Arindam Biswas

Professor,
Information Technology,

Dean, International Relations and Alumni Affairs,
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Profile

Arindam Biswas graduated from Jadavpur University, Kolkata, India, and received his master's and doctorate degree both from the Indian Statistical Institute, Kolkata, India. He is currently Professor in the Department of Information Technology, Indian Institute of Engineering Science and Technology, Shibpur, India. His research interests include digital geometry, image processing, approximate shape matching and analysis, medical image analysis, natural language processing, and biometrics. He has published over 100 research papers in international journals, edited volumes, and refereed conference proceedings, and holds one US patent. He has served as a Board Member of the Technical Committee 18 (tc18) for Discrete Geometry and Mathematical Morphology of International Association of Patern Recognition (IAPR) from 2016 to 2021. He is currently serving as the Dean, International Relations and Alumni Affairs of Indian Institute of Engineering Science and Technology, Shibpur.

Education

1990 Bachelor of Engineering, Jadavpur University, Kolkata, India.

2001 M. Tech in Computer Science, Indian Statistical Institute, Kolkata, India.

2010 PhD in Computer Science, Indian Statistical Institute, Kolkata, India.

PhD Thesis

Biswas, A. (2010). "Geometric Characterisation of Digital Objects: Algorithms and Applications to Image Analysis". PhD thesis. Indian Statistical Institute, Kolkata (08/05/2010).

Area of Research

Digital Geometry, Shape Analysis, and Medical Image Analysis.

Member

1. Board Member: IAPR Technical Committee 18 (tc18)
2. IEEE Member
3. ACM Member

Subjects Taught

Operating Systems, Computer Networks, Computational Geometry, Computational Topology, Information and System Security, Discrete Mathematics, Software Engineering, Web Technology, Graph Theory, and Formal Languages and Automata Theory.

PhD Supervised

Completed

1. Subarna Chatterjee (2013) "Computer Aided Breast Cancer Diagnosis Systems for Sono-mammogram"

2. Anirban Chatterjee (2013) "Automatic Diagram Drawing based on Natural Language Text Understanding"

3. Mousumi Dutt (2014) "On Some Shape-Analytic Algorithms and Applications for Isothetic Polygons"

4. Oishila Bandyopadhya (2016) "Automated Analysis of Orthopaedic X-ray Images based on Digital-Geometric Techniques"

5. Nilanjana Karmakar (2016) "Shape Analysis of 3D Objects using Digital Geometric Techniques"

6. Apurba Sarkar (2016) "On Some Combinatorial Algorithms for Analysis of Digital Objects on Isothetic and Triangular Grids"

7. Sandip Banerjee (2018) "Studies in four geometric optimization problems based on neighborhood-attributes of point-sets"

8. Shanta Phani (2019) "Culturomics and Style Analyses of Low-resourced Indian Languages"

9. Nilanjana Dutta Roy (12.02.2021) "Retinal Vascular Structure: Its Application in Biometry and Ocular Disease Detection"

10. Sharmistha Mandal (submitted 20.04.2021) "Characterization and Enhancement of 3D Objects using Digital Geometric Techniques"

1. Sabyasachi Mukherjee (2017)
2. Debapriya Sengupta (RP 2017)
3. Somrita Saha (2018)
4. Anukul Maity (2018)
5. Bijoly Saha (2018)
6. Aman Aziz (2018)
7. Shubhojyoti Das (2021)

Reviewer of

1. IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI).
2. IEEE Transactions on Systems, Man and Cybernatics (SMC-A)
3. Theoretical Computer Science - Elsevier.
4. Information Sciences - Elsevier.
5. Pattern Recognition Letters - Elsevier.
6. Journal of Computer and System Sciences - Elsevier.

Projects

COMPLETED

1. Generation, Decomposition, and Analysis of Isothetic Polygon, UGC, 3 years (July 2012 - June 2015), Rs. 2,59,400/-, PI
2. 3DTV-3D View from All Directions without Glasses, CSIR, 3 years (May 2012 - March 2015), Rs. 7,38,993/-, PI
3. A Foldscope Based Malaria Detection and Realtime Monitoring of Malaria outbreak, DBT, 1 year (May 2018 -September 2019), Rs. 8,00,000/- PI.

Work Experience

TEACHING

1. Lecturer, Computer Science and Technology, IIEST Shibpur, 01.09.2003 - 22.09.2008, 5 years

2. Assistant Professor, Information Technology, IIEST Shibpur, 23.09.2008 - 22.09.2011, 3 years

3. Associate Professor, Information Technology, IIEST Shibpur, 23.09.2011 - 21.02.2019, 7 years

4. Professor, Information Technology, IIEST, Shibpur, 22.02.2019 - till date

INDUSTRY

1. Deputy Manager, Steel Authority of India Ltd, Durgapur Steel Plant, 20.10.1990 - 09.10.2000, 10 years

2. Senior Software Engineer, Novell Software Development India Ltd, 06.08.2001 - 29.08.2003, 2 years

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Institute Administrative Responsibilities

1. HOD (Actg.), Department of Information Technology, IIEST, Shibpur, 26.01.2009 - 14.08.2009

2. Director, Purabi Das School of Information Technology, IIEST, Shibpur, 09.09.2010 - 09.07.2018.

3. Convener, INSTRUO 2009, Techno-Management festival of IIEST, Shibpur.

4. HOD, Department of Information Technology, IIEST, Shibpur, 03.02.2014 - 09.07.2018

5. External Member, Purchase Committee of CST, IIEST Shibpur, 2012 - 2015

6. Member, Website and Infrastructure Committee, IIEST, Shibpur, 2010 - 02.07.2018

7. Convener, INSTRUO 2015, Techno-Management festival of IIEST, Shibpur.

8. Member, Academic Committee, IIIT Kalyani, 2014 - 2017

9. Member, CPPC, IIEST, Shibpur, 2017 - 2018

10. Chairman, Network and IT Infrastructure Committee, 03.07.2018 -

11. Convener, Committee for Strengthening Placement, 29.09.2018 -

12. Institutional Coordinator, Scheme for Promotion of Academic and Research Collaboration, 24.10.2018 -

13. Member, Committee for Digital Display Board, 01/01/2019 -

14. Dean, International Relations and Alumni Affairs, 01/03/2019 -

15. Member, High Performance Computing Center, 08/07/2019 -

16. Member, Rajbhasa Implementation Committee, 10/07/2019 -

17. Chairman, Committee for Development and Re-design of Institute Website, 13/08/2019 -

18. Deputy Coordinator, Digital Education Technology Cell

19. President, Digital Education Hub in memory of Sushama Basu (ex-officio Dean, IRAA)

20. Chairman, Committee for upgradation and Maintenance of Institute Telephone System, 22/03/2021

Conferences/Workshops Attended

Annexure I

Conferences/Workshops Organized

Annexure II

Publications

INTERNATIONAL JOURNALS

34. Somrita Saha and Arindam Biswas, Surface polygonization of 3D objects using norm similarity, Journal of Combinatorial Optimization, 2021, Springer US

33. Nilanjana Dutta Roy and Arindam Biswas, Retinal image registration from artery–venous subtree by graph theoretical characterization of retinal vascular network, Publication date 2020/3 Journal Innovations in Systems and Software Engineering Volume 16 Issue 1 Pages 79-86 Publisher Springer London

32. Nilanjana Dutta Roy, Arindam Biswas, Fast and robust retinal biometric key generation using deep neural nets, 2020/3, Multimedia Tools and Applications, 79(9), 6823-6843, Springer US

31. Nilanjana Dutta Roy, Arindam Biswas (2019), "Fast and Robust Retinal Feature Selection Approach using Deep Learning for Biometric Applications", Multimedia Tools and Applications (accepted), Springer

30. Oishila Bandyopadhyay, Arindam Biswas, and Bhargab B Bhattacharya (2018). Bone Cancer Assessment and Destruction Pattern Analysis in Long-Bone X-ray Image. Journal of Digital Imaging, 32 (2), 300-313, Springer.

29. Sarkar, A., A. Biswas and, M. Dutt, and S. Mondal (2018). Finding Shortest Triangular Path and its Family inside a Digital Object. Fundamenta Informaticae 159(3), pp. 297-325, 2018.

28. S. Phani, S. Lahiri, and A. Biswas (2018). Readability Analysis of Bengali Literary Texts. Journal of Quantitative Linguistics. 26(4), pp. 287-305 Taylor and Francis. DOI: 10.1080/09296174.2018.1499456

27. Nilanjana Karmakar, Sharmistha Mondal, and Arindam Biswas (2018). Determination of 3D curve skeleton of a digital object. Information Sciences, vol. 499, pp. 84-101 https://doi.org/10.1016/j.ins.2018.06.021

26. Sarkar, A., A. Biswas, M. Dutt, and A. Bhattacharya (2018). Finding a Largest Rectangle inside a Digital Object and Rectangularization. Journal of Computer and System Sciences, JCSS (95), pp. 204-217.

25. Bandyopadhyay, O., T. Dutta, N. Dutta, A. Biswas, and B. B. Bhattacharya (2017). Structural feature analysis of the vascular network in retinal images. Computer Methods in Biomechanics and Biomedical Engineering: Imaging and Visualization, 37-48, Taylor and Francis.

24. Banerjee, S., B. B. Bhattacharya, B. Bhattacharya, A. Biswas, S. Das, R. Mandal, and S. Roy (2017). On Representing a Simple Polygon Perceivable to a Blind Person. Information Processing Letters 120. http://dx.doi.org/10.1016/j.ipl.2 1-5.

23. Biswas, A., P. Bhowmick, B. B. Bhattacharya, B. Das, M. Dutt, and A. Sarkar (2017). Triangular Covers of a Digital Object. Journal of Applied Mathematics and Computing, 58(1-2), pp. 667-691, https://doi.org/10.1007/s12190-017-1162-8.

22. Phani, S., S. Lahiri, and A. Biswas (2017). A Supervised Learning Approach for Authorship Attribution of Bengali Literary Texts. ACM Transaction Asian Low-Resource Language Information Processing 16(4), 20-27.

21. Sarkar, A., A. Biswas, M. Dutt, P. Bhowmick, and B. B. Bhattacharya (2017). A Linear-Time Algorithm to Compute the Triangular Hull of a Digital Object. Discrete Applied Mathematics 216. doi:10.1016/j.dam.2016.01.014, pp 408-423.

20. Bandyopadhyay, O., A. Biswas, and B. B. Bhattacharya (2016). Automated Analysis of Orthopaedic X-ray Images based on Digital-Geometric Techniques. Electronic Letters in Computer Vision and Image Analysis 15(2), 7-9.

19. Bandyopadhyay, O., A. Biswas, and B. B. Bhattacharya (2016). Classification of Long-Bone Fractures based on Digital-Geometric Analysis of X-ray images. Pattern Recognition and Image Analysis: Advances in Mathematical Theory and Applications 26(4), 10-25.

18. Bandyopadhyay, O., A. Biswas, and B. B. Bhattacharya (2016). Long-bone Fracture Detection in Digital X-ray Images Based on Digital-Geometric Techniques. Computer Methods and Programs in Biomedicine 123, pp 2-14.

17. Karmakar, N., A. Biswas, and P. Bhowmick (2016). Reeb Graph based Segmentation of Articulated Components of 3D Digital Objects. Theoretical

Computer Science 624. DOI=10.1016/j.tcs.2015.11.013, 25-40.

16. Bera, S., A. Biswas, and B. B. Bhattacharya (2015). A Fast and Automated Granulometric Image Analysis Based on Digital Geometry. Fundamenta Informaticae 138, 321-338.

15. Dutt, M., A. Biswas, P. Bhowmick, and B. B. Bhattacharya (2014). On Finding a Shortest Isothetic Path and its Monotonicity inside a Digital Object. Annals of Mathematics and Artificial Intelligence 22(7), 590-605.

14. Dutt, M., A. Biswas, P. Bhowmick, and B. B. Bhattacharya (2014). On the Family of Shortest Isothetic Paths in a Digital Object: An Algorithm with Applications. Computer Vision and Image Understanding 129, 75-88.

13. Mukherjee, A., U. Garain, and A. Biswas (2014). Experimenting with Automatic Text-to-Diagram Conversion: A Novel Teaching Aid for the Blind People. Journal of Educational Technology and Society (ISSN 1436-4522), Vol. 17, No. 3 (July 2014), pp. 40-53.

12. Dutt, M., A. Biswas, and P. Bhowmick (2013). Approximate Partitioning of 2D Objects into Orthogonally Convex Components. Computer Vision and Image Understanding 117(4), 326-341.

11. Biswas, A., P. Bhowmick, M. Sarkar, and B. B. Bhattacharya (2012). A Linear-time Combinatorial Algorithm to Find the Orthogonal Hull of an Object on the Digital Plane. Information Sciences, Elsevier 216. DOI:10.1016/j.ins.2012 176-195.

10. Bhowmick, P., A. Biswas, and B. B. Bhattacharya (2011). On the Representation of a Digital Contour with an Unordered Point Set for Visual Perception. Journal of Visual Communication and Image Representation 22(7), 590-605.

9. Chatterjee, S., R. Karim, A. Biswas, and A. K. Ray (2011). Image Processing of Ultrasound Color Doppler to Characterize Malignant Breast Lesion. Advanced Materials Research Journal (AMR) 403. DOI:10.4028/www.scientific.net/AM 408.830, ISSN:1022-6680, pp 830-834.

8. Chatterjee, S., A. K. Ray, R. Karim, and A. Biswas (2011). Architectural Design to Characterize Malignant Breast Lesion. International Journal of Computer Applications 31(11). DOI: 10.5120/3939-5529, ISBN: 978-93-80865-13-7, 8-15.

7. Dutt, M., A. Biswas, P. Bhowmick, and B. B. Bhattacharya (2011). On Finding an Orthogonal Convex Skull of a Digital Object. International Journal of Imaging Systems and Technology 21(1), 14-27.

6. Dutt, M., A. Sarkar, A. Biswas, P. Bhowmick, and B. B. Bhattacharya (2011). Efficient Word Segmentation and Baseline Localization in Handwritten Documents Using Isothetic Covers. International Journal of Digital Library Systems 2(3), 1-13.

5. Biswas, A., P. Bhowmick, and B. B. Bhattacharya (2010). Construction of Isothetic Covers of a Digital Object: A Combinatorial Approach. Journal of Visual Communication and Image Representation, Elsevier 21(4), 295-310.

4. Pal, S., P. Bhowmick, A. Biswas, and B. B. Bhattacharya (2010). Understanding Digital Documents Using Gestalt Properties of Isothetic Components. International Journal of Digital Library Systems 1(3), 1-25. -

3. Bhowmick, P., A. Biswas, and B. B. Bhattacharya (2008). Thinning-free Polygonal Approximation of Thick Digital Curves Using Cellular Envelope. Electronic Letters on Computer Vision and Image Analysis (ELCVIA) 7(2), 76-95.

2. Biswas, A., P. Bhowmick, and B. B. Bhattacharya (2008). Archival Image Indexing with Connectivity Features using Randomized Masks. Applied Soft Computing, Elsevier 8(4), 1625-1636.

1. Biswas, A., P. Bhowmick, and B. B. Bhattacharya (2008). Multiresolution Shape Codes and Their Applications to Image Retrieval. Electronic Letters on Computer Vision and Image Analysis (ELCVIA) 7(2), 62-75.

PAPERS IN INTERNATIONAL CONFERENCE PROCEEDINGS

74. Raina Paul, Md. Abdul Aziz Al Aman, Apurba Sarkar and Arindam Biswas, Generation of Random Curve Inside an Isothetic Cover of Digital Object, 2021 3rd International Conference on Video, Signal and Image Processing (VSIP 2021), accepted.

73. Raina Paul, Apurba Sarkar, Arindam Biswas,, Finding the Maximum Empty Axis-Parallel Rectangular Annulus, 2020/7/16, International Workshop on Combinatorial Image Analysis, Pages 139-146, Springer, Cham

72. Debapriya Paul, Nilanjan Daw, Nilanjana Dutta Roy, Arindam Biswas (2020) An Automated Dual Threshold Band-Based Approach for Malaria Parasite Segmentation from Thick Blood Smear. In: Mandal J., Bhattacharya D. (eds) Emerging Technology in Modelling and Graphics, pp. 485-500, Springer, Singapore

71. Nilanjana Dutta Roy, Arindam Biswas, Manabendra Dutta Choudhury, Abhijit Mitra, Souvik Ghosh and Rajarshi Lahiri (2019), Detection of Necrosis in Mice Liver Tissue using Deep Convolutional Neural Network, International Conference on Pattern Recognition and Machine Intelligence, 2019/12/17, pp. 32-40.

70. Sharmistha Mondal, Nilanjana Karmakar and Arindam Biswas (2019), Identification of Articulated Components in 3D Digital Objects using Curve Skeleton, International Conference on Pattern Recognition and Machine Intelligence, 2019/12/17, pp. 433-441.

69. Eric Andres, Mousumi Dutt, Arindam Biswas, Gaelle Largeteau-Skapin and Rita Zrour (2019). Digital Two-dimensional Bijective Reflection and Associated Rotation. International Conference on Discrete Geometry for Computer Imagery, 2019, pp. 3-14, Springer

68. Roy N.D., Biswas A. (2019) Early Detection of Proliferative Diabetic Retinopathy in Neovascularization at the Disc by Observing Retinal Vascular Structure. In: Proceedings of the International Conference on ISMAC in Computational Vision and Bio-Engineering 2018 (ISMAC-CVB). ISMAC 2018. Lecture Notes in Computational Vision and Biomechanics, vol 30. pp 1441-1450, Springer, Cham

67. Sabyasachi Mukherjee, Oishila Bandyopadhyay, Arindam Biswas and Bhargab B Bhattacharya (2018). International Workshop on Combinatorial Image Analysis (IWCIA 2018)At: Porto, Portugal, November 22 - 24, 2018.

66. Sabyasachi Mukherjee, Oishila Bandyopadhyay, Arindam Biswas, Bhargab B Bhattacharya (2018) Detection of Osteoarthritis by Gap and Shape Analysis of Knee-Bone X-ray International Workshop on Combinatorial Image Analysis, pp. 121-133, Springer

65. Nilanjana Dutta Roy and Arindam Biswas (2018). Graph Theoretical Characterization of Retinal Vascular Network Finding Minimum Cost Spanning Tree. Computational Intelligence, Communications, and Business Analytics CICBA 2018, pp. 257-266, Springer, Singapore

64. Nilanjana Dutta Roy, Arindam Biswas and Suchismita Goswami (2018). Biometric Template Generation Framework using Retinal Vascular Structure . Computational Intelligence, Communications, and Business Analytics CICBA 2018, pp. 245-256, Springer, Singapore

63. Raina Paul, Apurba Sarkar, and Arindam Biswas (2018). Construction of Simple Isothetic Polygon from a Set of Points. Fifth International Conference on Emerging Applications of Information Technology (EAIT-2018), pp. 1-4, IEEE

62. Ujjwal Kamila, Oishila Bandyopadhyay, and Arindam Biswas (2018). "Detection of Hemorrhagic region in Brain MRI", International Conference on Communication, Computing and Networking, LNNS 46, pp. 383-391, 2018.

61. Sabyasachi Mukherjee, Oishila Bandyopadhyay, Arindam Biswas, Bhargab B. Bhattacharya (2017), "Does Rotation Influence the Estimated Contour Length of A Digital Object?", Pattern Recognition and Machine Intelligence (PReMI), LNCS 10597, pp. 179-186, 2017.

60. Roy N.D., Suchismita Goswami, Sushmita Goswami, Sohini De, Arindam Biswas (2017) Extraction of Distinct Bifurcation Points from Retinal Fundus Images. In: Proceedings of the First International Conference on Intelligent Computing and Communication. Advances in Intelligent Systems and Computing, vol 458, pp. 443-450. Springer, Singapore.

59. M. Dutt, S. Saha, and A. Biswas (2017), A Study on the Properties of 3D Digital Straight Line Segments, In Proceedings of 7th International Conference on Pattern Recognition and Machine Intelligence: PReMI'17, Kolkata, India, LNCS 10597, pp. 212-218, Springer-Verlag, December 5-8, 2017.

58. Karmakar N., Mondal S., Biswas A. (2017) A 3D Curve Skeletonization Method. In: Brimkov V., Barneva R. (eds) Combinatorial Image Analysis. IWCIA 2017. Lecture Notes in Computer Science, vol 10256. Springer, pp. 184-197

57. Dutt, M. and A. Biswas (2016). Boundary and Shape Complexity of a Digital Object. In: 5th International Symposium Computational Modeling of Objects Presented in Images: Fundamentals, Methods, and Applications: CompIMAGE'16, Niagara Falls, New York, USA. Springer-Verlag. Lecture Notes in Computer Science (LNCS), vol 10149. Springer, pp. 105-117.

56. Karmakar, N. and A. Biswas (2016). Construction of an Approximate 3D Orthogonal Convex Skull. In: 6th International Workshop on Computational Topology in Image Context: CTIC 2016, Marseille, France. Vol. 9667. Springer-Verlag. Lecture Notes in Computer Science (LNCS), pp. 180-192.

55. Karmakar, N. and A. Biswas (2016). Shape Matching of 3D Topologically Segmented Objects. In: 6th International Workshop on Computational Topology in Image Context: CTIC 2016, Marseille, France. Vol. 9667. Springer-Verlag. Lecture Notes in Computer Science (LNCS), pp. 170-179.

54. Kundu, D. and A. Biswas (2016). Finding Shortest Isothetic Path inside a 3D Digital Object. In: 5th International Symposium Computational Modeling of Objects Presented in Images: Fundamentals, Methods, and Applications: CompIMAGE'16, Niagara Falls, New York, USA. Springer-Verlag. Lecture Notes in Computer Science (LNCS).

53. Mukherjee, S., O. Bandyopadhyay, and A. Biswas (2016). Automated Brain Tumor Diagnosis and Severity Analysis from Brain MRI. In: 5th International Symposium Computational Modeling of Objects Presented in Images: Fundamentals, Methods, and Applications: CompIMAGE'16, Niagara Falls, New York, USA, Springer-Verlag. Lecture Notes in Computer Science, vol 10149. Springer, pp. 194-207.

52. Phani, S., S. Lahiri, and A. Biswas (2016). A machine learning approach for authorship attribution for Bengali blogs. In: Proceedings of the 2016 International Conference on Asian Language Processing (IALP). IEEE, pp. 271-274.

51. Phani, S., S. Lahiri, and A. Biswas (2016). Personality Recognition in Source Code Working Note: Team BESUMich. In: FIRE (Working Notes). IEEE, pp. 16-20.

50. Phani, S., S. Lahiri, and A. Biswas (2016). Sentiment Analysis of Tweets in Three Indian Languages. In: Proceedings of the 6th Workshop on South

and Southeast Asian Natural Language Processing (WSSANLP2016), Osaka, Japan. Osaka, Japan: The COLING 2016 Organizing Committee, pp. 93-102.

49. Phani, S., S. Lahiri, S. Dutta, and A. Biswas (2016). An Indic Language N-gram Viewer. In: Proceedings of the 8th Annual Meeting of the Forum on Information Retrieval Evaluation, FIRE '16, Kolkata, India. New York, NY, USA: ACM, pp. 32-36.

48. Sarkar, A., A. Biswas, M. Dutt, and A. Bhattacharya (2016). Finding Largest Rectangle inside a Digital Object. In: 6th International Workshop on Computational Topology in Image Context: CTIC 2016, Marseille, France. Vol. 9667. Springer-Verlag. Lecture Notes in Computer Science (LNCS), pp. 170-179.

47. Sarkar, A., A. Biswas, S. Mondal, and M. Dutt (2016). Finding Shortest Triangular Path in a Digital Object. In: 19th IAPR International Conference on Discrete Geometry for Computer Imagery: DGCI'16, Nantes, France. Vol. 9647. Springer-Verlag. Lecture Notes in Computer Science (LNCS), pp. 206-218.

46. Sarkar, A., M. Dutt, and A. Biswas (2016). On Generation of 3D Random Digital Curves. In: 5th International Symposium Computational Modeling of Objects Presented in Images: Fundamentals, Methods, and Applications: CompIMAGE'16, Niagara Falls, New York, USA. Springer-Verlag. Lecture Notes in Computer Science (LNCS).

45. Dutt, M., A. Biswas, and B. B. Bhattacharya (2015). Enumeration of Shortest Isothetic Paths inside a Digital Object. In: 6th International Conference on Pattern Recognition and Machine Intelligence (PReMI'15). Vol. 9124. Warsaw, Poland: Lecture Notes in Computer Science (LNCS), pp. 105 -115.

44. Dutt, M., A. Biswas, and B. Nagy (2015). Number of Shortest Paths in Triangular Grid for 1- and 2-Neighborhoods. In: 17th International Workshop on Combinatorial Image Analysis: IWCIA'15. Vol. 9448. DOI: 10.1007/978-3-319-26145-4 10. Kolkata, India: Lecture Notes in Computer Science (LNCS), pp. 115-124.

43. Karmakar, N. and A. Biswas (2015). Construction of 3D orthogonal Convex Hull of a Digital Object. In: 17th International Workshop on Combina-

torial Image Analysis: IWCIA'15. Vol. 9448. DOI: 10.1007/978-3-319-26145-4 10. Kolkata, India: Lecture Notes in Computer Science (LNCS), pp. 125-142.

42. Phani, S., S. Lahiri, and A. Biswas (2015). Authorship Attribution in Bengali Language. In: Twelfth International Conference on Natural Language Processing (ICON-2015). Trivandrum, India.

41. Sarkar, A., A. Biswas, M. Dutt, and A. Bhattacharya (2015). Detection of Bifurcation Angle in a Retinal Fundus Image. In: Eighth International Conference on Advances in Pattern Recognition (ICAPR), 2015. Vol. 8959. Kolkata, ISI, India: IEEE Explore, pp. 1-6.

40. Sarkar, A., A. Biswas, M. Dutt, and A. Bhattacharya (2015). Generation of Random Digital Curves Using Combinatorial Techniques. In: Conference on Algorithms and Discrete Applied Mathematics: CALDAM'15. Vol. 8959. Kanpur, India: Lecture Notes in Computer Science (LNCS), pp. 286 -297.

39. Sarkar, A., A. Biswas, M. Dutt, and A. Bhattacharya (2015). Generation of Random Triangular Digital Curves using Combinatorial Techniques. In: 6th International Conference on Pattern Recognition and Machine Intelligence (PReMI'15). Vol. 9124. Warsaw, Poland: Lecture Notes in Computer Science (LNCS), pp. 136 -145.

38. Bandyopadhyay, O., A. Biswas, and B. B. Bhattacharya (2014). Long Bone Fracture Detection in Digital X-ray Images based on Concavity Index. In: 16th International Workshop on Combinatorial Image Analysis: IWCIA'14. Vol. 8466. Brno, Czech Republic: LNCS, pp. 212-223.

37. Bera, S., A. Biswas, and B. B. Bhattacharya (2014). A Fast Digital-Geometric Approach for Granulometric Image Analysis. In: 2nd International Conference on Recent Advances in Information Technology: RAIT'14. acccepted. Dhanbad, India: LNCS.

36. Das, B., M. Dutt, A. Biswas, P. Bhowmick, and B. B. Bhattacharya (2014). A Combinatorial Technique for Construction of Triangular Covers of Digital Objects. In: 16th International Workshop on Combinatorial Image Analysis: IWCIA'14. Vol. 8466. Brno, Czech Republic: LNCS, pp. 76-90.

35. Karmakar, N., P. Bhowmick, and A. Biswas (2014). Segmentation of 3D Articulated Components by Slice-based Vertex-weighted Reeb Graph. In: 18th IAPR International Conference on Discrete Geometry for Computer Imagery: DGCI'14. Vol. 8668. Sienna, Italy: Lecture Notes in Computer Science (LNCS), pp. 370-383.

34. Phani, S., S. Lahiri, and A. Biswas (2014). Inter-rater Agreement Study on Readability Assessment in Bengali. In: International Conference On Natural Language Processing And Cognitive Computing. Imphal, India.

33. Roy, N. D., M. Someswar, H. Dalmia, and A. Biswas (2014). Identification of Distinct Blood Vessels in Retinal Fundus Images. In: Computational Modeling of Objects Presented in Images: Fundamentals, Methods, and Applications: CompIMAGE'14. Vol. 8641. Pittsburgh, PA, USA: Lecture Notes in Computer Science (LNCS), pp. 106 -114.

32. Bandyopadhyay, O., A. Biswas, B. Chanda, and B. B. Bhattacharya (2013). Bone Contour Tracing in Digital X-ray Images based on Adaptive Thresholding. In: 5th International Conference on Pattern Recognition and Machine Intelligence, PReMI'13. Vol. 8251. ISI, Kolkata, India: LNCS, pp. 465-473.

31. Mukherjee, A., U. Garain, and A. Biswas (2013). Evaluation of the Graphical Representation for Text-to-Graphic Conversion Systems. In: 10th IAPR International Workshop on Graphics Recognition, GREC 2013. Vol. 8746. Lehigh University, Bethlehem, USA: LNCS, pp. 252-256.

30. Das, J. K., S. K. Saha, and A. Biswas (2012). Depth from Images Of External Outdoor Scenes. In: 8th Indian Conference on Computer Vision, Graphics and Image Processing: ICVGIP'12. Mumbai, India: ACM, New York, USA, pp. 1-7.

29. Dutt, M., A. Biswas, P. Bhowmick, and B. B. Bhattacharya (2012). On Finding Shortest Isothetic Path inside a Digital Object. In: 15th International Workshop on Combinatorial Image Analysis: IWCIA'12. Vol. 7655. Austin, Texas, USA: Lecture Notes in Computer Science (LNCS), Springer, pp. 16-30.

28. Karmakar, N., A. Biswas, and P. Bhowmick (2012). Fast Slicing of Orthogonal Covers Using DCEL. In: 15th International Workshop on Combinato-

rial Image Analysis: IWCIA'12. Vol. 7655. Austin, Texas, USA: Lecture Notes in Computer Science (LNCS), Springer, pp. 16-30.

27. Phani, S., S. Lahiri, and A. Biswas (2012). Culturomics On A Bengali Newspaper Corpus. In: International Conference on Asian Language Processing 2012 (IALP 2012). Hanoi, Vietnam, pp. 237-240.

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India: IEEE CS Press, pp. 219-223.

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6. Bhowmick, P., A. Biswas, and B. B. Bhattacharya (2006). PACE: Polygonal Approximation of Thick Dig- ital Curves Using Cellular Envelope. In: In Proc. of 5th Indian Conference on Computer Vision, Graphics and Image Processing: ICVGIP'06. Vol. 4338. Madurai, India: Lecture Notes in Computer Science (LNCS), Springer, pp. 499-310.

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4. Biswas, A., P. Bhowmick, and B. B. Bhattacharya (2005). MuSC: Multigrid Shape Codes and Their Applications to Image Retrieval. In: In Proc. of International Conference on Computational Intelligence and Security: CIS'05. Vol. 3801. Xian, China: Lecture Notes in Computer Science

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2. Biswas, A., P. Bhowmick, and B. B. Bhattacharya (2005). TIPS: On Finding a Tight Isothetic Polygonal Shape Covering a 2D Object. In: In Proc. of 14th Scandinavian Conference on Image Analysis: SCIA'05. Vol. 3540. Joensuu, Finland: Lecture Notes in Computer Science (LNCS), Springer, pp. 930-939.

1. Biswas, A., P. Bhowmick, and B. B. Bhattacharya (2004). CONFERM: Connectivity Features with Randomized Masks and Their Applications to Image Indexing. In: In Proc. of 4th Indian Conference on Computer Vision, Graphics and Image Processing: ICVGIP'04. Ed. by S. C. B. Chanda and L. Davis. Kolkata, India: Allied Publishers Private Limited, pp. 556-562.

BOOK CHAPTERS

1. Mukherjee, A., U. Garain, and A. Biswas (2014). Diagram Drawing Using Braille Text: A Low Cost Learning Aid for Blind People, Global Trends in Intelligent Computing Research and Development, IGI Global, B. K. Tripathy and D. P. Acharjya (Eds.), Chapter 14, pp. 384-426

2. Biswas, A., S. Pal, P. Bhowmick, and B. B. Bhattacharya (2010). Geometric Analysis and Efficient Indexing of Digital Documents, Machine Learning Techniques for Adaptive Multimedia Retrieval: Technologies, Applications and Perspectives, C. H. Wei.

Papers in National Conferences

1. S. Chatterjee, A. K. Ray, R. Karim, A. Biswas, Architectural Design for Median Filter, IEEE Proceed- ings of the 3rd National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG-2011), pp. 247 250, Dec, 15 17, 2011, Hubli, Karnataka, India.

2. S. Bag, P. Bhowmick, G. Harit, and A. Biswas, Character Segmentation of Handwritten Bengali Text by Vertex Characterization of Isothetic Covers, 3rd National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG 2011), Dec, 15 17, 2011, Hubli, Karnataka, India.

Patents

1. Acharya, T., B. B. Bhattacharya, P. Bhowmick, A. Bishnu, A. Biswas, M. K. Kundu, C. A. Murthy, S. Das, and S. C. Nandy (2008). Minutia Matching using Scoring Techniques". Patent US 7359532 (US).

Invited Talks

1. Expert talk on World Heart Day 2021 on 29.09.2021, organized by Cardiological Society of India, "Digital Application for CVD Detection", CSI, 29th Sep 2021.

2. Workshop on Digital Geometric Algorithms, Shape analysis using digital geometric techniques, IIIT Kalyani, 29th Oct 2018.

3. Insitute Talk: Cyber Security and Ethical Hacking, St. Thomas College of Engineering & Technology, 31st Oct, 2018.

Annexure I

Conferences/Workshops Attended

1. 9th ICIEV, 4th IVPR & 2nd ABC, 26-29 August, 2020, online, Kitakyushu, Japan.

2. IWCIA-2017: (PC Member) 17th International Workshop on Combinatorial Image Analysis, June 19-21, 2017, Plovdiv, Bulgaria, Europe. (attended - session chair to a keynote session, a paper presented)

3. CompIMAGE-2016: (As a session chair) International Symposium CompIMAGE'16 - Computa- tional Modeling of Objects Presented in Images: Fundamentals, Methods, and Applications, Sep 21-23, 2016, Niagara Falls, USA. (attended, session chair and presented a paper)

4. (Member Scientific Committee) WRRPR 2016 : 1st workshop on Reproducible Research in Pattern Recognition, 4 Dec 2016, Cancun (Mexico).

5. (Member of the Review Committee) Tenth Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP) 2016 18 - 22 December, Indian Institute of Technology Guwahati.

6. (Member Review Committee) 5th International Conference on Informatics, Electronics & Vision (5th ICIEV), 13 14 May, 2016, Dhaka, Bangladesh.

7. DGCI-2016:(Member of the review committee) 19th IAPR International Conference on Discrete Geometry for Computer Imagery, Nantes, France, April 18-20, 2016.

8. CTIC-2016:(Member Program Committee) 6th International Workshop on Computational Topol- ogy in Image Context, Marseille, France June 15-17, 2016.

9. CALDAM-2015: (As a member of organizing committee) Conference on Algorithms and DiscreteApplied Mathematics, February 8-10, 2015, Indian Institute of Technology, Kanpur, India. (attended and presented a paper)

10. ICAPR-2015: (As a member of program committee) 8th International Conference on Advances in Pattern Recognition, January 4-7, 2015, Indian Statistical Institute, Kolkata, India.

11. ICACNI-2014: (As session chair) 2nd International Conference on Advanced Computing, Net- working, and Informatics, June 24-26, 2014, St. Thomas' College of Engineering and Technology, Kolkata, India.

12. IWCIA-2014: (As session chair) 16th International Workshop on Combinatorial Image Analysis, May 28-30, 2014, Brno University of Technology, Czech Republic, Europe.

13. WALCOM-2013: (As a member of organizing committee) 7th International Workshop on Algorithms and Computation, February 14-16, 2013, Indian Institute of Technology, Kharagpur, India.

14. ICVGIP-2012: (Attended) The Eight Indian Conference on Computer Vision, Graphics, and Image Processing, December 16-19, 2012, Indian Institute of T echnology, Bombay, India.

15. DGCI 2011: 16th IAPR International Conference on Discrete Geometry for Computer Imagery

16. EAIT 2011: Second International Conference on Emerging Applications of Information Technology

17. ICFHR 2010: International Conference on Frontiers in Handwriting Recognition ICFHR 2010

18. ICCTA-2007: International Conference on Computing: Theory and Applications (ICCTA-2007), Platinum Jubilee of the Indian Statistical Institute, March 5-7, 2007, Kolkata.

19. ICAPR-2007: The Sixth International Conference on Advances in Pattern Recognition (ICAPR- 2007), January 2 - 4, 2007, Indian Statistical Institute, Kolkata.

20. PReMI-2005: 1st International Conference on Pattern Recognition and Machine Intelligence (PReMI 2005). Organized by: Indian Statistical Institute, Kolkata. Dec. 20-22, 2005.

21. SCIA 2005: 14th Scandinavian Conference on Image Analysis, Joensuu, Finland, June 19-22, 2005.

22. Biometrics Workshop 2005: International Workshop on Recent Advances in Biometric Systems. Organized by: IIT, Kanpur. April 15-16, 2005. Major

Speakers: Prof. J. L. Wayman (Director, U.S. National Biometric Test Center, San Jose State University, U.S.A.), Dr. Vinod Chandran (Queensland University of Technology, Australia), Dr. V.K. Chhada (Bhaba Atomic Research Center, Mumbai).

23. VLSI-2005: (As a member of the organizing committee.) 18th International Conference on VLSI Design and 4th International Conference on Embedded Systems. Organized by: Indian Statistical Institute, Kolkata. Taj Bengal, January 3-7, 2005.

24. IWDC-2004: (As a member of the organizing committee.) 6th International Workshop on Dis- tributed Computing. Organized by: IEEE, Calcutta Chapter. Indian Statistical Institute, Kolkata, 27-30 December, 2004.

25. ICVGIP-2004: 4th Indian Conference on Computer Vision, Graphics and Image Processing. Organized by: Indian Unit for Pattern Recognition and Artificial Intelligence (IUPRAI-IAPR) and Indian Statistical Institute. In cooperation with: ACM Siggraph and IIT Bombay. December 16-18, 2004, Kolkata.

Annexure II

Conferences/Workshops Organized

1. PC Member: CTIC 2019: 7th Workshop on Computational Topology in Image Context, Universidad de Malaga, France

2. PC Member: MIKE 2017: 5th International Conference on Mining Intelligence and Knowledge Exploration IDRBT Hyderabad, India, December 13-15, 2017

3. PC Member: ISED2017 (7th International Symposium on Embedded Computing and System Design). Durgapur, India, December 18-20, 2017

4. PC Member: Ninth International Conference on Advances in Pattern Recognition (ICAPR-2017) December 28-30, 2017

5. WoAAA-2016: (Co-Coordinator) Workshop on Advanced Application of Algorithms, 21-23 December, IIEST, Shibpur. (organized)

6. IWCIA-2015:(Program Chair) Seventeenth International Workshop on Combinatorial Image Analysis, November 24-27, 2015, ISI, Kolkata, India. (organized)

7. Research Promotion Workshop on Digital Geometry-2014: (As Coordinator and Speaker) Research PromotionWorkshop on Digital Geometry, June 23-25, 2014, Indian Institute of Engineering Science and Technology, Shibpur, Howrah, India.

8. Research Promotion Workshop-2013: (As Co-convener) Research Promotion Workshop on Introduction to Graph and Geometric Algorithms, March 14-16, 2013, Bengal Engineering and Science University, Shibpur, Howrah, India.

9. Research Promotion Workshop-2013: (As Co-convener) Research Promotion Workshop on Introduction to Graph and Geometric Algorithms, March 14-16, 2013, Bengal Engineering and Science University, Shibpur, Howrah, India.

10. ISED-2012: (As organizing Chair) International Symposium on Electronic System Design, December 19-22, 2012, Bengal Engineering and Science University, Shibpur, Howrah, India.

11. VDAT-2012: (As organizing Chair) 16th International Symposium on VLSI Design and Test, July 1-4, 2012, Bengal Engineering and Science University, Shibpur, Howrah, India.

12. ISAAC 2006: (As a member of the organizing committee) 17th International Symposium on Algorithms and Computation (ISAAC 2006) at Hotel Taj Bengal, Kolkata, India, December 18-20,2006. Hosted by Indian Statistical Institute, Kolkata in association with Indian Association for Research in Computing Science (IARCS) and Computer Science and Engineering Department, Indian Institute of Technology, Kharagpur.

Post Graduate Students

Annexure III

Graduate Students

Annexure IV

Annexure III

Post Graduate Students

COMPLETED

1. 2018: Arnab Chakrabarty

2. 2019: Debanjan Basak

3. 2020: Suman Kumar Bera

ONGOING

1. 2021: Bishwayan Saha "Deriving depth image from 2D image using ML"

2. 2021: Pritam Bikram "Object recognition in video sequences using AI"

Annexure IV

Graduate Students

PROJECTS

1. 2019: Malarial Parasite Classification using Deep learning: Arpita Raj, Khusboo Dohare, Ritesh Kumar Pandey

2. 2019: Detection of Geometric Patterns in Scene using Deep Learning Techniques: Arjun Basu, Sayantan Ray, Riya Srivastava

3. 2018: Face recognition using Deep Learning Methods: Rohitashwa Chakraborty, Vivek Sharma

4. 2018: Object recognition from a video stream: Kanav Mehra, Soumik Pal, Agnibha Chandra

5. 2018: Analyzing patterns in Brain MRIs: Mimat Khalil Kasu, Suprotik Dey

Mini Projects

1. 2018 Fall: GENERATION OF FRACTALS, Sobhan Mondal (Reg.No-510816054), Kainat Kauser Ali (Reg.No-510816059), Adil Mahmood (Reg.No-B08-511116011)

2. 2018 Fall: Study of Digital Spiral, Arjun Basu, Anagh Goswami, Md Jasimuddin

3. 2019 Fall: Determination of straight sjkeleton using Python, Joyoshish Saha, Debraj Das, Sahil Barnwal