. American Journal of Electrical and Computer Engineering, 2022-24
2. Medicon Engineering Themes, 2022-2023

International Conferences and Journals:

1. Publicity Chair, 6th Annual Compute Conference, organized at University of Hyderabad, Dec 9-11, 2023
2. Publicity Chair, for International Conference on Emerging Techniques in Computational Intelligence (ICETCI) Technically Co-sponsored by IEEE Computational Intelligence Society, Mahindra University, Hyderabad, Aug 2023
3. Sponsorship Chair, International Conference on Machine Intelligence for GeoAnalytics and Remote Sensing, Technically Co-Sponsored by IEEE GRSS, Vasavi College of Engineering, Hyderabad, India, 27-29 January 2023
4. Tutorials Chair, for International Conference on Emerging Techniques in Computational Intelligence (ICETCI) Technically Co-sponsored by IEEE Computational Intelligence Society, Mahindra University, Hyderabad, Aug 2022
5. Session Chair, International Conference on Computational Intelligence and Data

- Analytics (ICCIDA-2022) in association with Springer organized by Department of Information Technology, Vasavi College of Engineering, Hyderabad, India, 8-9 Jan 2022
6. Technical Program Committee (TCP) member for Special Session Title: Advances in Remote Sensing and Medical Applications using Machine Learning & Deep Learning, Organized by MVSR Engineering College for 16th INDIACOM 2021 International Conference on Computing for Sustainable Global Development, Technically approved by IEEE Delhi Section held during 23rd – 25th March, 2022 at Bharati Vidyapeeth, New Delhi (INDIA).
 7. Reviewer for IEEE Symposium Series on Computational Intelligence (IEEE SSCI 2021) December 4th – 7th 2021, Orlando, Florida, USA
 8. Tutorial Chair, International Conference on Emerging Techniques in Computational Intelligence, ICETCI 2021, Technically Co-sponsored by IEEE Computational Intelligence Society, Mahindra University, Hyderabad, Aug 25-27, 2021
 9. Reviewer for IEEE World Congress on Computational Intelligence 2020, Glasgow, UK for Fuzzy Systems track
 10. Technical Program Committee Member and Reviewer for IEEE Symposium Series on Computational Intelligence 2020, Australia
 11. Reviewer for International Conferences IEEE GRSS STARS HYDCON 2019, INDICON 2019, TENCON 2019, ICISGT 2019
 12. Invited for reviewing research papers in **Microsystem Technologies**, peer-reviewed, Springer publications, 2017, <https://link.springer.com/journal/542>
 13. Invited for reviewing research paper in **American Journal of Applied Sciences**, peer-reviewed, open-access international scientific journal, Science publications, 2016, <http://thescipub.com/journals/ajas>

Reviewer for Book:

Title: Theory of Automata, Languages and Computation

Author: Rajendra Kumar

Edition: First, Publisher: McGraw-Hill, ISBN: 9780070702042, June 2010

<http://highereducation.com/sites/default/files/0070702047/900657/Preface.pdf>

IV. 6) Guest Lectures / Workshops Conducted / External Expert

Resource Person for Workshops/Congress

1. Guest Speaker on “Augmented Reality(AR) vs Virtual Reality(VR)” at Two Days National Workshop in Manipal University, Jaipur, 16th Feb 2023
2. Guest Speaker on “Role of Computer Vision in Augmented/Virtual Reality” for ACM Chapter Inaugural, at Sree Vidyanikethan Engineering College (SVEC), Chittoor, A.P., 10th Feb 2023
3. Guest Speaker on “Computer Vision for Virtual and Augmented Reality” for Pre-

- Conference Workshop as a part of 6th International Conference on Intelligent Computing and Communication (ICICC), at G Narayanamma Institute of Technology and Science (GNITS) , Hyderabad, Nov 2022
4. Guest Speaker on “Real Life Practical AI/ML Case Studies – Audit, Law and Healthcare”, at Online Short Term Course Artificial Intelligence and Machine Learning, organized by UGC-HRDC, Academic Staff College, Osmania University, Hyderabad, September 2022
 5. Guest speaker on “AI – Future and Challenges”, at inaugural of Velagapudi Ramakrishna Siddhartha Engg College (VRSEC) SIGAI Student Chapter, Vijayawada, August 2022
 6. Guest Speaker on “Artificial Intelligence Vs Automation”, Institute of Aeronautical Engineering (IARE) ACM Student Chapter, Hyderabad, April 2022
 7. Guest Speaker on “Artificial Intelligence for Audit”, 2 weeks Online Management Development Program (MDP) in technical collaboration with Centre for Industry Academia Partnership (CIAP), organized by Maharaja Agrasen University, Solan, Himachal Pradesh, March 2022
 8. Guest speaker on “Machine Learning Algorithms”, at 3 Days Faculty Development Program, organized by Osmania University, CoE AIML (Under RUSA 2.0) and in technical collaboration with ACM Hyderabad Deccan Chapter, 6-8 Jan, Hyderabad
 9. Invited as Expert Member – Jury at 2-DAY INTERNATIONAL AI CONGRESS conducted by Computer Science and Engineering, CVR College of Engineering on 25th-26th June 2021
 10. Guest speaker on "Foundations of Deep Neural Networks for Image/ Video Applications with Hands-On Using Keras", at AICTE Sponsored One Week online STTP conducted by Department Of Computer Science & Engineering, MVSR Engineering College, Hyderabad, 18th to 23rd Jan 2021
 11. Guest speaker on “Introduction to Artificial Neural Network and its Applications using Python with couple of applications using Python’ for IEEE CIS Workshop on "Computational Intelligence and Machine Learning Applications" by IEEE Hyderabad Section, Online, 18-23 December 2020
 12. Guest speaker on “Introduction to Artificial Neural Networks and its variants” for International Workshop by IEEE CIS Neural Networks Technical Committee and ACM Chapter, Online, Sept 2020
 13. Guest Speaker on “Machine Learning using Python” for virtual workshop by Hyd Deccan ACM Chapter, July 2020
 14. Mentoring IEEE India COVID Move – Online Hackathon Challenge conducted by IEEE India Council in collaboration with IEEE Hyd Section and IEEE Bangalore Section, 30th March – 2nd April 2020
 15. Delivered Tutorial sessions in ‘Datasets and Tools used in Machine Learning’ and ‘Fuzzy Logic’ in 6 days Summer School on Computational Intelligence: Theory, Implementation & Applications, sponsored by IEEE Computational Intelligence

- Society, IEEE Geoscience & Remote Sensing Society, IEEE Hyderabad Section at M.J.C.E.T, Hyderabad, 22-27 November 2018, <https://cishyd-ss.ieeehyd.org>
16. Conducted Theory & Hands-on-session for Two-Day National Level Workshop on ‘Artificial Intelligence and Machine Learning (AIM 2018)’, conducted by GPREC, IEEE Information Theory Society Student Chapter, Kurnool, 24th-25th September 2018
 17. Conducted Theory & Hands-on-session for Two-Weeks Workshop on ‘Image Processing Using MATLAB’ conducted by Assistive Technology Labs, BVRIT Hyderabad, 6th-18th February 2017
 18. Invited Speaker to Smart Devices Symposium (SDS2020) at the Theme 201: Robotics and AI Technology Innovation was to be held on 17-19 March 2020 in Osaka Japan. (Event cancelled due to Covid pandemic) ,postponed to 2021
 19. Guest lecture on “Statistical Methods for Machine Learning and Neural Networks” for AICTE Sponsored Two-Week Faculty Development Program on Advances in Signal and Image Processing with hands-on training using MATLAB held in Geethanjali College of Engineering and Technology (Autonomous), Hyderabad on 26 Nov 2019
 20. Guest lecture on “Photo Caption Generation using Deep Learning Model” during 3-Days Workshop on Introduction to Deep Learning, at MVSR (Affiliated to OU), Hyderabad on 27 Sept 2019
 21. Guest lecture on ‘Computer Vision for Military Operations’ at Military College of Electronics and Mechanical Engineering (MCEME), November 2017
 22. Guest lecture on ‘Image Segmentation and Morphological Image Processing’ for Three Day National Workshop on Recent Trends in Image & Video Processing, organized by Department of CSE under TEQIP-II at VNR-VJiet (Affiliated to JNTU Hyderabad), March 2017
 21. Delivered lecture on ‘Introduction to Image Segmentation’ for Faculty Development Programme on ‘Recent trends in Digital Image & Video Processing’ organized by Department of Electronics and Communication, MGIT, Engineering College (Affiliated to JNTU Hyderabad) on Feb 2016
 22. Delivered lecture on ‘Color Image Segmentation’ for Faculty Development Programme on ‘Digital Image & Video Processing’ by Department of Computer Science, MVSR Engineering College (Affiliated to Osmania University), Hyderabad, Jan 2016

Summit/Conference/ Workshop/Webinars/Seminars Organized

23. Chair-ACM Hyderabad Deccan in collaboration with ACM SIGAI Student Chapter at Anil Neerukonda Institute of Technology and Science (ANITS), Vishakapatnam, A.P. organized webinar on “Mathematics for Machine Learning”, to commemorate National Mathematics Day, December 2022

24. Chair-ACM Hyderabad Deccan in collaboration with Keshav Memorial Institute of Technology (KMIT) organized One Day Workshop on “ AI & ML Applications in Cyber Security”, to commemorate National Cyber Security Awareness Month, Oct 2022
25. Chair-ACM Hyderabad Deccan in collaboration with Narayana Engineering College, Nellore, AP and Internet Society India Hyderabad Chapter organized webinar on “Cyber Security Awareness”, to commemorate National Cyber Security Awareness Month, Oct 2022
26. Chair-ACM Hyderabad Deccan in collaboration with Industry Academia Collaboration, Muffakham Jah College of Engineering & Technology (MJCET) organized technical seminar on “METAVERSE”, Sept 2022
27. Convener, Distinguished Lecture Series on Advanced Computing on “Geospatial Technology for Rural Development Applications” and “Deep Learning and its applications”, organized by Department of Artificial Intelligence, Anurag University with technical collaboration with ACM Hyderabad Deccan Chapter and Centre of Excellence AIML(under RUSA 2.0), Osmania University, 2022-23, Quarterly event, 27th July 2022
28. Chair-ACM Hyderabad Deccan in collaboration with Industry Institute Interface Centre, IARE ACM Student Chapter organized technical seminar on Role of Geospatial Technology in Environmental Science, to commemorate World Environment Day, June 2022
29. Chair-ACM Hyderabad Deccan in collaboration with Institution’s Innovation Council, ACMW BVRITH Student Chapter organized technical seminar on Climate Change and its Impact to commemorate World Environment Day, June 2022
30. Chair-ACM Hyderabad Deccan in collaboration with Industry Institute Interface Centre, IARE ACM Student Chapter organized technical seminar on National Technology Day, 11th May 2022
31. Chair-ACM Hyderabad Deccan in collaboration with Industry Institute Interface Centre, IARE ACM Student Chapter organized technical seminar on National Technology Day, 11th May 2022
32. Chair-ACM Hyderabad Deccan in collaboration with Industry Institute Interface Centre, IARE ACM Student Chapter organized technical seminar on National Technology Day, 11th May 2022
33. Convener, Distinguished Lecture Series on Advanced Computing on “Social Computing”, “Cloud Security” and “Quantum Computing”, organized by Department of Artificial Intelligence, Anurag University with technical collaboration with ACM Hyderabad Deccan Chapter and Centre of Excellence AIML(under RUSA 2.0), Osmania University, 2022-23, Quarterly even, 7th April 2022
34. Coordinator as Chairperson of ACM Hyderabad Deccan Chapter , 3 Days Faculty Development Program, organized by Osmania University, CoE AIML (Under RUSA 2.0) and in technical collaboration with ACM Hyderabad Deccan Chapter.

6-8 Jan, 2022

35. Convener, AI Readiness (AIR 2021) Webinar Series – July, Aug, Sept 2021, Dept of AI, Anurag University
36. Co-Convener of 5 Days International Conclave on Recent Advances in Computer Science held Online 21st Sept-25th Sept 2020, conducted by Dept of CSE, Anurag University
37. Conducted Women in Engineering (WiE) Event as WiE Chair of Hyderabad Deccan ACM Chapter, titled ‘*Two-Day Virtual Workshop on LaTeX*’ to be delivered by Prof Durga Bhavani and Prof. T. Shobha Rani, SCIS, University of Hyderabad, 24-25 May 2020
38. Conducted Women in Engineering (WiE) Event as WiE Chair of Hyderabad Deccan ACM Chapter, titled ‘*Ontology Engineering for UAV based Scene Understanding*’ delivered by Prof Sabrina Senatore, Department of Information Engineering, Electrical Engineering and Applied Mathematics (DIEM), University of Salerno, Italy, 20 April 2020
39. Convener for 2 Days IEEE Workshop on GIS Concepts for Remote Sensing Applications, conducted by IEEE CIS/GRSS Jt Hyd Section in association with BVRIT Hyderabad, 8-9th Jan 2019

External Expert

40. External Expert Member for Training Quality Improvement and Management Committee (TQIMC) for the Centre for Information and Communication Technology, National Institute of Rural Development, Ministry of Rural Development, Hyderabad, 2020
41. External Expert Member of Curation Committee on Ai Testing program, ATA and DevOps++ Alliance, 2020

V. Teaching Contribution

Summary: Tilottama Goswami has experiences of teaching and training computer science related courses to people from various backgrounds, such as software industry, business schools, engineering colleges. She has adapted teaching in pedagogy methodology, rooted in practical applications that proved to be effective for classroom management from inter-disciplinary backgrounds. Software industry experiences have enriched her with strong programming skills and working knowledge with recent software technologies and domain applications. Besides teaching several computer sciences related fundamental courses, Tilottama Goswami introduced new elective courses on recent technologies and advancements, to the final year undergraduate students. External

Examiner to various engineering colleges for conducting viva on CSE subjects. As part of the outreach activities, she contributed by delivering guest lectures on computer courses to business schools, R&D organization; provided training sessions to engineers from industry. In the capacity of full time Ph.D. research scholar, she has mentored, delivered presentations, conducted MATLAB training classes for graduate students (for various post graduate programmes) in the field of image segmentation, object detection, image understanding and analysis through machine learning techniques based on soft computing. The combination of research, teaching and training has motivated her in pursuing academic career and also contribute to advanced research.

Tilottama Goswami Learning Portal : <https://tilottamagoswami.co.in/> (Teaching)

Faculty/Trainer/Visiting	Subjects	Year	Number of Students
Professor	Introduction to Artificial Intelligence Data Wrangling and Visualization using Python Data Mining Computer Vision Predictive Analytics with R Problem Solving and Programming in C language Mathematical Foundations of Computer Science Object Oriented Analysis Machine Learning Python Programming (Lab) Data Structures	Present	65 per class
Resource Person for Two-Day National Level Workshop on ‘Artificial Intelligence and Machine Learning (AIM 2018)’, conducted by GPREC, IEEE Information Theory Society Student Chapter, Kurnool	Theory & Hands-on-session for Artificial Intelligence & Machine Learning Datasets, Tools and Techniques using Python, Scikit-learn, Keras and Weka tool	24th-25th September 2018	80
Resource Person for Two-Weeks Workshop on ‘Image Processing Using MATLAB’ conducted by Assistive Technology Labs, BVRIT Hyderabad	Theory & Hands-on-session for Digital Image Processing	6th-18th February 2017	70

Professor at BVRIT Hyderabad, affiliated to JNTU Hyderabad	Mathematical Foundations of Computer Science Object Oriented Analysis and Design (Case Tools Lab) Design Patterns Machine Learning Software Engineering (Lab)	July 2016 - April 2019	~65
Associate Professor at Swami Vivekananda Institute of Technology (SVIT), affiliated to JNTU, Hyderabad, http://www.svit.ac.in/	Web Technologies, Theory of Computation Image Processing (<i>introduced</i>)	Sep 2009 - Aug 2010	~120
Visiting faculty for teaching Business Management students, Dhruva College of Management, Hyderabad http://www.dhruvacollege.net/	Management Information Systems, Business Process Modeling using UML	Apr 2010	~125 ~30
Trainer for Post-graduate level Diploma program students, Centre for Development of Advanced Computing (C-DAC), Ministry of Communications & Information Technology, Govt. of India, http://www.cdac.in/	.NET framework	Dec 2010	~60
Subject Matter Expert (SME) for developing online course, for TMI Networks, Hyderabad http://www.tminetwork.com/	Architecture Modeling using UML	Jan 2008	Online
Faculty Member at the ICFAI University, Institute of Science and Technology, Hyderabad http://www.icfai.org/hyderabad.html	Core Courses: Data Structures and Algorithms, Programming Languages and Compiler Construction Electives: Multimedia Computing (<i>introduced</i>), Software Engineering	Aug 2006 - Aug 2009	~120
Trainer for Mechanical, Electrical, Production Engineers of Intergraph, Hyderabad http://www.intergraph.com/global/in/	Data Structures	Sep 2006	~40
Visiting faculty for teaching Business Management (Finance and HR) students, ICFAI Business school, Hyderabad http://www.icfai.org/hyderabad.html	Internet Technologies	Jun 2002 - Oct 2002	~120

Engineers of GIS department, Intergraph, Hyderabad http://www.intergraph.com/global/in/	Training session on Performance Analysis and Web Stress Testing	Feb 2001	~25
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VI. Administrative Services and Mentoring Activities

Professor, Department of Artificial Intelligence, Dec 2020 – Sept 2022 Anurag University

Professor, Department of Computer Science & Engineering, July 2016 – Dec 2020, Anurag Group of Institutions, <https://anurag.edu.in/>

1. Convener, Distinguished Lecture Series on Advanced Computing – 2022-23, Dept of AI, Anurag University in technical collaboration with ACM Hyderabad Deccan Chapter and CoE AIML (under RUSA), Osmania University
2. Convener, AI Readiness (AIR 2021) Webinar Series – July, Aug, Sept 2021, Dept of AI, Anurag University
3. Course Coordinator of Data Wrangling & Visualization, Feb 2022
4. Executive Council Member, Women Cell Committee, 2021-Till Date
5. Coordinator, Anurag Teaching Learning Centre (ATLC)
6. Coordinator, Orbit Next “Redefine the Future of Learning”
7. ACM Professional Society In-charge, Anurag University
8. Course Coordinator of Machine Learning, Sept 2021-22
9. Research Coordinator, Department of AI, Dec 2020 - Till Date
10. Board of Studies Member for Department of Artificial Intelligence, Anurag University, 2021-2022
11. Co-Convener of 5 Days International Conclave on Recent Advances in Computer Science held Online 21st Sept-25th Sept 2020, conducted by Dept of CSE, Anurag University
12. WIE Chair, Hyderabad Deccan ACM Chapter, April 2020 – Till Date
13. Course Coordinator for Introduction to Artificial Intelligence, April 2020-21
14. Course Coordinator for Predictive Analytics using R Programming, April 2020-21
15. Co-Chair International Conference on Advances in Computational Intelligence and Informatics. Anurag Group of Institutions, Dec 2019
16. Publicity Chair, Souvenir Committee Incharge for International Conference on

Advances in Computational Intelligence and Informatics. Anurag Group of Institutions, Dec 2019

17. Member of Board of Studies in Department of Artificial Intelligence, Nov 2019 – 2020
18. Research Wing Leader in Department of CSE, June 2019– August 2020
19. Mentor for a group of CSE Students

Professor and Head of R&D Cell, Department of CSE, July 2016 – April 2019
BVRIT Hyderabad, <http://bvrithyderabad.edu.in/>

1. IEEE Chapter Advisor for BVRIT Hyderabad Student Branch Chapter GRSS, Dec 2018 – June 2019.
2. Convener for 2 Days IEEE Workshop on GIS Concepts for Remote Sensing Applications, 8-9th Jan 2019 conducted by IEEE CIS/GRSS Jt Hyd Section in association with BVRIT Hyderabad
3. Appointed as Head of R&D Cell, BVRIT Hyderabad, July 2017 - Till Date
4. Two research proposals approved in the area of computer vision and machine learning in collaboration with National Remote Sensing Centre, Indian Space Research Organization, Hyderabad from Feb 2017 – till date.
5. Research Initiative: Prepared a roadmap for generating minor and major student projects on research areas of image processing, computer vision and machine learning (July 2016 – Till Date) and encourage quality publications
6. Appointed as Major Project Coordinator for final year domain based projects for batch 2013-2017. The responsibilities include assessing project feasibility study, providing all the required project formats for Software Requirement Specifications (SRS), High Level Design (HLD), Low Level Design (LLD), report; and conducting reviews for the project milestones for all the groups.
7. Coordinator for Spotlight Poster Presentation conducted by Department of CSE, BVRITH under IEEE Student Chapter and CSI Student Section on 17 Dec 2016
8. Lab External Examiner for Data Structures at Sridevi Engineering College on November 2016 Represented BVRIT Hyderabad to propose research collaborations in image processing and computer vision to the delegates from EPITA Labs, Paris, France, in October 2016
9. Coordinator for Seminar – Guest Lecture on Big Data Hexagon during Sept 2016
11. Represented BVRIT Hyderabad in SVES, Narsapur campus to propose research collaborations in image processing and computer vision with State University of New York, Binghamton, USA in September 2016
12. Appointed as Class Teacher for 3rd Year CSE batch in the year 2016-17
13. Conduction of Activity Based Learning projects and assignments for the course subjects undertaken.

Annexure – I: Industrial Experience

TECHNICAL SKILLS

Programming Languages: MATLAB 2010, OpenCV 3.1, Python 2.7, R, ASP.Net, Java, Visual C++ 5.0/6.0, JDBC, XML, XSL 1.0, ASP 2.0, JSP, Javascript, VBScript, Sybase Aspen

Development Tools/Utilities: Google Colab, R Studio, Visual C++ 5.0/6.0, Visual J++ 6.0, Symantec Cafe 4.5, Kawa 3.0, Rational Rose 4.0, Erwin, IIS, Weblogic, Crystal Report 7.0, Purify, WAS Tool, MS Visual Source Safe, VCS, Visual Test 4.0, ERWIN Case Tool

Databases: MS SQL Server, Oracle 7.0/8i, MS Access, MySQL

SIGNIFICANT PROJECTS AND CONTRIBUTIONS

System Analyst at TMI Network

<http://www.tminetwork.com/>

Career Centre,
1-8-303/48/12, Prenderghast Road,
Secunderabad - 500003, INDIA

Dec 2003 - Dec 2004

Provided consultancy for software projects at system analysis and evaluation level.

Contributions

Software system requirements analysis, evaluation of platform and technologies, evaluation of software products, setting up development guidelines and in-house development work. Provided consultancy to various projects namely -

- TMI First - Recruitment site for fresher,
- RARE - Recruitment Advertising Response Management System,
- TTKM - Tata Tele Knowledge Management System
- ECBS - Essar Competency Building System

Environment

C++, Visual Basic, ASP, .NET

Software Consultant at Intergraph India

<http://www.intergraph.com/>

Hexagon Capability Center India Pvt Ltd.
1-8-446 and 447, S.P. Road
Secunderabad - 500 003, INDIA

Aug 2000 - April 2001

Project: Geomedia Data Servers

Geomedia integrates data from multiple vendors and standard data sources. Users can perform analysis against multiple data sources without costly transaction between

formats. Provided key engineering in Performance Group of Mapping/GIS department, which includes performance tuning and solving memory leaks in various DataServers. Provided training and presentation on MS WebApplicationStress Tool which is used to measure the performance of the WebMap software. The system is designed using Visual C++.

Contributions

- Overall responsibility for the project execution as per the QMS.
- Study of system and setting up required software and hardware tools and configurations.
- Tracking and monitoring the project as per the plan.
- Investigated Memory Leaks in the ServerUtils and DataServers.
- Wrote PerformanceVB Client for performance and monitoring the memory leak.

Environment

VSS, WAS Tool, Visual C++

Software Consultant at Kronos Inc., USA

<http://www.kronos.in/>
[Kronos Incorporated](#)
[297 Billerica Road](#)
[Chelmsford, MA 01824](#)

Mar 1999 - May 2000

Project Conversion Wizard

Contributions

- Reverse Engineered the existing software program using Rational Rose.
- Reviewed design specifications for migration of data to C/S system.
- Implemented database mappings in a format required for Client Server database.
- Provided memory allocation updates, skip padding for Unix file development.
- Implemented database connection using MFC classes.

Project Millennium Terminal

Provided key development in Java based application for a new Timekeeper Terminal called Millennium. Development environment used Symantec Café, JDK 1.1.6, Sybase Aspen which is used as embedded database in the terminal, Mobil Link synchronization to sync the punch-in data with the Client Server database for the system.

Environment

Visual C++, Oracle, SQL Server, Symantec Café, JDK 1.1.6, Sybase Aspen, Mobil Link

Senior Consultant at Xerox, USA (Client project of STIL, USA)

www.xerox.com

[6 New England Executive Park,
Burlington, Massachusetts, 01803](#)

Oct 1998 - Apr 1999

Worked with Xerox Distributed Network Application group in Burlington, MA

Project: Book In Time

A repository of books are maintained in Oracle 7 RDBMS and referred as document server objects. The system is based on distributed Client/Server architecture. The system has been designed using Rational Rose(UML approach) and developed using C++ and RogueWave classes on Unix (Solaris) platform.

Contributions

- Took a Lead Role in designing of Order Entry Service and Order Handler modules and the interfaces with other packages using Rational Rose 98.
- Developed the Table Schemas for the persistent objects for Oracle RDBMS.
- Developed Singleton, Transportable and Persistent objects.
- Carried out coding using C++ and RogueWave classes for the modules.
- Used RCS for version control.

Senior Consultant at Matrix One Inc. (Client project of STIL, USA)

www.matrixone.com

[210 Littleton Rd., Westford, MA 01886](#)

Mar 1998 - Jul 1998

Project : Release of Monet (Matrix System 6.0)

Participated in finalization and release of the software package Matrix Version 6.0 Monet. Monet is Object Oriented PDM (Product Data Management), designed and developed for the management of workflow of any organization, and keeps track of the process control for manufacturing industries. The product is based on Client/Server architecture. User interface is developed using Galaxy(which is platform independent) and Visual C++ 5.0 for Windows platform. Oracle Server (7.0) is used for back end. The product is developed for different platforms like Unix, Windows NT, Windows 95.

Contributions

- Played a crucial role in Quality Engineering / Quality Automation.
- Took a Lead Role in the project and prepared about 1000 Query Scripts to explore different features of MQL(Matrix Query Language) which is a wrapper over SQL to interact with Oracle 7.0 RDBMS.
- Carried out execution of the Query Scripts on Unix(IRIX 6.2) as well as Windows NT platform(4.0).
- Explored the Business Administrator and System Administrator features of Monet.

Senior Consultant at Adra Systems Inc.(Client project of STIL, USA)

www.adra.com

[Two Executive Drive, Chelmsford, MA 01824](#)

Nov 1997 - Feb 1998

Project Title : CADRA

Cadra is multi-platform CAD product, mechanical drafting software, developed for the design and drafting professionals. Graphical User Interface for Windows platform has been developed in Visual C++ 4.2 using MFC and C. The project involved implementation of the enhancements for the new release of the product, and solution provider for the bugs generated in Windows NT Platform 4.0 using Rational tools such as Purify5.0 and VisualTest 4.0.

Contributions

- Added functionality to Overlay, Translation, Figure modules using Visual C++ 4.2(MFC).
- Locating memory errors such as MLK, UMR, HAN using Purify Atra 5.0 and fixing them.
- Simulating and Verifying User Actions using Visual Test 4.0 utilities like Scenario Recorder, Suite Manager and Screen utility.

Software Engineer at Larsen & Toubro Infotech

<https://www.lntinfotech.com/>

[L&T Infotech Park, Mount Tower, Mount Poonamalle High Rd,](#)

[Sathya Nagar, Manapakkam, Chennai 600089](#)

July 1995 - Sep 1997

Project: Nuclear Medicine Information System (NMIS)

This system is designed and implemented to meet the needs of Nuclear Medicine department in today's health care environment and developed in Client-Server Architecture. It involves centralizing and sharing information across the department. Development was done on Windows NT(3.5) using Visual C++ 4.2, MFC(4.2), OLE Control for front end and Oracle at the backend.

Contributions

- Used Document-View architecture of MFC(4.2) in designing the screens.
- Designed table schema in Oracle database using ERWIN Case Tool.
- ODBC used as an interface between Oracle and front end.
- Used Crystal Reports for report generation.
- Carried out ISO-9001 documentation at design level.

Project: Material Safety Data Sheet System (CEIS-MSDS) for Hoechst Celanese

Each product manufactured by the Company is accompanied by a 'Material Safety Data Sheet' which contains essential safety details regarding the product. Developed using Client-Server technology with Oracle 7 configured as back end and Visual Basic, ODBC

for the front end.

Contributions

- Database (Oracle) was configured on Windows NT Server (3.5).
- Designed the database using ERWIN Case Tool.
- Coded various RSPs (Remote Stored Procedures) and Triggers in PL/SQL using Developer 2000 for updating tables and for auto-populating different sections of the MSDS.
- Developed test plans and did thorough unit testing of the RSPs (PL/SQL).
- Carried out ISO-9001 documentation at design level.
- PVCS was used for version control.

Annexure – II: Publication Details

Multi-Faceted Hierarchical Image Segmentation Taxonomy (MFHIST)

IEEE Access, pg: 1-14, Print ISSN: 2169-3536, Online ISSN: 2169-3536, Digital Object Identifier: 10.1109/ACCESS.2021.3055678, SCIE, WoS indexed

Authors: Tilottama Goswami, Arun Agarwal, C. Raghavendra Rao

An abundance of various segmentation techniques are available in the literature, that cater to wide range of image understanding applications. The paper proposes a unified way of systematic categorization of the research work on image segmentation called Multi-Faceted Hierarchical Image Segmentation Taxonomy (MFHIST), which consist of six facets presented in a hierarchical manner - scope, requirement, control, feature, image representation and approach specifications. Every scope is exemplified with research works from the literature for better understanding. The paper gives an illustration of populating MFHIST, to provide the reader a quick grasp of few important state-of-art image segmentation research works and their adaptations. As a case study, the illustrations display a limited version to uncover the journey of basic to modern adaptations in the areas region based segmentation approach, such as Markov Random Fields, Spectral Clustering, Active Contour Model, Mean Shift Clustering. The other segmentation approaches have not been considered here, owing to the enormous volume of works in the past four to five decades and limitation in articulating all of them using MFHIST. The performance analysis of the algorithms using quantitative metrics is not in the present scope and will be considered in future version of MFHIST.

CNN Model for American Sign Language Recognition

Springer Nature Singapore Pte Ltd. 2021, A. Kumar and S. Mozar (eds.), ICCCE 2020, Lecture Notes in Electrical Engineering 698, pg 55-61, https://doi.org/10.1007/978-981-15-7961-5_6

Authors: Tilottama Goswami and Shashidhar Reddy Javaji

This paper proposes a model based on convolutional neural network for hand gesture recognition and classification. The dataset uses 26 different hand gestures, which map to English alphabets A–Z. Standard dataset called HandGesture Recognition available in Kaggle website has been considered in this paper. The dataset contains 27,455 images (size 28 * 28) of hand gestures made by different people. Deep learning technique is used based on CNN which automatically learns and extracts features for classifying each gesture. The paper does comparative study with four recent works. The proposed model reports 99% test accuracy.

Classification Accuracy Comparison for Imbalanced Datasets with Its Balanced

Counterparts Obtained by Different Sampling Techniques

Springer Nature Singapore Pte Ltd. 2021, A. Kumar and S. Mozar (eds.), ICCCE 2020, Lecture Notes in Electrical Engineering 698, pg 45-54, https://doi.org/10.1007/978-981-15-7961-5_6

Authors: Tilottama Goswami and Uponika Barman Roy

Machine learning (ML) is accurate and reliable in solving supervised problems such as classification, when the training is performed appropriately for the predefined classes. In real world scenario, during the dataset creation, class imbalance may arise, where one of the classes has huge number of instances while the other class has very less in numbers. In other words, the class distribution is not equal. Such scenarios results in anomalous prediction result. Handling of imbalanced dataset is therefore required to make correct prediction considering all the class scenarios in an equal ratio. The paper mentions various external and internal techniques to balance dataset found in literature survey along with experimental analysis of four different datasets from various domains- medical, mining, security, finance. The experiments are done using Python. External balancing techniques are used to balance the datasets- two oversampling SMOTE and ADASYN techniques and two undersampling Random Undersampling and Near Miss techniques. These datasets are used for binary classification task. Three machine learning classification algorithms such as logistic regression, random forest and decision tree are applied to imbalanced and balanced datasets to compare and contrast the performances. Comparisons with both balanced and unbalanced are reported. It has been found that undersample technique loses many important data points and thereby predicts with low accuracy. For all the datasets it is observed that oversampling technique ADASYN makes some decent prediction with appropriate balance.

Chapter 16 - Machine learning behind classification tasks in various engineering and science domains

Cognitive Informatics, Computer Modelling, and Cognitive Science Volume 1: Theory, Case Studies, and Applications 2020, Pages 339-356 Academic Press, Elsevier Inc.

ISBN: 978-01-12-819443-0, <https://doi.org/10.1016/B978-0-12-819443-0.00016-7>

Pages 339-356, April 2020

Author: Tilottama Goswami

Prediction, forecast, and prognosis about the future is an interesting analysis and one of the most popularly used applications in various domains of science and technology, management science, medical science, agricultural science, and many more applied fields. This task of prediction can be automated using classification techniques, a part of supervised machine learning (ML) algorithms. The classification technique is applied to classify true/false outcome or multiple classes of any prediction. Logistic regression, Naïve Bayes, k-nearest neighbor, decision trees, support vector machines, and artificial neural network are some of the popularly used classification algorithms in various domains. Depending on the case studies from various domains, clean and considerable amount of data is one of the basic requirements for class prediction. Some of the case studies from various domains are

discussed in this chapter. The datasets, classification programs written in Python are provided for each case study. The algorithms to be used vary depending upon various factors such as binary or multiclass classification, multivariate or temporal datasets, size of training data, fast or accurate prediction. The ML is an upcoming field, the Python language is very popular for building software, with its rich set of libraries for efficient data management such as pandas, scientific numerical computation using NumPy, ML algorithms based on scikit-learn, visualization tools using Matplotlib, neural network algorithms using Keras, etc. The author in this chapter will showcase various ML tasks with case studies using Python programming language so that the novice readers in this field can start their learning curve smoothly.

Intelligent Computing for Air Pollution Monitoring using GIS, Remote Sensing and Machine Learning

Book Series LNEE, Emerging Trends in Electrical, Communications, and Information Technologies, Proceedings of ICECIT-2018, Volume 569,

DOI:https://doi.org/10.1007/978-981-13-8942-9_12, January 2020

Author: Tilottama Goswami, Hitendra Sarma

With an alarming increase in pollution level in various parts of the world, the study of air pollution monitoring has become one of the most demanding areas in national and international arena. The paper makes an attempt to serve as a concise guide in providing basic understanding of types of remote sensing, sources of satellite data, geospatial data analysis, aerosol optical depth for air pollution monitoring. The paper gives important references on the datasets and available formats, prerequisite tools required for processing and analysis of the data. The futuristic insights finally discuss the role of machine learning in correcting AOD values as well as filling gaps for missing aerosol values when compared to ground based sensors.

Predictive Model for Classification of Power System Faults using Machine Learning

TENCON - 2019 IEEE Region 10 Conference (TENCON), Kochi, Kerala, pg 1881-1885

ISBN: 978-1-7281-1895-6, DOI: 10.1109/TENCON.2019.8929264, December 2019, IEEE Xplore Digital Library

Authors: Tilottama Goswami, Uponika Barman Roy

Power System is a combination of electric power generation, transmission, distribution and utilization systems. In brief, power system is the heart of any electrical system. In an electric power system, a fault or fault current is any abnormal electric current. As a consequence of such fault, the entire system may damage and eventually collapse. The aim of this work is to automatically classify the faults into one of the eleven faulty classes, which includes both balanced and unbalanced faults. The dataset of generated fault in overhead transmission lines is synthetic, which consists of 11 different faults for 100 kilometers. The simulation is done using MATLAB/Simulink software model. The task of

classification of faults is implemented using supervised machine learning algorithms in Python and scikit-learn. Comparison is made using three commonly used classification algorithms - Decision Tree (DT), K-Nearest Neighbor ...

A Case Study on Correctness Evaluation of Content based Recommender System based on Text, Semantic text

In: Kumar A., Paprzycki M., Gunjan V. (eds) ICDSMLA 2019. Lecture Notes in Electrical Engineering, vol 601. Springer, Singapore. https://doi.org/10.1007/978-981-15-1420-3_59

Author: Tilottama Goswami, Vaishnavi Yerrapothu

Recommender systems provide suggestions to appropriate recipients based on suggestions and inputs given by the clients or users. The system guides the user in a tailored way to objects of interest a larger space of possible options. In this paper, with the help of a case study the analysis of the results are obtained for different algorithms used for recommender systems—text based, semantic text based, visual similarity based product similarity. Correctness measure is performed using mean reciprocal rank metric. The paper concludes that no single algorithm is suitable for all recommender systems. Based on the type of user preferences, ensemble and hybrid algorithms are the future for recommendation.

Impact of Deep Learning in Image Processing and Computer Vision

International Conference on Micro-Electronics, Electromagnetics and Telecommunications, ICMEET-2017, Hyderabad, Sept 8-9 2017 LNEE Springer

Author: Tilottama Goswami

With deep learning techniques, a revolution has taken place in the field of image processing and computer vision. The survey paper emphasizes the importance of representation learning methods for machine learning tasks. Deep learning, the modern machine learning is commonly used in the vision tasks - semantic segmentation, image captioning, object detection, recognition and image classification. The paper focuses on the recent developments in the domain of remote sensing, retinal image understanding and scene understanding based on newly proposed deep architectures. The author finds it quite intriguing of the classical building blocks of image segmentation (Gabor, K- Means), shifting gear and contributing to image recognition tasks based on deep learning (GaborConvolutionalNetwork, K-Means dictionary learning). The survey makes an attempt to serve as a concise guide in providing latest works in computer vision applications based on deep learning and giving futuristic insights.

Review of Publicly Available Image Forensic Tools

6th IEEE International Conference on Communication and Signal Processing, April 6-8 ICCSP-2017, Tamil Nadu

Authors: Chandana Gogineni, Tilottama Goswami

Digital images have been a great joy in capturing the entire special, any and every moment in people's lives. However, with the emergence of low cost editing tools, the authenticity of images can no longer be guaranteed. It is vital to ensure the integrity, since there is an enormous increase in usage of images in various applications and fields in which these images serve as witness that could influence the judgment. The digital image can be either an active one or passive. Active images are those which have a watermark or a signature embedded. However, the luxury of embedding watermark or signature is not common among most of the camera manufacturers. The images which leave no traces or information behind are the passive ones. The image forensic tools help in detecting and deciding whether an image has been tampered or forged. This paper presents a comprehensive list of publicly available image forensic tools to the best of the authors' knowledge and proposes the idea of an interactive hybrid tool as a move towards future direction. This hybrid tool may employ both active and passive techniques; and may also cater a collective approach to employ multiple forensic tools and techniques to create rich forensic evidence knowledge for deriving the best judgment.

Hybrid Region and Edge Based Unsupervised Color-Texture Segmentation for Natural Image

International Journal of Information Processing (IJIP) 9(1), pp 77-92, 2015

Authors: Tilottama Goswami, Arun Agarwal, C. Raghavendra Rao

The paper proposes a generic color-texture feature integration framework. We propose two variants of edge based texture capturing method using filter banks of tensor products obtained from Orthogonal Polynomials (OP) - OP3 of order 3 and OP5 of higher order 5 which are applied on Hybrid Color Space (HCS) for color texture feature integration. Experimental evidences are gathered showcasing the strength of color texture segmentation using OP3-HCS, OP5-HCS when compared with only color feature segmentation. A case study analysis indicates OP5 is biased towards over-segmentation as compared to OP3. Experimental results demonstrate the inherent simplicity and effectiveness of the proposed OP-HCS based hybrid color-texture image segmentation by achieving an average of 74 percent on PRI and at the same time having good balance on the rest of the three BDE, GCE and VOI measures.

Statistical Learning for Texture Characterization

Proceedings of the 2014 Indian Conference on Computer Vision, Graphics and Image Processing, ICVGIP-2014, Bangalore, India, December 14-18, 2014. ACM 2014, ISBN 978-1-4503-3061-9, 11:1-11:8, IISc, Bangalore

Authors: Tilottama Goswami, Arun Agarwal, C Raghavendra Rao

The paper proposes a novel method for image texture characterization. Characterization is governed by simple perceptual variations in relative orientations in terms of either no variations present or variations present as row specific, column specific or diagonal specific. This generalization is obtained by modeling the input as a whole or image

blocks depending on the broader or narrow coverage respectively. Most of the texture characterization is done either keeping a specific domain (synthetic or natural images specific to a category) or is application specific (segmentation on specific benchmark dataset or image retrieval). Contrary to this, our method is not biased towards any domain or application; rather it acts as a pre-processing step for guiding towards locating both non-textural and orientation specific textural image blocks. The proposed method quantifies the texture-tonal characterization of an image or image blocks using statistical ANOVA grading system. Once the grading for abstraction is assigned for both image as a whole and also for image blocks, the decision as to which higher-level algorithms need to be implemented on which block will become easier. The proposed method can be considered to be a three stage process - progressive sampling, image partitioning in blocks, ANOVA analysis and grading.

Color Texture features Integration for Unsupervised Image Segmentation based on Orthogonal Polynomial Operators and Hybrid Color Space

ICISP-2014, pp 52-59, Bangalore, Jul 25, 2014, Elsevier

Authors: Tilottama Goswami, Arun Agarwal, C. Raghavendra Rao

This paper proposes a hybrid color-texture feature integration framework for natural image segmentation. The framework uses filter banks of tensor products obtained from orthogonal polynomials of order 3(OP3) for capturing the contrasts extracted from our new hybrid color space (HCS). This paper presents region based unsupervised image segmentation algorithm based on split-and-merge. The first step applies a classical K-means in an iterative manner on an adaptive feature vector representation of significant principal components of hybrid color-texture feature (OP3-HCS) controlled by Kolmogorov-Smirnov (KS) test. A spatially constrained merge step is implemented to address the problem of over-segmentation and also cater to non-contiguous sub-regions in image segments. The paper reports our results using Berkley natural images standard dataset (BSD300). The segmentation is quantitatively evaluated using four performance measures and is compared with 11 other segmentation methods. The results are found to be encouraging and competitive.

Edge Detection in Image - An Overview

National Conference on Emerging Trends In Soft Computing, in association with Indian Society for Rough Sets and Computer Society of India (CSI), pp 51-58, Pune, Feb 2, 2011

Authors: Tilottama Goswami

The paper is an overview of edge detection for greyscale and color images, discusses the various perspectives of finding an edge from image data. The classical ones work well for most of the images which are well captured by the image sensors, where as in case of satellite imagery and biological images, there is a need of more efficient, robust and adaptable edge detectors based on fuzzy logic, neural network or genetic algorithms. The paper also emphasizes on the requirements of a standardized performance evaluator to

investigate the robustness and superiority among the available edge detection techniques.

Advancements in Content Based Image Retrieval towards ACO Metaheuristic

Approach

Indian Conference on Computer Vision, Graphics, Image and Video Processing, Nagpur
Mar, 2009

Authors: Tilottama Goswami, Manesh Kokare

This survey paper discusses the state-of-art techniques for CBIR. The lessons learned from the state-of-art approaches for content-based retrieval based on the perceptual properties like color, texture and shape have a significant drawback called pre-mature convergence. This helped in establishing clear objectives and helped in defining a superior optimization approach for the CBIR based on meta-heuristic bio-inspired ant system, which is more flexible and adaptive. The future problem faced in the CBIR to bridge the semantic gap is not fulfilled by the traditional heuristics of the various feature descriptors applied, but has been found effective by swarm intelligence approach of applying metaheuristics technique found in ant colony optimization. The survey was done to find the evidence of the emerging experiments with variations of ant colony optimization techniques in the field of CBIR such as in clustering algorithms, wavelet based textures, color quantization, texture classification, shape matching.

Role of Metaheuristics Optimization Approach in Image Segmentation Techniques

The IUP Journal of Science & Technology, Vol 5, No. 21, pp 21-34, Mar 2009

Authors: Tilottama Goswami

The survey paper emphasizes the recent use and increasing growth of the meta-heuristics approach based on natural computing inspired by natural and biological systems for solving the image segmentation specific to various domain specific applications. The findings of recent studies of such approximate algorithmic approach largely based on heuristics to obtain near-optimal solutions are showing strong evidence to the fact that they can be applied to almost all approaches of various image segmentation techniques such as edge detection, region oriented, morphological watersheds and clustering. This paper works towards bridging the gap regarding drawbacks of the state-of-art solution of the various segmentation techniques and the available meta-heuristic techniques and technologies like particle swarm optimization, ant colony optimization and genetic algorithms. Finally, the paper proposes modeling such automated system for learning algorithms based on signals-to-symbol model.

Overview of Pattern Classifiers and their Application Areas

IEEE (Delhi section) sponsored International Conference on Recent applications of soft computing in Engineering and Technology Dec 22, 2007

Authors: Tilottama Goswami, Sudepto Bhattacharya

The paper focuses on the fact that a single classifier scheme is not the answer for classification of any type of universal data. Classifier with supervised or unsupervised learning paradigm along with datasets having fair chances of uncertainty, and randomness makes the task of pattern recognition very challenging. The paper justifies the need of hybrid classifiers and also cites some scholastic research work done in the past decade in various application areas. Soft computing paradigms have witnessed growing recognition to construct new generation intelligent hybrid classifier in inter-and trans-disciplinary contexts such as Bayesian Decision Tree, Fuzzy Decision Tree, Fuzzy based Evolutionary, Fuzzy Clustering, each of which has strongly claimed to reduce the error rate of misclassification with respect to uncertainty measures.