

## BIO-DATA

**Name** : Dr. Chandan Singh  
**Father's Name** : Late Shri Bachi Singh  
**Date of Birth** : DEC 6, 1954  
**Address for Correspondence** : Professor of Computer Science  
(Re-employed)  
: (Ex-Dean Research, Ex-Dean  
Faculty of Physical Sciences, and Faculty of  
Engineering and Technology, Ex-Head of the  
Department, Ex-Director University Computer Centre)  
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**Current Areas of Specialisation** : Digital Image Processing, Pattern Recognition, Noise Removal, Image Super-resolution, Face Recognition, Image Retrieval, Invariant Moments.

**Previous Areas of Specialisation** : Computer Graphics, Finite Element Analysis, Optimisation, Scientific and Engineering Software Development.

**Research Metrics(Google Scholars)** : All :Citaions : 1578, **h-index** : 23, **i10-index** : 49.  
**Since 2012** :Citaions : 1069, **h-index** : 17, **i10-index** : 40.

### Academic Qualifications :

Sr. no.	Degree Held	Year	Board/Univ./ Inst.	% of marks	Div./ Rank	Subjects Taken
1	High School	1971	U.P.Board,All-ahabad, India	70.2	I Divn.	Hindi, English, Maths, Science, Biology
2	Intermediate	1973	-do-	70.2	I Divn.	Hindi, English, Maths, Physics, Chemistry
3	B. Sc.	1975	Kumaon Univ. Nainital, U. P.	75.8	I Divn. & I Rank in Univ.	Maths, Physics, Chemistry
4	M. Sc.	1977	-do-	84.75	I Divn. & I Rank in Univ.	Maths
5	Doctoral Courses	1977-1979	Indian Institute of Technology, Kanpur, India	C.P.I. 9.5 out of 10.0	(Not Applicable)	8 Advanced Level Courses in Appl. Maths & Numerical Computing
6	Ph. D.	1982	Indian Institute of Technology, Kanpur, India	-----	-----	Applied Maths (Computer Oriented)

- Reviewer of the Journals:**
1. Pattern Recognition(Elsevier)
  2. IEEE Transaction on Image Processing
  3. IEEE Transactions on Circuits and Systems for Video Technology(IEEE Publications).
  4. Pattern Recognition Letters(Elsevier)
  5. Journal of Mathematical Imaging and Vision(Springer)
  6. Journal of Real-Time Image Processing(Springer)
  7. International Journal of Pattern Recognition and Artificial Intelligence

**Membership of Professional Organisations**

- Organisations :**
1. Member of Indian Science Congress Association
  2. Life Member of Punjab Academy of Sciences

**Medals Awarded:**

- 1) Governor's "Silver Medal"
- 2) Governor's "Bronze Medal"
- 3) Pundit Hansa Datt Ghananand Pandey "Gold Medal"
- 4) Smt. Hari Pyari Memorial "Gold Medal"
- 5) Smt. Beer Bhadra Sanwal "Silver Medal"

**Scholarships:**

- 1) Various scholarships from 5-th standard to M. Sc. level
- 2) National scholarship during M. Sc.(1975 - 1977).

**Details of Experience:** ( Refer Appendix - I)

**Total Experience (Teaching/Research and Development) : 37 years** Approx.

**Administrative: As Head of the Department:** Over 9 Years

**As Incharge of the Department:** 8 months Approx.

**As Dean, Faculty of Engineering and Technology :** Over 5 Years

**As Dean, Faculty of Physical Sciences:** 2 Years

**As Dean, Research:** 2 Years

**As Director, University Computer Centre:** Over 10 Years

**Theses Guided/Under Guidance: (Computer Science and Engineering)(Refer Appendix-II)**

Ph. D. – Completed: 12, Under Guidance: 06

M. Tech. - (Completed: 31)

**R & D Projects : 23** ( Refer Appendix -III)

**Research Profile**

Parameters	All	Since 2013
Citations	1770	1046
h-index	24	17
I10-index	51	37

## Major R&D Project

Sr. no	Title	Funding Agency	Duration		Principal Investigator	Co- Principal Investigator	Approved Amount
			From	To			
1	Development of Algorithms and Software Packages for 2-D and 3-D Contour Plotting Using Non-Linear Interpolation	UGC	1 January 2005	31 December 2007	Dr. Chandan Singh	Dr. G.S. Lehal	Rs. 4.126 lakhs.
2	Development of Algorithms and Software Packages for Image Recognition with Special Applications to Character Recognition	AICTE	1 April 2006	31 March 2009	Dr. Chandan Singh	Dr. G.S. Lehal	Rs. 5.25 lakhs.
3	Special Assistance Programme (SAP-DRS-II)	UGC	1 April 2009	31 March 2014	Dr. Chandan Singh	Dr. G.S. Lehal	Rs. 51.00 lakhs.
4	Development of Efficient Techniques for Feature Extraction and Classification for Invariant Pattern Matching and Computer Vision Applications	UGC	1 July 2015	30 June 2018	Dr. Chandan Singh	Dr. Amandeep Kaur	Rs. 13.70 lakhs.

**Invited Talks/Articles** : 03 (Refer Appendix-IV)  
**Papers Published(in Journals)** : 85 (Refer Appendix-V)  
**Conference Papers** : 45 (Refer Appendix -V)

**No. of Packages Developed :10 (in Digital Image Processing and Scientific Visualisation)**

## **Technical Proficiency in Computer Science, Applications and Engineering :**

Languages Known : JAVA, C, C++, FORTRAN, BASIC, PASCAL

Operating Systems : WINDOWS, UNIX, LINUX

Hardware Used : IBM Compatible PCs, DEC-10, PDP-11/24, PDP-11/34, HARRIS-800, HARRIS-60, IBM-360, IBM-7044

## **Major Contributions at Punjabi University, Patiala:**

(Joined the University on July 22, 1994 as Reader and appointed as Incharge of the Department. Appointed as Professor in May 1995 and worked as Head of the Department from 06-06-95 to 23-06-2000 and from May 16, 2002 to July 2, 2006. Worked as Dean of Faculty of Engg. & Tech. from Oct. 95 to Feb 2000 and Dean, Faculty of Physical Sciences from Jan 1, 2006 to Dec 31, 2007. Also served as Director, University Computer Centre from June 1995 to November, 2006.

- Developed Infrastructure facilities for R&D activities and Leading R&D work in the areas of Computer Graphics and Image processing.
- **In recognition of the Academic and Research activities of the Department, UGC has brought the Department Under Special Assistance Program – DRS, w. e. f. April 1, 2004, for a period of five years Which was extended to DRS-II from April 1, 2009 for a period of five years upto March 2014. I was appointed as the Co-ordinator of the SAP-II Programme. Recently, The UGC has recommended the status for SAP-III which will be effective from April, 2015 for a period of 5 years.**
- **Department of Science and Technoloy(DST), Govt. of India, has also awarded FIST Programme to the Department during my Headship for a period of 5 years from April 2006 to March 2011.**
- Established Local Area Network(LAN) over the campus covering more than 40 departments/offices using initially thicknet in 1995 and Fibre Optics Cabling in 2004.
- Provided INTERNET connectivity over LAN through VSAT and Radio Link.
- Setup the University website <http://www.universitypunjabi.org> which is named now <http://www.punjabiuniversity.ac.in>.
- Setup computer laboratories in the Department of Computer Science and University Computer Centre connecting all the systems over LAN and providing INTERNET facility. At present more than 7- computer laboratories are functional. These include PC-S/W labs, UNIX labs, ORACLE labs and Graphics lab and Research labs.
- Introduced M. Tech(Computer Science and Engineering) course, w. e. f. the academic session 1995-96, first full time course in this region. A second programme M.Tech.(ICT) was introduced from 2006-07.
- Started one year PGDCA course at Mohali, w.e.f. the academic session 1996-97.
- Developed infrastructure in terms of building, manpower and equipment.
- Syllabi of B. Tech., M. C. A., M. Tech. and PGDCA revised thoroughly many times covering more than 120 papers.

- Introduced 3-years Bachelor's of Computer Application (BCA) course in affiliated colleges of the University. The whole ordinances and syllabi were prepared.
- Introduced a 2-year diploma course at Punjabi University Extension Centre for Computer Education at Jaito. Course structure, ordinances and syllabi were developed.
- Started one year PGDCA course at Punjabi University Extension Centre for Computer Education at Jaito.
- Worked as resource person for the establishment of computer labs in various departments and offices of the university.
- Developed software packages for processing of examination results.
- **A software package was developed to process the objective type of answers through scanners for entrance tests. The process was introduced in the university for the first time. This resulted in lots of saving in manpower for data entry and proof checking and increase in accuracy of the result and secrecy of the test process. The overall cost of processing the results reduced drastically.**
- Worked as co-ordinator for the computerisation of various entrance tests and regular examination of the university.
- Worked as co-ordinator for various entrance tests such as MCA, M. Tech., and PGDCA.
- Worked as Coordinator of State Level Joint Entrance Test for B. Ed. Admission for all B. Ed. Colleges in the State of Punjab for the academic session 2008-09. More than 33000 candidates appeared in the Test.
- Worked as Coordinator of a 3 Week UGC Sponsored Refresher Course in Computer Science and Information Technology Organized by the Academic Staff College of the University, from Nov. 14 to Dec. 4, 2014.

### **List of papers taught at Undergraduate and Postgraduate Levels:**

- i) Digital Image Processing, ii) Computer Graphics,      iii) Data Structures,  
 iv) Multimedia Systems, v)C/C++ Programming, vi)Operating Systems, vii) Numerical Analysis,  
 viii) Artificial intelligence, ix) Optimisation Techniques, x) Statistical Techniques,  
 xi) Object Oriented Programming and Java ,      xii) Introduction to Information Technology,  
 xiii) Internet Programming, Java and Multimedia, xiv) Object Oriented Programming in C++

## APPENDIX- I

### DETAILS OF EXPERIENCE

<i>Sr. No.</i>	<i>Name of Inst./ Employer</i>	<i>Position Held</i>	<i>Period</i>	<i>Major Job Responsibilities and Nature of Experience</i>
1	Department of Computer Science, Punjabi University, Patiala	Reader <b>(10 months)</b>  Professor <b>(Approx. 20 years)</b> <b>(Re-employed)</b>  Dean Research  Head, Dept. Computer Science. and (Over 8 years)  Director, University Computer Centre, <b>(Over 8 years)</b>  Dean, Faculty of Engineering and Technology <b>(Over 5 years)</b>  Dean, Faculty of Physical Sciences, <b>(2 years)</b>	July 1994 to May 1995  June 1995 to 2014  Since Jan 2015  Since June 2, 2010 to June 30, 2012  June 1995 to June 2000 And from 15-05-2002 to 2-6-2006  June 95 to No. 2006  From Oct. 1995 to Dec. 2000  From Jan 2006 to Dec 2007	<ol style="list-style-type: none"> <li>1. Teaching, Research and Development and Administrative work in the department and in University Computer Centre. Planning and execution of policies related to research activities of the University as Dean Research.</li> <li>2. Currently doing extensive research work in the area of Digital Image Processing, OCR and Pattern Recognition</li> <li>3. Developed many software packages based on the new algorithms developed in digital image processing and scientific visualisation</li> <li>4. Set up one of the best computing infrastructure among universities in India.</li> <li>5. Set up Local Area Network (LAN) in the University and INTERNET connectivity over LAN.</li> <li>6. Computerisation of Entrance tests, Examinations of the University.</li> <li>7. Developed software for processing of entrance tests through scanner. This was done first time in the university.</li> <li>8. Setup website for the University (<a href="http://www.universitypunjabi.org">http://www.universitypunjabi.org</a>)</li> </ol>
2	Thapar Corporate R&D Centre, Patiala, India (Mechanics and Computers Division)	Research Scientist	From 21-10-1987 to 21-7-1994	<ol style="list-style-type: none"> <li>1. To carry out research and development work in the area of Computer Aided Engineering, Modelling, Simulation and Optimisation of Engineering Systems.</li> <li>2. Research and development in Computer Graphics for Engineering Applications.</li> </ol>
3	R & D Centre, M/S Jyoti Ltd., Baroda, India (Maths, Stats and Computer Group)	Mathematician and Senior Mathematician	From 2-2-1982 to 17-10-1987	<ol style="list-style-type: none"> <li>1. To carry out research and development work in the area of Computer Aided Engineering, Modelling, Simulation and Optimisation of Engineering Systems.</li> <li>2. To Look after Maths, Statistics and Computer Group</li> </ol>
4	Deptt. of Maths, I. I. T. Kanpur, India	Research Fellow	4 Years & 1 Month	To carry out Research Work Leading to Ph. D. Degree in Applied Maths(Extensive Usage of Computational Techniques)

### **Administrative Experience At Punjabi University, Patiala**

Sr. No.	Post Held	Duration	Period	
			From	To
1	Head of the Department	Over 5 Years	6-6-95	21-6-2000
2	Head of the Department	Over 3 Years	15-5-02	02-06-2006
3	Incharge of the Department	Over 8-Months	Sept. 94	May 95
4.	Director, University Computer Centre	Over 8 Years	June 95	Nov. 2006
5	Dean, Faculty of Engineering and Technology	Over 5 Years	October 95	Dec 2000
6	Dean, Faculty of Physical Sciences	2 Years	From 1-1-2006 to 31-12-2007	
7	Dean, Research	2 years	From 2-7-2010 to 30-06-2012	

## APPENDIX-II

### Ph. D. THESIS/M. TECH. THESIS GUIDED/UNDER GUIDANCE

#### Ph. D. THESIS GUIDED

1. G. S. Lehal, "Optical Character Recognition of Machine Printed Gurmukhi Script", Degree awarded on 12-12-02.
2. Ekta Walia, "Development of Three Dimensional Rendering Algorithms Based on Non-Linear Interpolation and Analysis of Their Relative Performances", Degree Awarded in Dec 2006.
3. Renu Dhir, "A Bilingual Optical Character Recognition System for Gurmukhi and Roman Scripts", Degree awarded in 2008.
4. Indu Chhabra, "Feature Extraction and Neural Networks Classifiers for the Optical Character Recognition of Printed and Handwritten Gurmukhi Scripts", Degree awarded in 2008.
5. Satish Kumar, "Recognition of Presegmented Devanagri Handwritten Characters Using Neural Networks", Degree awarded in 2008.
6. Jaswinder Singh Saini, "Fast Algorithms for Contour Plotting in 2D and 3D Domains for Finite Element Analysis Data", Degree awarded in 2012.
7. Neerja, "Development of Fast and Accurate Face Recognition Algorithms", Degree awarded in 2012.
8. Pooja, "Image Retrieval Using Radial Moments", Degree awarded in 2013.
9. Amandeep Kaur Kullar, "Development of Algorithms for Automatic Landmark Detection for Cephalometric System", Degree awarded in 2013.
10. Sukhjeet Kaur, "Development of Robust and Fast Algorithms for Digital Watermarking Using Moments", Thesis submitted on 08-04-2013.
11. Rahul Upneja, "Accurate Calculation of Radial Moments for Image Analysis", Thesis submitted on 29-07-2013.
12. Ali Mohmmmed Sahan, "Face Recognition Using Radial Moments and Wavelet Transforms", submitted on 27-08-2013.
13. Ashutosh Aggarwal, "Development of Fast and Efficient Image Super-Resolution Methods", Thesis Submitted on 30-11-2017.

#### Ph. D. STUDENTS UNDER GUIDANCE

1. Kanwalpreet Kaur, "Analysis and Development of Algorithms for Content-Based Color Image Retrieval", Registered in December 2013.
2. Karamjeet Singh, "Development of Efficient and Fast Algorithms for Denoising Medical Images"(Co-Supervisor).
3. Anu Bala, "Development of Algorithms for Segmentation of Brain Magnetic Resonance Images", Registered on 29-02-2016.
4. Jaspreet Singh, "Object Recognition Using Rotation Invariant Shape and Color Features", Registered in 2016.



5. Shahbaz Majid, "Color Face Recognition Using Local and Global Feature Descriptors", Enrolled in 2016.
6. Dalvinder Kaur, Enrolled for Ph.D. in 2017 in the area of image processing.

#### **M. Tech./M.E. THESIS GUIDED**

1. Nighat Nazir, "A Comparative Performance Analysis of Fuzzy C-Means Based Methods for Segmentation of Brain Magnetic Resonance Images", August, 2017.
2. Satvinder Singh, "Analysis of Algorithms for MRI Image Denoising", August 2015.
3. Megha, "Denoising of Magnetic Resonance Images Using Sliding Window DCT", August, 2015.
4. Neha, "Denoising of Magnetic Resonance Images Using Wavelet-Based Techniques", July 2015.
5. Ravneet Kaur Sidhu, "Analysis and Development of Color Edge Detection Techniques", July 2014.
6. Vishav Jyoti, "Face Recognition Using Orthogonal Combination of Local Binary Patterns", July 2014.
7. Harpreet Kaur, "De-noising of Ultrasound Images", July 2014.
8. Navneet Kaur, "Real Time Automatic Object Tracking by Pan-Tilt Zoom Cameras in IP Surveillance System", January 2013.
9. Deepak Sharma, "Face Recognition Using Combined Features of Discrete Cosine Transform and Local Binary Pattern", August 2011.
10. Ravi Prakash, "Edge Detection in Coloured Images Using Different Filters", 2003
11. Sandeep Kumar, "Dynamic Time Warp and Hidden Markov Model Techniques for Isolated Word Recognition", 2003
12. Ramanjit Singh, "A fast Algorithm for Zernike Moments as a Feature Extractor for the Recognition of Hand Written Gurmukhi Script and Neural Network Classifiers", 2003
13. Mukhtaj Singh, "Recognition of Segmented Gurmukhi Characters Using Features Based on Zernike Moments and Neural Network Classifiers", 2002
14. Gurpreet Singh, "Recognition of Segmented Gurmukhi Characters Using Gradient Based Features and Neural Network Classifiers", 2002
15. Anupam Garg, "A Proposed New Algorithm for Hybrid Lossless Comparison of Medical Images", 2001.
16. Anita Ganapati, "Face Recognition Using Principal Component Analysis", 2000
17. Jagjot Singh, "Hybrid Lossless Algorithm for the Compression of Medical Images", 2000
18. Harjinder Singh, "Comparision of Edge Detectors on Medical Images", 2000
19. Amardeep Singh, "Recognition of Machine Printed Gurmukhi Numerals Using Neural Networks", 2000
20. Vikas Sangwan, "Design and Implementation of Persistent Object Database Management System", Punjabi University, 1999.

21. Kirandeep Kaur, "Improvement in the Performance of Fractal Image Compression", Punjabi University, 1999.
22. Kamal Kumar, "Search Methods in Automatic Test Data Generation", Punjabi University, 1999.
23. Ravinderpal Singh Chahal, "Effect of Classification Schemes on Compression Factor in Fractal Image Compression", 1999.
24. Vijay Kumar, "Video Segmentation", Punjabi University, 1998.
25. Gulshan Kumar Arora, " Color System Based Image Analysis : Boundary Tracing Using Water Flow Model ", Punjabi University, 1997.
26. Kawalinderjit Kaur, " Fractals and Nature", Punjabi University, 1997.
27. Col. S.P. Ghrera, " Contour Plotting Using Bilinear Interpolation", TIET, 1995.
28. G. S. Lehal, "Visualization of 2D and 3D Fluid Flow Data", TIET, 1995.
29. Rashmi Vashist, "Fractal Geometry: Curves and Surfaces"
30. A. K. Goyal, " Development of a General Purpose Neural Network Simulator(NNSim)", TIET, 1995.
31. K.S. Papneja, "Automatics Triangulation of 2-D and 3-D Planner Domains", TIET, 1993.
32. A.K. Goel, "Shading Algorithms for 3-D Surfaces", TIET, 1993.
33. A. Singh, "Generating and Displaying Contours on 2-D and 3-D Surfaces", TIET, 1992.
34. A.L. Sangal, "Animation with PC Graphics", TIET, 1990
35. Seema Chaudhary, "Development of a Software Package to Generate and Manipulate Surfaces Using Bezier B-Spline Approximation", TIET, 1989.

### **SOFTWARE PACKAGE EXPORTED**

Plot Programs for Contour Plot : This Scientific and Engineering software package was exported to M/S Dornier, West Germany (An Aerospace Company).

(A new algorithm was developed and the same was converted into a Package form)

## APPENDIX-III

### MAJOR R & D PROJECTS

**NOTE:** For majority of the following projects efficient algorithms have been developed and implemented into programs which are in use.

#### A) AT PUNJABI UNIVERSITY, PATIALA:

##### 1. Major R&D Project :

- i) UGC Major Project entitled, "Development of Efficient Techniques for Feature Extraction and Classification for Invariant Pattern Matching and Computer Vision Applications",  
July 2015-June 2018.
- ii) UGC Major Project entitled, "Development of Algorithms and Software Packages for 2-D and 3-D Contour Plotting Using Non-Linear Interpolation",  
January 2005-March 2009.
- ii) AICTE Major Project, "Development of Algorithms and Software Packages for Image Recognition with Special Applications to Character Recognition",  
August 1, 2006-Feb. 28, 2010.

##### 2. **RESULT PROCESSING THROUGH SCANNERS(1997):**

Development of a Software Package for processing of Objective Tests for entrance examinations through scanners.(This program is in use for processing of objective type of answers in entrance tests of all sizes. The scanned data is stored in TIFF format and the program interprets the answers. This results in saving of time and increases the accuracy and secrecy of result).

##### 3. **PLOT PROGRAM FOR CONTOUR PLOT(1996):**

Development of Efficient Algorithms and Computer Packages for Plotting of Contours in 2-D and 3-D Domains.

##### 4. **AUTOMESH(1994):**

Automatic Mesh Generation in 2-D and 3-D Domains using Delaunay Triangulation.

#### B) AT THAPAR CORPORATE R&D CENTRE, PATIALA:

1. Mold Flow Simulation of Injection Molding of Plastics (This Includes the development of a S/W package using FEM/FDM), 1994.
2. Development of a Software Package for Simulation of Injection Molding of Plastics, 1993.
3. Development of a Fast and Efficient Algorithm for Renumbering of Nodes in Finite Element Meshes, 1993.
4. Development of a S/W Package for the Plotting of Contours on 3D Surfaces, 1993.
5. PCFEAST: Development of PC Based S/W Package for Static and Dynamic Analysis of Structures, 1992.
6. Development of 2D and 3D Mesh Generators Using Delaunay Triangulation, 1991.

7. Development of a Software Package for the Heat Transfer Analysis of Totally Enclosed Fan Cooled Motors(TEFC) by Finite Element Analysis, 1990.
8. PCFEAST: PC Based Finite Element Analysis Package for Structure. (Consists of more than 40,000 lines of source codes), 1990.
9. Development of a Software Package for 3-D Automatic Mesh Generation with Interactive Graphics Features, 1990.
10. Optimisation of Induction Motor Design, Report No. TCRDC/C/19-89, October 1989.
11. Estimation of Electromagnetic Forces in the End Region of Large Motor or Alternator, Report No. TCRDC/C/25-89, December 1989.
12. A Software Package for Non-linear Constrained Optimisation Problems Based on Sequential Quadratic Programming Technique, Report No. TCRDC/C/24-89,December 1989.
13. Considerations to a Simple Algorithm for the Plotting of Contours, Report No./TCRDC/C/18-89, October 1989.
14. Development of a Software Package for the Plotting of Contours using Quadrilateral Meshes, 1989.
15. Efficient Program for the Removal of Hidden Lines and Surfaces, 1988.

**C) AT M/S JYOTI LTD., VADODARA**

1. Development of Software Package for Electrostatic and Electromagnetic Field Analysis in Transformers, Motors and Alternators, 1987.
2. Optimisation of Induction Motor and Voltage Transformer using Orthogonal Array, 1986.
3. Development of a Software Package for 3-D Flow Analysis in Pump Impellers using Finite Element Analysis, 1985.
4. Development of FEMGEN - Finite Element Automatic Mesh Generator, 1984.
5. Development of Fast Algorithms for the Solution of Large, Banded, Systems of Linear Equations, 1983.

## APPENDIX- IV

### INVITED TALKS/ ARTICLES

1. Falling Standards in IT Educations, “The Tribune”, Chandigarh, May 2002.
2. Invited Talk and Chair one of the sessions in, “National Seminar on Mathematical and Statistical Techniques”, Organized by Department of Applied Mathematics and Computer Applications, Thapar Institute of Engineering and Technology, Patiala, India, Dec 6-8, 2001.  
Topic : Optical Character Recognition : Computational Aspects
3. Invited Talk in, “ National Seminar on Emerging Dimensions in Information Technology”, Organized by Department of Computer Science and Engineering, GJU, Hisar, India, August 10-11, 2002.  
Topic : Overview of Optical Character Recognition.

### WorkShop Attended

Sr. No.	Subject/Title	Place	Duration
1	Third Training Programme for Assessors of NAAC	Bangalore, India	July 6-8, 2000
2	INTERNET AND EDUCATION (organised by Commonwealth Educational Media Centre for Asia) .	Osmania University, Hyderabad	Dec 28, 1998 to Jan 1, 1999
3	Training Workshop for Assessors of UG/PG visits	Organised by AICTE, Chandigarh office at TTTI, Chandigarh	November 21, 2003
4	Workshop on Model Credit Based Semester System	Organised by AICTE, Chandigarh, at IIT, Delhi	December 12, 2003

## APPENDIX-V

### LIST OF PUBLICATIONS

#### A: COMPUTER SCIENCE

##### IN JOURNALS:

1. Chandan Singh, Jaspreet Singh, Multi-Channel Versus Quaternion Orthogonal Rotation Invariant Moments for Color Image Representation, Accepted in Digital Signal Processing 78(2018)376-392. **Publisher: ELSEVIER. Thomson Reuters Impact Factor: 2.337.**  
DOI: <https://doi.org/10.1016/j.dsp.2018.04.001>
2. Chandan Singh, Anu Bala, A DCT-based Local and Non-Local Fuzzy C-means Algorithm for Segmentation of Brain Magnetic Resonance Images, Accepted in Applied Soft Computing, 2018, **Publisher: ELSEVIER. Thomson Reuters Impact Factor: 3.541.**  
DOI: <https://doi.org/10.1016/j.asoc.2018.03.054>
3. Chandan Singh, Jaspreet Singh, Quaternion generalized Chebyshev-Fourier and pseudo-Jacobi-Fourier moments for color object recognition, Accepted for publication in the journal Optics and Laser Technology, 2018, **Publisher: ELSEVIER. Thomson Reuters Impact Factor: 2.109.**
4. Chandan Singh, Ekta Walia, Kanwal Preet Kaur, "Enhancing color image retrieval performance with feature fusion and non-linear support vector machine classifier" in the journal "IJLEO", Optik, **158(2018)127-141**, <https://doi.org/10.1016/j.ijleo.2017.11.202>, **Publisher: ELSEVIER. Thomson Reuters Impact Factor: 0.835.**
5. Chandan Singh, Ekta Walia, Kanwal Preet Kaur, Color Texture Description with Novel Local Binary Patterns for Effective Image Retrieval, Accepted in Pattern Recognition, **78(2018) 50-68** <https://doi.org/10.1016/j.patcog.2017.10.021>, **Publisher: ELSEVIER. Thomson Reuters Impact Factor: 4.582.**
6. Chandan Singh, Ashutosh Aggarwal, An efficient and robust multi-frame image super-resolution reconstruction using orthogonal Fourier-Mellin moments, Displays, Accepted for publication in Displays 49(2017)101-115, <https://doi.org/10.1016/j.displa.2017.06.002> **Publisher: ELSEVIER. Thomson Reuters Impact Factor: 1.526.**
7. Karamjeet Singh, Sukhjeet K. Ranade, Chandan Singh, A hybrid algorithm for speckle noise reduction of ultrasound images, Accepted for publication in Computer Methods and Programs in Biomedicine (2017) <https://doi.org/10.1016/j.cmpb.2017.06.009>. **Thomson Reuters Impact Factor: 2.50 (SCI Indexed). Publisher: ELSEVIER.**
8. Amandeep Kaur, Chandan Singh, Contrast enhancement for cephalometric images using wavelet-based modified adaptive histogram equalization, Applied Soft Computing, 51 (2017) 180–191, <https://doi.org/10.1016/j.asoc.2016.11.046> **Thomson Reuters Impact Factor: 3.541 (SCI Indexed), Publisher: ELSEVIER.**

9. Chandan Singh, Ashutosh Aggarwal, Single-Image Super-Resolution Using Orthogonal Rotation Invariant, Accepted for publication in the journal Computers and Electrical Engineering, 62(2017)266-280, <https://doi.org/10.1016/j.compeleceng.2017.02.009> (SCI Indexed), Thomson Reuters Impact Factor: 1.084. Publisher: ELSEVIER. ISSN No. 0045-7906.
10. Chandan Singh, Kanwal Preet Kaur, A Fast and Efficient Image Retrieval System Based on Color and Texture Features, Journal of Visual Communication and Image Representation., 41(2016)225-238. <https://doi.org/10.1016/j.jvcir.2016.10.002> Thomson Reuters Impact Factor: 2.164, Publisher: ELSEVIER.
11. Chandan Singh, Ashutosh Aggarwal, Sukhjeet Kaur, A New Convolution Model for the Fast Computation of Zernike Moments, Accepted for Publication in International Journal of Electronics and Communications(2016), <https://doi.org/10.1016/j.aeue.2016.11.014> Thomson Reuters Impact Factor: 0.786, Publisher: ELSEVIER.
12. Karamjeet Singh, Sukhjeet K. Ranade, Chandan Singh, Comparative Performance Analysis of Various Wavelet and Nonlocal Means Based Approaches for Image Denoising, Accepted for publication in Optik (2016) <https://doi.org/10.1016/j.ijleo.2016.11.055>. Thomson Reuters Impact Factor: 0.724 (SCI Indexed). Publisher: ELSEVIER
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DATE: 16-12-2017

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