

Dr. Jhila Mukherjee

CONTACT INFORMATION

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PRESENT STATUS

- Assistant Professor, Department of Computer Science and Engineering, Adamas University.

RESEARCH INTERESTS

Implementation and exploration of different Computer Aided Diagnosis system that will extends the diagnosis procedure and survival rate of patient in medical domain by analysis different modalities of medical image with several deadly disease using different computer vision and pattern recognition techniques.

EDUCATION

Ph.D(Tech) in Information Technology University College of Science and Technology, (University Of Calcutta), September 2022.

- Research Topic: *Design and Development of an Automated Lung Nodule Risk Prediction model from radiological images*
- Adviser: Dr Amlan Chakrabarti , Dr. Madhuchanda Kar.
- Area of Study: Information Technology

M.Tech in Computer science & Application:, First Class, 73%, University College of Science and Technology, (University Of Calcutta), August 2013.

- Masters project title: *A detailed Study of Different De-noising Techniques on Digital X-ray images for semi automated Cobb Angle Measurement and Development of Training set & Contour Detection model for Automation*
- Adviser: Dr Amlan Chakrabarti

Master in ComputerApplication:, First Class, DGPA=8.38, Academy of Technology, Adisaptagram Hooghly, June 2010.

- Masters project title(6th sem): *Development of Adaptive Thresholding Technique for Edge Detection in Images*
- Adviser: Dr Amlan Chakrabarti & Amitava Nag.
- Masters project title(5th sem): *Genome Analysis-A Bioinformatics matter*
- Adviser: Debasish Biswas

B.SC General:,Second Class, 46.2%, Rishi Bankim Chandra College (University Of Calcutta), July 2006 .

Higher Secondary School Level:,First Divison ,708/1000, WBCHSE(Halisahar High School), June 2002.

Secondary School Level:,First Divison, 584/800, WBCSE(Halisahar Annapurna Balika Vidyalaya), June 2000

FELLOWSHIP

Senior Research Assistant, Centre of Excellence in Systems Biology and Biomedical Engineering(TEQIP-II and TEQIP-III).

EXPERIENCE

- Research Experience: Senior Research Assistant Centre of Excellence in Systems Biology and Biomedical Engineering (TEQIP-II and TEQIP-III) from 02.07.2014-08.12.2020 (6 years 6 months).
- Teaching Experience:
- Multimedia Practical class for MCA and B.Tech Information Technology course, University of Calcutta.
- Operating System Practical class for MCA course, University of Calcutta.
- Assistant Professor at JIS College of Engineering, Kalyani from 09.12.2020 to 01.02.2022.
- Assistant Professor at Department of Computer Science and Engineering, Adamas University, Barasat from 02.05.2022.

PUBLICATIONS

- [1] **Jhilam Mukherjee**, Raka Kundu and Amlan Chakrabarti, "*Variability of Cobb Angle Measurement from Digital X-ray Image Based on Different De-noising Techniques*", ***International Journal of Biomedical Engineering and Technology (IJBET)*** November 2014 published, DOI:10.1504/IJBET.2014.065656, ISSN:1752-6418 (Print), 1752-6426 (Online),
- [2] **Jhilam Mukherjee**, Amlan Chakrabarti, Soharab Hossain Sheikh and Madhuchanda Kar "*Automatic segmentation and classification of Solitary pulmonary Lung Nodules from Computed Tomography images*", Proc of International Conference on 4th international conferences on Emerged Advanced Information Technology, 19-21 December 2014, published , DOI: 10.1109/EAIT.2014.64, ISBN:978-1-4799-4272-5.
- [3] **Jhilam Mukherjee**, Soharab Hossain Shaikh Madhuchanda Kar and Amlan Chakrabarti "*Comparative analysis of image segmentation techniques towards automatic risk prediction of Solitary pulmonary nodules*", Proceedings of 2nd International Doctoral symposium of Applied Computation and Security System, DOI:10.1007/978-81-322-2650-5-11.
- [4] **Jhilam Mukherjee**, Bishwadeep Sikder, Amlan Chakrabarti, Sayan Das, Madhuchanda Kar, *A Novel Technique for Contrast Enhancement of Chest X-ray Images Based on Bio-Inspired Meta-heuristics*, published in Proc of Applied Computation and Security Systems 2017, DOI: 10.1007/978-981-10-8180-4-5.
- [5] **Jhilam Mukherjee**, Triparna Poddar, Bhaswati Ganguli, Madhuchanda Kar, Amlan Chakrabarti, *An Automated Classification Methodology of Sub-centimeter Pulmonary Structures in Computed Tomography Images* **Published in Computers and Electrical Engineering, Elsevier**, DOI: <https://doi.org/10.1016/j.compeleceng.2020.106629>.
- [6] **Jhilam Mukherjee**, Madhuchanda Kar, Amlan Chakrabarti, Sayan Das, *A Soft-Computing based Approach towards Automatic Detection of Pulmonary Nodule*, **Published in Biocybernetics and Biomedical Engineering, Elsevier**, DOI: <https://doi.org/10.1016/j.bbe.2020.03.006>.
- [7] Triparna Poddar, **Jhilam Mukherjee**, Madhuchanda Kar, Bhaswati Ganguli, Amlan Chakrabarti, *A Clinically Applicable Automated Risk Classification model for Pulmonary Nodules*, Published in Proceedings of International Conference on Data Management, Analytics & Innovation, 2019 DOI:10.1007/978-981-13-9364-8-5
- [8] **Jhilam Mukherjee**, Madhuchanda Kar, Amlan Chakrabarti, Sayan Das, *Computer aided diagnosis in early detection of lung cancer* (In press of Elsevier)

- [9] **Jhilam Mukherjee**, Madhuchanda Kar, Sayan Das, Amlan Chakrabarti, *SSHP: Small Sample High Precision in automated risk prediction of pulmonary nodules with an assistive explainable AI* communicated in Artificial Intelligence in Medicine, Elsevier.
- [10] **Jhilam Mukherjee**, Sayan Das, Madhuchanda Kar, Amlan Chakrabarti, *Pulmonary Nodule Image Dataset: A New Aspect in Lung Cancer Diagnosis*, (soon to be applied for Indian copyright)
- [11] **Jhilam Mukherjee**, Madhuchanda Kar, Amlan Chakrabarti, Sayan Das, *A Statistical based Approach towards Analyses of Different morphological features of Solitary Pulmonary Nodule*, has been accepted for oral presentation in 8th Biennial Conference of Indian Society for Study of Lung Cancer, 2018.
- [12] Triparna Poddar, **Jhilam Mukherjee**, *A CAD tool for Automated Detection of Subcentimeter Pulmonary Nodules from CT images*, has been presented as a poster in Tenth International Triennial Calcutta Symposium on Probability and Statistics.
- [13] Aveepsa Sarkar, **Jhilam Mukherjee**, Madhuchanda Kar, Amlan Chakrabarti, *A Graphical Neural Network-based Chatbot Model for Assisting Cancer Patients with Dietary Assessment in Their Survivorship*, Presented in Proceedings of International Conference on Data Management, Analytics & Innovation, 2024

RESEARCH
EXPERIENCE

August 2012 - At Present :

Topics covered in the research activities along with information of research papers mentioned in the following section:

- Exploration of Noise Model for digital X-ray Imaging techniques.(Paper-1).
- Modeling of best preprocessing step for Cobb Angle Measurement of a scoliotic spine.(Paper 1).
- Exploration of best image segmentation techniques to detect lung nodules from CT images automatically. (Paper 2)
- Exploration of State of malignancy of Solitary pulmonary nodule from thoracic CT (paper 3).
- Exploration of Bio-inspired meta-heuristics in chest X-ray images, also introduction of benchmark chest X-ray Database for external research community (Paper 4).
- Detection of very sub-centimeter nodule from thoracic CT images (Paper 5)
- Reduction of False positive detection of Pulmonary Nodule from and high resolution CT images (paper 6).
- Recognition of High-Risk and Low-Risk pulmonary nodule based on different morphological features of Pulmonary Nodule (Paper 7)
- Exploration of pattern recognition techniques to reduce misclassification rate of Vascularized Nodule (Paper 8)
- Introduction of a benchmarking Thoracic CT Database for pulmonary nodule for external research community (Paper 9).
- Implementation of Benchmarking dataset "Swash Thoracic Image Dataset", available at (<http://www.cu-coe.in/datalist.php>). This image dataset will help to implement more accurate Computer Aided Diagnosis System for lung cancer.
- An automated tool for physicians to analysis Lung CT images. The tool consist of the research work stated above.

PROFESSIONAL MEMBERSHIPS

- The Institute of Electrical and Electronics Engineers(IEEE).
 - Engineering in Medicine and Biology Society from March 2017.
- Pattern Recognition Society
 - International Institute of Pattern Recognition from March 2017
 - Indian Data Science Association
 - Society for Data Science

PROFESSIONAL ACTIVITIES

- Organizing Committee member of *2nd International Doctoral Symposium on Applied Computation And Security Systems, 2015* jointly organized by University of Calcutta, India and AGH University of Science and Technology, Poland.
- Organizing Committee member of *3rd International Doctoral Symposium on Applied Computation And Security Systems, 2016* jointly organized by University of Calcutta, India and AGH University of Science and Technology, Poland.
- Organizing Committee member of **2 Days Workshop on Biomedical Signal Processing**
- Organizing Committee member of **6 Days Workshop on Machine Learning and Its Application**

REVIEWER OF PAPERS

- Springer Conference on 1st International Doctoral symposium on Applied Computation and Security Systems [ACSS2014]. ISSN: 2194-5357.
- Springer Conference on 3rd International Doctoral symposium on Applied Computation and Security Systems [ACSS2016]. ISSN: 2194-5357.
- Springer Conference on 1st International Doctoral symposium on Applied Computation and Security Systems [ACSS2018]. ISSN: 2194-5357.
- International Conference on Intelligent Computing and Smart Communication[ICSC 2019].
- Innovation and Research in Biomedical Engineering, Journal-Elsevier.
- Computers in Biology and Medicine, Journal-Elsevier.
- IEEE INDICON 2021
- 3rd International Conference on Data Science and Applications (ICDSA 2022)
- International Conference on Advances in Data Science and Computing Technologies (ADSC-2022).
- 4th International Conference on Data, Engineering and Applications 2022 (IDEA-2k22).
- Seventh International Conference on Data Management, Analytics and Innovation - ICDMAI 2023.

MEMBER OF TECHNICAL PROGRAM COMMITTEE:

- 4th International Conference on Data, Engineering and Applications 2022 (IDEA-2k22).
- 1st International Conference on Data Analytics and Insights 2023 (ICDAI 2023)

HARDWARE AND

SOFTWARE SKILLS Computer Programming:

- C, Matlab programming ,Java,PI/SQL, PhP, UNIX, R, Python.

Productivity Applications:

- \TeX (\LaTeX , \BibTeX), most common productivity packages (for Windows, OS X, and Linux platforms)

Operating Systems:

- Microsoft Windows family, Linux, and other UNIX variants

EXPERTISE

Computer Science and Engineering:

- Digital Image processing by Matlab and Python, Image Binarization, Pattern Recognition, Data Analysis using R and Python

CONFERENCE,
SEMINAR &
WORKSHOP
ATTENDED

- *Three-Day Workshop on “Embedded System Design: Recent Trends and Techniques” 08-10 March,2013* organized by University of Calcutta
- *Three-Day Workshop on “Recent Trends in Multimedia Technology” 10-12 July 2013* organized by RCC Institute of Information Technology
- *One Day Seminar of “IEEE Special Lecture Series” on Automatic Anatomy Recognition, Digital Topology and Geometry and their Applications, Formal Methods for Embedded System Design 9th December,2013* organized by Jadavpur University.
- ACSS 2014 at Pride Hotel Rajarhat, jointly organized by University of Calcutta, Kolkata, India and AGH University of Science and Technology, Poland.
- *One-Day Workshop on “Biomedical Instrumentation” 14th August,2014* organized by University of Calcutta.
- *One-Day Author Workshop on 20 November,2014*, jointly organized by Springer & University Calcutta.
- EAIT 2014 at Indian Statistical Institute, jointly organized by Indian Statistical Institute and Computer Society of India.
- NALCCON 2015 at CII auditorium, SaltLake, organized by Indian Society for study of Lung cancer.
- *Two-Day Workshop on “Biomedical Instrumentation and Signal Processing” 6-7 May,2016* organized by Centre of Excellence in Systems Biology and Biomedical Engineering, University of Calcutta.
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- *Six-Day Workshop on “Machine Learning and It’s Application” 11-16 July,2016* organized by Centre of Excellence in Systems Biology and Biomedical Engineering, University of Calcutta.
- ACSS 2016 at Pride Hotel Rajarhat, jointly organized by University of Calcutta, Kolkata, India and AGH University of Science and Technology, Poland.
- Two days workshop on Modelling, Fabrication, and characterization of Bio-electronic Devices, circuits and Systems on 30-31 August, 2016.
- *One Day Workshop on Biomedical Instrumentation, October 21,2016* Organized by Department of Applied Electronics and Photonics, University of Calcutta.
- 5 Days Winter School on “Optimizing Techniques”, 15-20 December 2016 organized by ISI, Kolkata.
- *3 Days Workshop on “Quantitative Methods for Public Health Researchers in SAARC Countries”, December 28-30,2016.*, Organized by Department of Statistics University of Calcutta.
- IRISS 2017, ACM India Annual Events, Jointly Organised by University of Calcutta and Amity University Kolkata.
- ACSS 2017 at National Institute of Technology, Patna, jointly organized by NIT Patna, University of Calcutta, Kolkata, India and AGH University of Science and Technology, Poland.
- Workshop on Women in Smart Computing, Bhubaneswar, jointly organized by KIIT University, University of Calcutta and ACM-W, Eastern Region.
- Representing University of Calcutta in Smart India Hackathon, 2018, Hubli, Karnataka, organized by Ministry of Human Resource and Development.
- 1st ACM-India Grad Cohort, IIT Bombay
- An Interactive Workshop on Research Methodology: What they expect you to know

but are never taught, organised by Kolkata Haematology Education & Research Initiative.

COLLABORATION

- Prof. Amlan Chakrabarti, Professor, A.K.Choudhury School of Information Technology, University of Calcutta; Research Area: Medical Image Analysis.
- Dr. Madhuchanda Kar, Clinical Director, Department of Oncology, Peerless Hospital, Kolkata; Research Area: AI in Precision Oncology.
- Dr. Sayan Das, Senior Consultant, Department of Radiology and Interventional Radiology, Peerless Hospital, Kolkata; Research Area: Medical Image Analysis.
- Ms. Paramita Ray, Assistant Professor, Dinabandhu andrews institute of technology and management; Research Area: "Clinical Text Data Analysis".
- Dr. Krishnendu Guha, Assistant Professor, University Colloge Cork, Ireland; Research Area: Security in Telemedicine Technology

PROJECT SUPERVISION

- *"An Explainable AI-based model for Automated Identification of Squamous Cell Carcinoma Using Oral Histopathological Images."*: M.Tech project.
- *Development of an automated Web-based Software tool for risk prediction of Pulmonary nodules from Thoracic Computed Tomography Images.*:MCA project.
- *"An Active Learning-based model for automated detection of Pneumonia from X-ray images."*: M.Tech project.
- *"Development of an Interactive Healthcare Information portal for the citizen of West Bengal."*: B.Tech Project
- *"An IoT-based model for smart Farming"*: BCA project.

INTERSHIP SUPERVISION

- Ms. Archita Mazumdar (Department of Bioinformatics, Pune University.)
- Ms. Asmita Mukherjee (Department of Computer Science and Engineering, KIIT University, Bhubaneswar)
- Mr. Raj Swarmin (Department of Computer Science and Engineering, Institute of Engineering and Management, Kolkata)
- Ms. Gitanjali Paul (Department of Information Technology, Institute of Engineering and Management, Kolkata)
- Mr. Bishwadeep Sikder (Department of Computer Science and Engineering, Institute of Engineering and Management, Kolkata)
- Mr. Soham Majumdar (Department of Computer Science and Engineering, Institute of Engineering and Management, Kolkata)
- Ms. Diksha Jha (Department of Computer Science and Engineering, Institute of Engineering and Management, Kolkata)
- Mr. Ashish Sarkar (Department of Computer Science and Engineering, Institute of Engineering and Management, Kolkata)
- Mr. Nitesh Singh (Department of Computer Science and Engineering, Institute of Engineering and Management, Kolkata)
- Ms. Avipsha Sarkar (Department of Computer Science and Engineering, Institute of Engineering and Management, Kolkata)

NATIONAL LECTURE	<ul style="list-style-type: none"> • Delivered Lecture on National Seminar of "Digital Image Processing and Machine Learning", Organised by Dinabandhu Andrews Institute of Technology & Management; Title "Medical Image Modalities, Processing, Challenging on CAD Development", July 29, 2018. • Delivered Lecture on Lung Cancer Awareness Program, "Lung Cancer Hope-Hype?", Organised by Manami Cancer Care, an NGO for cancer patients; Title "Application of AI in Lung Cancer" on 4th February, 2022, World Cancer Day.
AWARDS	<ul style="list-style-type: none"> • Triparna Poddar, Jhilar Mukherjee, <i>A CAD tool for automatic detection of Subcentimeter Nodule from CT images</i>, achieved third prize in Tenth Triennial Calcutta Symposium, 2019 (Poster)
PREFERABLE SUBJECTS:	<ul style="list-style-type: none"> • Data analytics and data mining • Computer Vision • Artificial Intelligence • Software Engineering • Computer Graphics • Data Structures • C++ • Digital Image Processing • Numerical Methods • Mobile Computing • Social Network Analysis
ACADEMIC ACTIVITIES:	<ul style="list-style-type: none"> • Question Paper setter of Computer Vision, Digital Image Processing, Mobile Computing of Under graduate and post graduate courses of JIS College of Engineering (An Autonomous Institute). • Examiner of of Computer Vision, Digital Image Processing, Mobile Computing of Under graduate and post graduate courses of JIS College of Engineering (An Autonomous Institute). • Routine Coordinator of the department.
EXTRA-CURRICULAR ACTIVITY	<ul style="list-style-type: none"> • YouTuber- Channel Name "Health Informatics". • Participated in Radio Talk show "Niramoy" on Air Gitanjali, Topic: "How AI assist doctor in early detection of cancer" on 4th February, 2022, World Cancer Day. • Attach with Manami Cancer Care an NGO involved in survivor of cancer patient.
REFERENCES AVAILABLE TO CONTACT	<p>Dr. Amlan Chakrabarti (e-mail: acakcs@caluniv.ac.in; phone:+919831129520)</p> <ul style="list-style-type: none"> • Professor & Coordinator & Dean of Technology, A.K.C.S.I.T, University of Calcutta, Kolkata, India ★ <i>Dr. Chakrabarti was my PhD supervisor .</i> <p>Dr. Madhuchanda Kar (e-mail: madhuchandakar@yahoo.com; phone:+919830155915)</p> <ul style="list-style-type: none"> • Clinical Director, Department of Oncology, Peerless Hospitex Hospital, Kolkata, India ★ <i>Dr. Kar was my PhD supervisor .</i> <p>Dr. Bhaswati Ganguli (e-mail: bgstat@gmail.com; phone:+9748581822)</p> <ul style="list-style-type: none"> • Professor, Department of Statistics, University of Calcutta, Kolkata, India ★ <i>Dr. Ganguli was my Research Collaborator.</i>