

CURRICULUM VITAE

Gurpreet Singh Lehal

Professor,

Computer Science Department,
Punjabi University, Patiala.

Director,

Research Centre for Punjabi
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Punjabi University, Patiala.



Degrees:

- B.Sc. (Maths Hons.) , Punjab University, Chandigarh
- M.Sc. (Maths Hons.) , Punjab University, Chandigarh
- M.E. (Computer Science) Thapar Institute of Engineering & Technology, Patiala
- PhD (Computer Science), Punjabi University, Patiala

Employment:

- **1988-1995**, Systems Analyst/Research Engineer, Thapar Corporate Research & Development Centre, Patiala
- **1995-2000**, Lecturer in Department of Computer Science and Engineering, Punjabi University, Patiala
- **2000-2003**, Assistant Professor in Department of Computer Science and Engineering, Thapar Institute of Engineering & Technology , Patiala
- **From 2003**, Professor in Department of Computer Science and Engineering, Punjabi University

Administrative Experience:

1. **Director**, Research Centre for Punjabi Language, Literature and Culture, Punjabi University Patiala (*From 2004*)
2. **Director**, Centre for Artificial Intelligence and Data Science (*From 2018*)
3. **Dean**, Faculty of Computing Sciences, Punjabi University Patiala (*2016-2018*)
4. **Nominated Director**, State Bank of Patiala (*2014-2017*)
5. **Dean**, Faculty of Physical Sciences, Punjabi University Patiala (*2013-2015*)
6. **Head**, Department of Computer Science, Punjabi University Patiala (*2006-2009*)
7. **Warden**, Boys Hostel No. 7, Punjabi University Patiala (*1997-1999*)

Member of International/National Committees:

- **Member**, ICANN (Internet Corporation for Assigned Names and Numbers) Neo-Brahmi Generation Panel for Gurmukhi Script
- **Member**, Panel on *Character set for Indian Languages for Mobile phones*, Bureau of Indian Standards
- **Member**, Committee for development of Script Grammar for Punjabi, Ministry of Communications and Information Technology, Government of India
- **Member**, Punjab State Advisory Committee (2003-2006)
- **Member**, Project Review and Steering Group for the CoIL-Net Projects, Ministry of Communications and Information Technology, Government of India. (2003-2005)

Courses Taught (Appendix-I)

- Under Graduate: 4
- Post Graduate: 10

Professional Activities (Appendix-II)

- International Collaborations/Assignment: 10
- National Research Collaborations: 3
- Conferences/Workshops Organized: 10
- Program Committee Member/Co-Chair: 14

Language Software and Technologies (Appendix-III)

- Languages worked on: 6
- Software and Technologies developed: 24
- Technology transferred: 2
- Software Copyrighted: 5

Research Funding, Consultancies and Grants (Appendix-IV)

International Projects

Count	Amount
3	59,896 US\$ + 29,819 AU\$

National Projects

Count	Amount
12	Rs. 533.25 Lakhs

Consultancy

Count	Amount
6 (National)	Rs. 77,66,108
3 (International)	8,630 US\$

Research Publications (Appendix-V)

- Scopus/SCI Indexed Publications: 60
- International Book/ Book Chapter: 2
- Citation Indices (Source; Google Scholar)

Citations	3124
h-index	26
i10-index	67

Research Guidance (Appendix-VI)

- Phd. Students supervised: 19
- M.Tech/M.Phil theses guided: 112

Academic/Research Visits abroad: 20 (Appendix-VII)

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Appendix – I

Courses Taught

- Introduction to Information Technology
- Data Structures
- Theory of Computation
- Operating System
- Algorithm Analysis and Design
- Computer Graphics
- Object Oriented Programming and Java
- Unix & C
- Software Testing, Validation and Verification
- Advanced Algorithms and Data Structures
- Natural Language Processing using Python

Appendix – II

Professional Activities

International Collaborations/Assignments

- **Target Language Expert Content Selector** in project “Eastern Punjabi Transcription and Translation Test language”, National Foreign Language Center, University of Maryland, USA (2019-2020).
- **Member** of ICANN (Internet Corporation for Assigned Names and Numbers) Neo-Brahmi Script Generation Panel for development of Label Generation Rules for validating Internationalized Domain Names in Gurmukhi, (2017-2019).
- **Chief Coordinator** of Indo-UK joint project “Enhancing Communication and Co-operation across South Asia: An ICT Solution to Script Barriers” with University of Manchester, UK (2014-2015). **Project sponsored under ISIF grants, Australia.**
- **Consultant** in project, “Transliteration of Punjabi words in the *English-Punjabi Dictionary* from the AP2171 Romanization into the modified Perso-Arabic script”, with University of Maryland, Maryland, USA (2012-2013).
- **Consultant** in project, “Digitization of Naturalistic Punjabi Recordings”, with University of Maryland, Maryland, USA (2012).
- Conducted collaborative workshop on “Punjabi Language and Technology Workshop”, with University of Columbia, New York, USA (2011).
- Conducted collaborative workshop on “Punjabi Language Education Technology Workshop” with Kwantlen Polytechnic University, Vancouver, Canada (2011).
- **Chief Coordinator** of Indo-UK joint project “Web based Transliteration and Translation System between Urdu and Hindi Languages” with University of Manchester, UK (2009-2010). **Project sponsored under ISIF grants, Australia.**
- Indo-US collaborative workshop, “Workshop on Punjabi teaching materials for internet use”, with University of California, Santa Barbara, USA. (2007-2008).
- **Chief Coordinator** of Indo-UK joint project “Shahmukhi to Gurmukhi Transliteration Solution for Networking” with University of Manchester, UK (2006-2008). **Project sponsored under Pan-Asia grants, Singapore.**

National Research Collaborations

- Worked in Consortium mode with 15 premier institutes in India, with IIT Delhi as Consortium Leader. Other participating institutes include IIT Bombay, IIT Kharagpur, IIT Gauhati, IIT Hyderabad, ISI Calcutta, CDAC and IISc Bangalore for *Development of Robust Document Analysis and Recognition System for Bilingual Printed Gurmukhi Script and Urdu Script* during 2010-2013.
- Chief coordinator of project “Punjabi Text to Speech Help for people with cognitive disabilities” in collaboration with IIT Delhi and GNEC Ludhiana during 2011-2013.
- Worked in Consortium mode with 11 national Institutions, with IIT Delhi as Consortium Leader, for *Development of Indic Script Optical Character Recognition Systems* during 2006-2009.

Conferences/Workshops Organized

- ICON 2018 - Fifteenth International Conference on Natural Language Processing, Patiala, 2018
- regICON 2015 - Third International Conference on Natural Language Processing, Patiala, 2015
- DAR 2014 - Workshop on Document Analysis and Recognition, IISc Bangalore, India, 2014.
- National Workshop on Multilingual Technologies, Patiala, 2013
- National Workshop on Digital Image Processing using MATLAB, Patiala, 2012
- International Conference on Information Systems for Indian Languages (ICISIL-2011), Patiala, 2011
- National Workshop on Recent Advances in Future Trends in Digital Image Processing, Patiala, 2010
- 3rd National Conference on Recent Advances in Future Trends in IT (RAFIT) Patiala, 2009
- 2nd National Conference on Recent Advances in Future Trends in IT (RAFIT) Patiala, 2007
- 1st National Conference on Recent Advances in Future Trends in IT (RAFIT) Patiala, 2005

Program Committee Member/Co-Chair

- ICDAR 2019 - 15th International Conference on Document Analysis and Recognition, Sydney, Australia (2019)
- ICDAR 2017 - 14th International Conference on Document Analysis and Recognition, Kyoto, Japan (2017)
- IAPR Summer School on Document Analysis: Document Informatics, Jaipur , Rajasthan, India (2017)
- WSSANLP 2016 - 6th Workshop on South and Southeast Asian Natural Language Processing , Osaka, Japan (2016).
- MOCR 2015 - 5th International Workshop on Multilingual OCR, Gammarth, Tunisia (2015).
- ICON-2014: The Eleventh International Conference on Natural Language Processing, Goa University, Goa, India (2014).
- NCVPRIPG 2013 - National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics, Indian Institute of Technology Jodhpur, Rajasthan, India (2013).
- ACL 2013 System Demonstration - 51st Annual Meeting of the Association for Computational Linguistics , Sofia, Bulgaria (2013).
- MOCR 2013 - 4th International Workshop on Multilingual OCR, Washington DC, USA (2013).
- MTPIL 2012 - Workshop on Machine Translation and Parsing in Indian Languages, IIT Bombay, Mumbai, India (2012).
- DAR 2012 - Workshop on Document Analysis and Recognition, IIT Bombay, India (2012).
- Joint Workshop on Multilingual OCR and Analytics for Noisy Unstructured Text data, Beijing, China (2011).
- WSSANLP - Second Workshop on South and Southeast Asian Natural Languages Processing, Chiang Mai, Thailand (2011).
- SSANLP - First Workshop on South and Southeast Asian Natural Languages Processing, Beijing, China (2010).

Appendix – III

Language Software and Technologies

Technology Developed

- **Optical Character Recognition (OCR) Systems**
 - Sindhi Optical Character Recognition (OCR) System
 - Urdu Optical Character Recognition (OCR) System
 - Web based Gurmukhi OCR
(Launched by Shri Sachin Pilot, Hon'ble Minister of State for Communications and Information Technology in 2011)
 - First Bilingual Gurmukhi/Roman OCR
 - First Gurmukhi OCR
(CD Released by Mr. Thiru Dayanidhi Maran, Hon'ble Union Minister of Communications and Information Technology in 2007)

- **Transliteration Software**
 - First Sindhi(Perso-Arabic) to Sindhi(Devnagri) & Sindhi(Devnagri) to Sindhi(Perso-Arabic) Transliteration Software
 - Devnagri to Urdu & Urdu to Devnagri Transliteration Software
 - Urdu/Kashmiri to Roman Script Transliteration Software
 - Shahmukhi (Urdu) to Gurmukhi Transliteration online software
 - **Sangam**, Gurmukhi-Shahmukhi (Urdu) transliteration Software
(Released by Mr. Arjun Singh, Hon'ble Union Minister of Human Resource Development in 2004)

- **Punjabi Language Software**
 - **Akhar 2016**, First Unicode based Indic word processor for Punjabi, Hindi, Urdu and English (Project Leader)
 - Fuzzy Code Mixed Query Search Utility for Punjabi/English terms
 - English/Punjabi typing test software (Project Leader)
 - **Akhar 2010**, First Punjabi word processor
 - PunjabiKhoj, Customized Search Engine for Punjabi (Project Leader)
(Released by Sardar Parkash Singh Badal, Hon'ble Chief Minister of Punjab in 2008)
 - Punjabi Morphological Analyser & Generator (Project Leader)
(Released by Mr. Thiru Dayanidhi Maran, Hon'ble Union Minister of Communications and Information Technology in 2007)
 - First Intelligent Predictive Romanized typing utility for Gurmukhi text
 - First Punjabi font to Unicode & Reverse conversion utility
 - First Intelligent Punjabi/Hindi Font Recognition System
 - First Punjabi Spell Checker
 - First Shahmukhi Spell Checker (Project Leader)
 - First Punjabi Grammar Checker (Project Leader)
 - First Punjabi Text to Speech Synthesis System (Project Leader)
 - Online Punjabi teaching website (Project Leader)
(Launched by Maharani Preneet Kaur, Hon'ble Member of Parliament in 2005)

Technology Transfer

- The software package, “Development of Punjabi Morphological Analyser and Generator” developed by our research team was bought by C-DAC, Pune for Rs. One Lakh. The software was released by Thiru Dayanidhi Maran Hon'ble Union Minister of Communications and Information Technology in 2007 for mass distribution in the Punjabi CD launched by Ministry of Communications and Information Technology. Punjabi Word Processor.
- The technology of our “Urdu-Hindi Transliteration system” was transferred to IIIT Hyderabad to improve their Urdu-Hindi Translation System.

Software Copyrighted

- Punjabi Word Processor
- Punjabi Spell Checker
- Gurmukhi OCR
- Jaanchak, Punjabi/English typing test software
- Hindi to Punjabi Machine Translation
(co-authored with Dr. Vishal Goyal)

Appendix – IV

Research Funding, Consultancies and Grants

International Projects

Year	Funding Agency	Project	My role	Budget
2014-2015	The Information Society Innovation Fund (ISIF) Grants, Australia	Enhancing Communication and Co-operation across South Asia: An ICT Solution to Script Barriers	Coordinator	AU\$ 29,819
2009-2010	The Information Society Innovation Fund (ISIF) Grants, Australia	Web based Transliteration and Translation System between Urdu and Hindi Languages	Chief Coordinator	US\$ 29,896
2006-2008	Pan Asia Grants, Singapore	Shahmukhi to Gurmukhi Transliteration Solution for Networking	Chief Coordinator	US\$ 30,000

National Projects

Year	Funding Agency	Project	My role	Budget
2016-2018	Punjab School Education Board, Mohali, India	Video Lecture based Online Teaching of Punjabi	Coordinator	Rs. 30 Lakh
2015-2020	University Grants Commission, India	Special Assistance Programme – DRS III (Thrust Areas : Digital Image Processing, Multilingual Computing, Computer Networks)	Coordinator	Rs. 110.0 Lakh
2010-2015	Ministry of Communication and Information Technology, India	Development of Optical Character Recognition System for Gurmukhi and Urdu Scripts	Chief Coordinator	Rs. 105 Lakh
2011-2013	Department of Science and Technology, India	Punjabi Text to Speech Help for people with cognitive disabilities	Chief Coordinator	Rs. 18.62 Lakh
2009-2014	University Grants Commission, India	Special Assistance Programme -DRS-II (Thrust Area : Digital Image Processing)	Co-Coordinator	Rs. 51.0 Lakh
2008-2009	Defence R&D Organization, India	Transliteration system from Urdu to Devnagri	Principal Investigator	Rs. 9.9 Lakh
2008-2010	Ministry of Communication and Information Technology, India	Development of a grammar checking system for Punjabi	Principal Investigator	Rs. 25.48 Lakh
2007	Defence R&D Organization, India	Transliteration system from Urdu/Kashmiri to Roman script and reverse	Principal Investigator	Rs. 1.25 Lakh
2006-2009	Ministry of Communication and Information Technology, India	Development of Robust Document Analysis and Recognition System for Printed Gurmukhi Script	Chief Coordinator	Rs. 36.0 Lakh
2005	MP Local Area Development Fund, Maharani Perneet Kaur, MP Patiala	Multi-media based Website for Online Teaching of Punjabi (www.learnpunjabi.org) & Establishment of Natural Language Processing Lab	Project Leader	Rs. 20.0 Lakh
2004-2009	University Grants Commission, India	Special Assistance Programme(Thrust Research Areas : Punjabi Speech Synthesis and Gurmukhi OCR)	Coordinator	Rs. 45.0 Lakh
2000-2003	Ministry of Communication and Information Technology, India	Resource Centre for Indian Language Technology Solutions-Punjabi	Chief Coordinator	Rs. 81.0 Lakh

Consultancy

Year	Organisation	Amount
2020	University of Maryland, USA	2250 US\$
2020	Punjab Police	Rs. 9.10 Lakh
2020	NITTR, Chandigarh	Rs. 0.40 Lakh
2019	Punjab Public Service Commission, Patiala	Rs. 5.90 Lakh
2018	Maharaja Ranjit Singh Punjab Technical University, Bathinda	Rs. 2.31 Lakh
2018	Govt of Punjab, National Health Mission	Rs. 19.16 Lakh
2018	Subordinate Staff Selection Board, Punjab	Rs. 40.79 Lakh
2013	University of Maryland, USA	4995 US\$
2012	University of Maryland, USA	1385 US\$

Appendix – V

Scopus/SCI Indexed Research Publications

S. No.	Publications	Citations
1.	S. Goel and G. S. Lehal, “A solution for line segmentation problems in Sindhi character recognition system”, <i>International Journal of Innovative Technology and Exploring Engineering (IJITEE)</i> , Vol. 8, No. 10, pp. 3668-3674 (2019)	-
2.	Munish Kumar Jindal, Simpel Rani, MK Jindal and Gurpreet Singh Lehal, “Improved Recognition Results of Medieval Handwritten Gurmukhi Manuscripts Using Boosting and Bagging Methodologies”, <i>Neural Processing Letters</i> , Volume 50, Issue 1, pp. 43-56 (2019).	2
3.	S Arya, I Chhabra and G. S. Lehal, “Integrated feature exploration for handwritten Devanagari numeral recognition”, <i>Advances in Intelligent Systems and Computing</i> , pp. 145-157 (2018).	-
4.	Amandeep Kaur, Renu Dhir and Gurpreet Singh Lehal, “A survey on camera-captured scene text detection and extraction: towards Gurmukhi script”, <i>International Journal of Multimedia Information Retrieval</i> , Volume 6, Issue 2, pp. 115–142 (2017).	3
5.	S. Sharma and G. S. Lehal, “Improving existing Grammar Checker”, <i>Proceedings International Conference on Computational Techniques in Information and Communication Technologies, ICCTICT 2016</i> , pp. 445-449 (2016)	1
6.	S Rani and G. S. Lehal, “Recognition based classification of Gurmukhi manuscripts”, <i>2016 Symposium on Colossal Data Analysis and Networking, CDAN 2016</i> , pp. 1-5 (2016)	-
7.	Kawarbir Singh Dhanju, Gurpreet Singh Lehal, Tejinder Singh Saini and Arshdeep Kaur, “Design and Implementation of Shahmukhi Spell Checker”, <i>Indian Journal of Science and Technology</i> , Vol. 8, Issue 27, pp. 1-12 (2015).	3
8.	A. Rana and G. S. Lehal, “Offline Urdu OCR using ligature based segmentation for Nastaliq script”, <i>Indian Journal of Science and Technology</i> , Vol. 8, Issue 35, pp. 1-9 (2015)	7
9.	Shraddha Arya, Indu Chaabra and Gurpreet Singh Lehal, “Recognition of Devnagari Numerals using Gabor Filter”, <i>Indian Journal of Science and Technology</i> , Vol. 8, Issue 27, pp. 1-6 (2015).	10
10.	Gurpreet Singh Lehal, “A Bilingual Gurmukhi-English OCR based on multiple script identifiers and language models”, <i>Proceedings of 4th International Workshop of Multilingual OCR</i> , Article No. 3, Washington DC, USA. (2013).	1
11.	Vishal Gupta and Gurpreet Singh Lehal, “A Survey of Common Stemming Techniques and Existing Stemmers for Indian Languages”, <i>Journal of Emerging Technologies in Web Intelligence</i> , Vol 5, No 2, pp. 157-161 (May 2013).	10

12.	Vishal Gupta and Gurpreet Singh Lehal, "Automatic Text Summarization System for Punjabi Language", <i>Journal of Emerging Technologies in Web Intelligence</i> , Vol 5, No 3, pp. 257-271 (August 2013).	9
13.	Gurpreet Singh Lehal, "Ligature Segmentation for Urdu OCR", <i>Proceedings of 12th International Conference of Document Analysis and Recognition</i> , Washington DC, USA. pp. 1162-1166. (2013)	17
14.	Gurpreet Singh Lehal and Ankur Rana, "Recognition of Nastalique Urdu Ligatures", <i>Proceedings of 4th International Workshop of Multilingual OCR</i> , Article No. 7, Washington DC, USA. (2013)	3
15.	Rajneesh Rani, Renu Dhir and Gurpreet Singh Lehal, "Script Identification of Pre-Segmented Multi-Font Characters and Digits", <i>Proceedings of 12th International Conference of Document Analysis and Recognition</i> , Washington DC, USA. pp. 1182-1186. (2013)	18
16.	Gurpreet Singh Lehal, "Choice of recognizable units for Urdu OCR" <i>Proceedings of the Workshop on Document Analysis and Recognition (DAR 2012)</i> , Mumbai, Publisher ACM, USA. 79-85. (2012)	13
17.	Simpel Jindal and Gurpreet Singh Lehal, "Line segmentation of handwritten Gurmukhi manuscripts", <i>Proceedings of the Workshop on Document Analysis and Recognition (DAR 2012)</i> , Mumbai, Publisher ACM, USA. 74-78. (2012)	4
18.	UmrinderPal Singh, Vishal Goyal and Gurpreet Singh Lehal, "Named Entity Recognition System for Urdu", <i>Proceedings of the COLING 2012</i> , Mumbai, pp. 2507-2518. (2012)	17
19.	Rajneesh Rani, Renu Dhir and Gurpreet Singh Lehal, "Performance analysis of feature extractors and classifiers for script recognition of English and Gurumukhi words", <i>Proceedings of the Workshop on Document Analysis and Recognition (DAR 2012)</i> , Mumbai, Publisher ACM, USA. pp. 30-36. (2012)	3
20.	Manoj K. Sachan, Gurpreet Singh Lehal, and Vijender Kumar Jain, "A Novel Method to Segment Online Gurmukhi Script", <i>Information Systems for Indian Languages</i> , Communications in Computer and Information Science, Vol. 139, Springer-Verlag, pp. 1-8. (2011).	4
21.	Parminder Singh and Gurpreet Singh Lehal, "A Rule Based Schwa Deletion Algorithm for Punjabi TTS System", <i>Information Systems for Indian Languages</i> , Communications in Computer and Information Science, Vol. 139, Springer-Verlag, pp. 98-103. (2011)	4
22.	M.Sachan, G. S. Lehal and V. Jain, "A system for online Gurmukhi script recognition", <i>Information Systems for Indian Languages</i> , Communications in Computer and Information Science, Vol. 139, Springer-Verlag, pp. 299-300. (2011)	7
23.	Gurpreet Singh Lehal, and Tejinder Saini, "A Transliteration Based Word Segmentation System for Shahmukhi Script", <i>Information Systems for</i>	-

	<i>Indian Languages</i> , Communications in Computer and Information Science, Vol. 139, Springer-Verlag, pp. 136-143. (2011).	
24.	Rajneesh Rani, Renu Dhir, and Gurpreet Singh Lehal, “Comparative Analysis of Gabor and Discriminating Feature Extraction Techniques for Script Identification”, <i>Information Systems for Indian Languages</i> , Communications in Computer and Information Science, Vol. 139, Springer-Verlag, pp. 174-179. (2011).	3
25.	Deepak Arya, C. V. Jawahar, Chakravorty Bhagvati, Tushar Patnaik, B. B. Chaudhuri, G. S. Lehal, Santanu Chaudhury and A. G. Ramakrishna, “Experiences of integration and performance testing of multilingual OCR for printed Indian scripts”, <i>Proceedings of the 2011 Joint Workshop on Multilingual OCR and Analytics for Noisy Unstructured Text Data</i> , Beijing, China. Article No.: 9. (2011)	3
26.	D. Sharma and G. S. Lehal, “Hand-filled form processing system for Gurmukhi script <i>Information Systems for Indian Languages</i> , Communications in Computer and Information Science, Vol. 139, Springer-Verlag, pp. 304-304. (2011)	-
27.	Vishal Goyal and Gurpreet Singh Lehal, “Hindi to Punjabi Machine Translation System”, <i>Information Systems for Indian Languages</i> , Communications in Computer and Information Science, Springer-Verlag, pp. 236-241. (2011).	1
28.	R. Rani, R. Dhir and G. S. Lehal, “Identification of printed Punjabi words and English numerals using Gabor features”, <i>World Academy of Science, Engineering and Technology</i> , 73(1), pp. 392-395 (2011)	4
29.	Jasbir Singh and Gurpreet Singh Lehal, “Optimizing Character Class Count for Devnagari Optical Character Recognition”, <i>Information Systems for Indian Languages</i> , Communications in Computer and Information Science, Springer-Verlag, pp. 144-149. (2011).	-
30.	Vishal Gupta and Gurpreet Singh Lehal, “Preprocessing Phase of Punjabi Language Text Summarization”, <i>Information Systems for Indian Languages</i> , Communications in Computer and Information Science, Vol. 139, Springer-Verlag, pp. 250-253. (2011).	6
31.	P. Singh P and G. S. Lehal, “Text-to-speech synthesis system for Punjabi language”, <i>Information Systems for Indian Languages</i> , Communications in Computer and Information Science, Vol. 139, Springer-Verlag, pp. 98-103. (2011)	-
32.	G. S. Lehal, T. Saini and V. Kalra, “Urdu to Hindi and reverse transliteration system”, <i>Information Systems for Indian Languages</i> , Communications in Computer and Information Science, Vol. 139, Springer-Verlag, pp. 305-306. (2011)	-
33.	S. Sharma and G. S. Lehal, “Using Hidden Markov Model to improve the accuracy of Punjabi POS tagger”, <i>Proceedings - 2011 IEEE International Conference on Computer Science and Automation Engineering, CSAE 2011</i> , pp. 697-701 (2011)	7

34.	V Gupta and G.S.Lehal, "A Survey of Text Summarization Extractive Techniques", <i>Journal of Emerging Technologies in Web Intelligence</i> , Volume 2, No. 3, pp. 258-268 (2010).	255
35.	V. Goyal, G. S. Lehal, "Automatic standardization of spelling variations of Hindi text", <i>Proceedings of International Conference on Computer and Communication Technology (ICCT)</i> , Allahabad, IEEE Computer Society Press, California, USA, pp 764-767. (2010).	4
36.	P. Singh P and G. S. Lehal, "Statistical syllables selection approach for the preparation of Punjabi speech database", <i>2010 International Conference for Internet Technology and Secured Transactions, ICITST 2010</i> (2010)	1
37.	V Goyal and G.S.Lehal, "Web Based Hindi to Punjabi Machine Translation System", <i>Journal of Emerging Technologies in Web Intelligence</i> , Volume 2, No. 2, pp. 148-151 (2010).	15
38.	D. Sharma, G. S. Lehal, "A Fast Skew Detection and Correction Algorithm for Machine Printed Words in Gurmukhi Script", <i>Proceedings of International Workshop of Multilingual OCR</i> , Article No. 15, Barcelona, Spain. (2009).	-
39.	V Gupta and G S Lehal, "A Survey of Text Mining Techniques and Applications", <i>Journal of Emerging Technologies in Web Intelligence</i> , Volume 1, No. 1, pp. 60-76 (August 2009).	286
40.	D. Sharma, G. S. Lehal, P. Kathuria "Digit Extraction and Recognition from Machine Printed Gurmukhi Documents", <i>Proceedings of International Workshop of Multilingual OCR</i> , Article No. 12, Barcelona, Spain. (2009).	-
41.	D. Sharma and G. S. Lehal, "Form Field Frame Boundary Removal for Form Processing System in Gurmukhi Script", <i>Proceedings of 9th International Conference of Document Analysis and Recognition</i> , Barcelona, Spain. pp. 256-260(2009).	3
42.	G.S. Lehal, "Optical Character Recognition of Gurmukhi Script using Multiple Classifiers", <i>Proceedings of International Workshop of Multilingual OCR</i> , Article No. 7, Barcelona, Spain. (2009)	1
43.	M.K. Jindal, R.K. Sharma, G.S. Lehal, "Segmentation of touching characters in upper zone in printed Gurmukhi script", <i>Proceedings of the 2nd Bangalore Annual Compute Conference</i> , Bangalore, Publisher ACM, USA, Paper No. 9. (2009).	11
44.	D. Sharma, G. S. Lehal, "Shape Encoded Post Processing of Gurmukhi OCR", <i>Proceedings of 9th International Conference of Document Analysis and Recognition</i> , Barcelona, IEEE Computer Society Press, California, USA, pp 788-792. (2009).	6
45.	M. S. Gill and G. S. Lehal, "A Grammar Checking System for Punjabi", <i>Coling 2008: Companion volume: Posters and Demonstrations</i> , Manchester, UK, pp. 149-152 (August 2008).	8

46.	G. S. Josan and G. S. Lehal, "A Punjabi to Hindi machine Translation System", <i>Coling 2008: Companion volume: Posters and Demonstrations</i> , Manchester, UK, pp. 157-160 (August 2008).	6
47.	V. Goyal and G. S. Lehal, "Hindi Morphological Analyzer and Generator", <i>Proceedings First International Conference on Emerging Trends in Engineering and Technology</i> , Nagpur, IEEE Computer Society Press, California, USA, pp. 1156-1159 (2008).	16
48.	T S Saini and G S Lehal "Shahmukhi to Gurmukhi Transliteration System: A Corpus based Approach", <i>Research in Computing Science (Mexico)</i> , Volume 33, pp. 151-162 (2008).	2
49.	M.K. Jindal, R.K. Sharma, G.S. Lehal, "Structural Features for Recognizing Degraded Printed Gurmukhi Script", <i>Proceedings International Conference on Information Technology : New Generations (ITNG 2008)</i> , Las Vegas, IEEE Computer Society Press, California, USA, pp. 668-673. (2008).	7
50.	M. Jindal, R. K. Sharma and G. S. Lehal, "A study of different kinds of degradation in printed Gurmukhi script", <i>Proceedings - International Conference on Computing: Theory and Applications</i> , ICCTA 2007, pp. 538-544 (2007)	8
51.	D V Sharma and G S Lehal, "An Iterative Algorithm for Segmentation of Isolated Handwritten Words in Gurmukhi Script", <i>Proceedings 18th International Conference on Pattern Recognition</i> , Hong Kong, IEEE Computer Society Press, California, USA, Vol 2, pp 1022-1025. (2006).	14
52.	M.K. Jindal, R.K. Sharma, G.S. Lehal, "Segmentation of Horizontally Overlapping Lines in Printed Gurmukhi Script.", <i>Proceedings 14th International Conference on Advanced Computing and Communications</i> , Surathkal, IEEE Computer Society Press, NJ, USA, pp. 226-229. (2006).	-
53.	G S Lehal and Chandan Singh, "A complete OCR system for Gurmukhi script", <i>Structural, Syntactic and Statistical Pattern Recognition</i> , T. Caelli, A. Amin, R.P.W. Duin, M. Kamel and D. de Ridder (Eds.), Lecture Notes in Computer Science, Vol. 2396, Springer-Verlag, Germany, pp. 344-352, (2002)	2
54.	G S Lehal and Chandan Singh, "A Post Processor for Gurmukhi OCR", <i>SADHANA Academy Proceedings in Engineering Sciences</i> , Vol. 27, Part 1, pp. 99-112, (2002)	17
55.	G S Lehal, Chandan Singh and Ritu Lehal , "A shape based post processor for Gurmukhi OCR", <i>Proceedings of 6th International Conference on Document Analysis and Recognition</i> , Seattle, USA, IEEE Computer Society Press, USA, pp. 1105-1109, (2001)	17
56.	G S Lehal and Chandan Singh, "A technique for segmentation of Gurmukhi	8

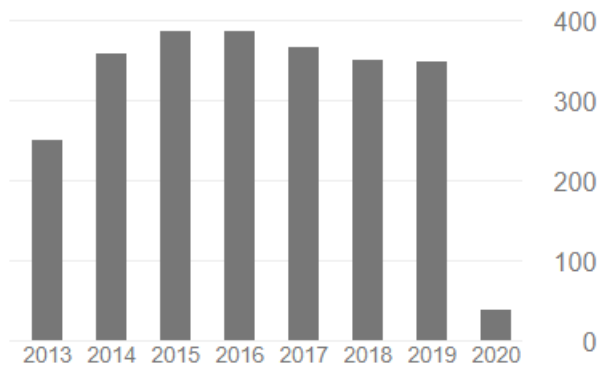
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58.	G S Lehal and Chandan Singh, “A Gurmukhi script recognition system”, <i>Proceedings 15th International Conference on Pattern Recognition</i> , Barcelona, Spain, IEEE Computer Society Press, California, USA, Vol 2, pp 557-560. (2000).	57
59.	G. S. Lehal and Nivedan Bhatt, “A recognition system for Devnagri and English handwritten numerals”, <i>Advances in Multimodal Interfaces – ICMI 2001</i> , T. Tan, Y. Shi and W. Gao (Editors), Lecture Notes in Computer Science, Vol. 1948, Springer-Verlag, Germany, pp. 442-449. (2000).	12
60.	G S Lehal and Renu Dhir, “A Range Free Skew Detection Technique for Digitized Gurmukhi Script Documents”, <i>Proceedings 5th International Conference of Document Analysis and Recognition</i> , Bangalore, IEEE Computer Society Press, California, USA, pp. 147-152, (1999)	6

International Book/ Book Chapter:

1. Chandan Singh, Gurpreet Singh Lehal, Jyotsna Sengupta, Dharam Veer Sharma and Vishal Goyal (Eds.), “Information Systems for Indian Languages: International Conference, Proceedings ICISIL 2011”, Volume 139 of Communications in Computer and Information Science Series, Springer, Germany. (2011) **Total downloads - 27,161. One of the top 50% most downloaded eBooks in the relevant SpringerLink eBook Collection in 2017.**
2. Gurpreet Singh Lehal, Chapter Title: “A Complete Machine Printed Gurmukhi OCR System”, Guide to OCR for Indic Scripts, Series: Advances in Pattern Recognition, Springer, Germany. (2009)

Citation Indices (Source: Google Scholar)

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Citations	3124	1876
h-index	26	16
i10-index	67	37



Appendix – VI

Research Guidance

1. Ph.D. Students Supervised

S. No.	Name	Topic	Completion Year
1.	Manish Kumar	Degraded Text Recognition of Gurmukhi Script	2008
2.	Gurpreet Singh Josan	Development of Punjabi to Hindi Machine translation System	2008
3.	Mandeep Singh	Development of a Punjabi Grammar Checker	2008
4.	Dharamveer Sharma	A System for Recognition of Hand-filled forms in Gurmukhi Script	2010
5.	Vishal Goyal	Development of Hindi to Punjabi Machine Translation System	2010
6.	Kamaljeet Kaur	A Punjabi to English Machine Translation System for Legal Documents	2012
7.	Tejinder Saini	Development of Shahmukhi to Gurmukhi Transliteration System	2012
8.	Manoj Kumar Sachan	A System for Online Recognition of Gurmukhi Script	2013
9.	Vishal Gupta	Development of Text Summarisation System for Punjabi	2013
10.	Parminder Singh	Development of a syllable based Punjabi Text to Speech Synthesis System	2014
11.	C.P. Kamboj	ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਕੰਪਿਊਟਰੀਕਰਨ : ਸਥਿਤੀ, ਸਮੱਸਿਆਵਾਂ ਅਤੇ ਪ੍ਰਸਤਾਵਿਤ ਹੱਲ	2014
12.	Rajnish Rani	Script Identification from printed Bilingual documents(Gurmukhi/English)	2015
13.	Simple Rani	Recognition of Gurmukhi Handwritten Manuscripts	2016
14.	Sanjeev Kumar Sharma	A Punjabi Grammar Checker For Compound And Complex Sentences	2016
15.	Jasbir Singh	Development of Devnagari Optical Character Recognition System Using Multiple	2017

		Classifiers	
16.	Ankur Rana	Development of Language Model based Optical Character Recognition System for Urdu Script	2017
17.	Umarinder Singh	Urdu to Punjabi Machine Translation System	2017
18.	Sapna Dhiman	Enhancing Accuracy Of Gurmukhi OCR using Multiple Classification Schemes and Language Modeling	2018
19.	Shradha Arya	Recognition Of Online And Offline Handwritten Composite Characters and Numerals in Devnagari Script	2020
20.	Shanky Goyal	Development of Optical Character Recognition System for Sindhi	Submitted

M.Phil./M.Tech. students guided– 112

Appendix – VII

Academic/Research Visits Abroad

1. 2019: Panellist for *Second annual conference on Punjab's history, art and culture*, LUMS, Lahore, **Pakistan**.
2. 2017: Invited by ICANN to 3rd Neo-Brahmi Generation Panel Face to face meeting at Colombo, **Sri Lanka**.
3. 2017: Invited by ICANN to 2nd Neo-Brahmi Generation Panel Face to face meeting at Kathmandu, **Nepal**.
4. 2015: Demonstrated the *Perso Arabic-Indic Script Machine Transliteration System* in 7th International Conference on Information and Communication Technologies and Development, **Singapore**.
5. 2013: Presented four Research Papers in 12th International Conference of Document Analysis and Recognition and 4th International Workshop of Multilingual OCR, Washington DC, **USA**.
6. 2011: Conducted a One day Workshop on *Punjabi Language and Technology* at Columbia University, **USA**.
7. 2011: Conducted a One day Workshop on *Gurmukhi and Shahmukhi Software Tools* at University of Maryland, **USA**.
8. 2011: Conducted a Three day Workshop on *Punjabi Language Education Technology* at Kwantleen Polytechnic University, Surrey, **Canada**.
9. 2010: Demonstrated the *Urdu to Devnagri Transliteration System* in IEEE International Conference on Information and Communication Technologies and Development, London, **UK**.
10. 2010: Invited talk on *Software Tools for Punjabi Language Processing and Learning* in International Conference on “Sikhs in Europe. Migration, Identity and Translocal Practices”, Lund University, **Sweden**.
11. 2009: Chaired a session and presented paper on *A Two Stage Word Segmentation System For Handling Space Insertion Problem In Urdu Script* in World Academy of Science, Engineering and Technology 2009, Bangkok, **Thailand**.
12. 2009: Indo-UK joint project “*Web based Transliteration and Translation System between Urdu and Hindi Languages*”, University of Manchester, **UK**.
13. 2008: Workshop on *Punjabi teaching materials for internet use*, The Center for Sikh and Punjab Studies, University of California, Santa Barbara, **USA**.
14. 2008: Demonstrated the *Grammar Checking System for Punjabi* in the 22nd International Conference on Computational Linguistics, Manchester, **UK**.
15. 2007: Workshop on *Punjabi teaching materials for internet use*, The Center for Sikh and Punjab Studies, University of California, Santa Barbara, **USA**.
16. 2007: Invited to Learning Forum by Asian Media Information And Communication Centre, **Singapore**.
17. 2006: Indo-UK joint project “*Shahmukhi to Gurmukhi Transliteration Solution for Networking*”, University of Manchester, **UK**.
18. 2003: Invited talk on *Computers and Punjabi* in 2nd World Punjabi Conference, Prince George, **Canada**.
19. 2001: Presented paper *A shape based post processor for Gurmukhi OCR* in 6th International Conference of Document Analysis and Recognition, Seattle, **USA**.

20. 1999: Presented paper *Segmentation of Machine Printed Gurmukhi Script* in 9th International Graphonomics Society Conference, **Singapore**.