Panthadeep Bhattacharjee

FULL CURRICULUM VITAE

Present Affiliation

• National Institute of Technology, Rourkela

Department of Computer Science and Engineering, NIT Rourkela

Rourkela, India July 2023 – Present

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Designation:: Assistant Professor Nature of job:: Teaching/Research

RESEARCH INTERESTS

- Developing incremental data mining algorithms with focus on Clustering and Anomaly detection; Data Mining; Machine Learning; Human Computer Interaction.
- Brief description: I had primarily worked in designing incremental algorithms for handling dynamic data for the purpose of mining clusters and outliers. In course of my research uptil now, I had developed four incremental mining algorithms, out of which three are related to clustering and one is an outlier detection algorithm. Among the four algorithms, two are exact incremental and the remaining are approximate incremental algorithms. The updates to this methods are made in batches as well as point-based While designing incremental algorithms, It is important to know about the nature of the state-of-the-art, before we attempt to design its incremental version. To the best of our observation, there is no standard framework to produce the dynamic extension of the naive methods. The heavier components of the benchmark is recalibrated to reduce the time complexity, while the lesser intensive components are kept intact. I have also conducted one of the most comprehensive studies about density-based clustering algorithms that were proposed since 1996 onwards ranging over a period of 23 years.

As a part of my current research, I am studying various techniques to find communities within complex networks. I am also working on predicting priority-based layer wise connections in social-networks using density-based clustering. I am also collaborating with my colleagues from other institutes where I can contribute through my expertise in their domain of work.

• Visit here for details.

EXPERIENCE

• Indian Institute of Information Technology, Guwahati

Assistant Professor, Computer Science and Engineering

Guwahati, India July 2022 - July 2023

- o Courses taught: Continual Learning, Cloud Computing Lab, Software Engineering, Software Engineering Lab
- Kalinga Institute of Industrial Technology (KIIT) Deemed to be University Bhubaneswar, India Assistant Professor (II), School of Computer Engineering July 2020 July 2022
 - Courses taught: Design Analysis of Algorithms (DAA), Operating Systems (OS), Computer Programming Lab, Automata and Formal Language (AFL)
 - Innovative teaching methodology: Conducted online classes using various virtual platforms.
- Indian Institute of Technology, Guwahati

 $Teaching\ Assistant,\ Dept.\ of\ CSE$

Guwahati, India Aug 2014 - May 2019

- Courses handled: Operating Systems (CS558/CS548), Data Mining (CS568), Databases lab (CS345), Computer Vision and Machine Learning (CS574), Computer Graphics (CS461), Computing Lab (CS110).
- Kalinga Institute of Industrial Technology (KIIT) Deemed to be University

 Assistant Professor (I), School of Computer Engineering

 June 2012 Dec 2013
 - Courses taught: Introduction to Computing/C language, C Programming Lab, Principles of Programing Language (PPL), Theory of Computation (TOC), Object Oriented Programming (C++) lab.
 - Innovative teaching methodology: Organized seminars for the PPL course as well as the TOC course as a part of interactive classroom teaching.

• **Recognition**: Received a letter of appreciation from University authority for obtaining an annual rating point score of 4.11 out of 5 based on the student's feedback in the School of Computer Engineering for the academic session 2012-2013.

• National Institute of Technology, Durgapur

Teaching Assistant, Dept. of CSE

Durgapur, India Jan 2012 - May 2012

• Courses handled: C programming.

EDUCATION

• Indian Institute of Technology Guwahati

Guwahati, India

PhD. in Computer Science and Engineering

Jan 2014 - Feb 2020

- o Broad Research Area: Data Mining.
- Thesis title: "Density-Based Mining Algorithms for Dynamic Data: An Incremental Approach".
- o Thesis Supervisor: Dr. Pinaki Mitra, Dept. of CSE, IIT Guwahati.
- \circ Course work CPI: 7.92/10.
- Thesis submitted on: 26th of February 2020.
- o Thesis Defense / Viva-Voce seminar on: 1^{st} of February 2021.
- \circ **Degree awarded on**: 9^{th} of February 2021.

• National Institute of Technology Durgapur

Durgapur, India

Master of Technology in Computer Science and Engineering

Aug 2010 - May 2012

- Specialization: Information Technology.
- o Thesis title: "Design of Optimal Virtual Keyboard in Bengali".
- Thesis Supervisor: Dr. Sanghita Bhattacharjee, Dept. of CSE, NIT Durgapur.
- **Overall CGPA**: 8.98/10.
- \circ **Recognition**: Secured an overall 3^{rd} rank in that respective batch after the completion of programme.

• Assam University Silchar

Silchar, India

Bachelor of Technology in Information Technology

Aug 2006 - May 2010

- Affiliated School: Triguna Sen School of Technology.
- Project title: "Design of a Tool for String Matching Using Regular Expression".
- Project Supervisor: Dr. Mousum Handique, Dept. of CSE (formerly IT), Assam University Silchar.
- Overall percentage: 80.49%.
- \circ **Recognition**: Secured an overall 3^{rd} rank in that respective batch after the completion of programme.

• Cotton College

Guwahati, India

Higher Secondary (12th)

July 2003 - Mar 2005

- o Board: Assam Higher Secondary Education Council (AHSEC).
- Stream: Science.
- o Subjects: Physics, Chemistry, Mathematics, Statistics, English, Alt. English.
- \circ 12th percentage: 73.8%.
- Recognition: Letter marks in Physics and Chemistry.

• Happy Child High School

Guwahati, India

 $Matriculation (10^{th})$ June 2003

- o Board: Board of Secondary Education Assam (SEBA).
- \circ 10th percentage: 81.5%.
- Recognition: Letter marks in General Science, General Mathematics, Social Studies, Advanced Mathematics.

Membership in Professional Bodies

• Member ACM

Association of Computing Machinery

November 2016 - Present

- o Membership id:: 9414081
- Category:: Professional member.

• Kisan Darshan, an agricultural/farming venture

Raipur, India

Based out of Raipur, India.

October 2020 - Present

- **Project goal:**: To create a platform for farmers, consumers and investors for seamless buying and selling of agricultural products along with storekeeping and product recommendation.
- \circ **Role:** Honorary consultant.
- Founder:: Mr. Praveen Kumar Sharma https://www.linkedin.com/in/praveen-sharma-59635941/
- **URL:**: https://www.ekisandarshan.in/

• String Matching Application

Silchar, India

Dept. of IT, Assam University Silchar

Feb 2010 - May 2010

- Project goal: Designing of a tool for String Matching using Regular Expression.
- \circ **Role**: Developer.
- o Tools used: HTML, PHP, MySQL, WAMP Apache Server, AJAX, JavaScript.

• Virtual Keyboard in Bengali

Durgapur, India

May 2011 - May 2012

- Dept. of CSE, NIT Durgapur
 - o Project goal: Designing of Virtual Keyboard in Bengali language for ensuring faster text entry rate.
 - o Role: Developer, Analyzer.
 - o Tools used: Visual C# Studio, C#.

PRACTICAL TRAINING

• MED TECH 2022, AIIMS, Guwahati

Guwahati, India

November 2022

- Dept. of Orthopaedics, AIIMS Guwahati
 - Training goal: Workshop on various advances in medical science.
 - Role: Delegate, participant.
 - o Tools used: Visual demonstration.

• Indian Institute of Technology, Guwahati

Guwahati, India

Apr 2022

- $Students\ Academic\ Board\ (SAB),\ IIT\ Guwahati$
 - Training goal: Workshop on Python for Scientific Computing and Data Science.
 - $\circ\,$ Role: Learner, participant.
 - o Tools used: Visual demonstration.

• Indian Statistical Institute, Kolkata

Kolkata, India

Aug 2015

- o **Training goal**: Workshop on Big Data, Hadoop, Map-Reduce, Machine Learning.
- o Role: Learner, participant.

Machine Learning Unit

o Tools used: Visual demonstration.

• KIIT Deemed to be University

Bhubaneswar, India

Sept 2013

- School of Computer Engineering
 - Training goal: Workshop on MATLAB, to gather a hands on experience.
 - Role: Learner, participant.
 - o Tools used: Matlab.

• Excoflare Software Technologies Pvt. Ltd

Guwahati, India

Guwahati Branch

 $June\ 2009\ \hbox{--}\ July\ 2009$

- Training goal: Designing a repository for various data resources.
- o Role: Developer.
- Tools used: HTML, PHP, MySQL, WAMP Apache Server, JavaScript.

- Languages: C, C++, HTML, PHP, SQL, C#, Bash scripting, Python, Matlab.
- Softwares used: Microsoft Office, Libre Office, Visual C# Express 2010, Oracle 9G, 8085 Simulator, Altera Quartus, TexStudio, MathWorks.
- Operating System: Windows XP, Windows 7/10/11, Linux Ubuntu 11-20.

Positions of Responsibility

• Role: Host, frame questions.

Assam University Silchar

o Role: Host.

Workshop on "Cyber Security", School of Technology

• Panel member, RSW-2024 NIT Rourkela Research Scholar's week, NIT Rourkela May 2024 o Role: Panel Member • PC member, IT track, ICDCIT-2024 Bhubaneswar School of Computer Engineering, KIIT-DU Bhubaneswar January 2024 • Role: Program Committee member/Reviewer. • Coordinator, Short Term Course, RTCV-2023 NIT Rourkela Recent Trends in Computer Vision, Dept. of CSE, NIT Rourkela December 2023 o Role: Coordinator. • Technical Program Committee member, IEEE GCON-2023 IIT Guwahati Dept. of CSE, IIT Guwahati June 2023 o Role: Paper reviewer. • Students Gynkhana Council (SGC) elections IIIT Guwahati, India April 2018 IIIT Guwahati o Role: Electoral officer. • Technical Program Committee member, IEEE ISACC-2023 Silchar, India Dept. of CSE, Assam University Silchar Feb 2023 o Role: Paper reviewer. • AIDSCV research group coordinator, IIIT Guwahati IIIT Guwahati Artificial Intelligence, Data Science, Computer Vision Sept 2022-Present • Role: Coordinator, supervision, invited talks. • 4th CALDAM and Indo-Canadian Pre-Conference School IIT Guwahati, India IIT Guwahati Feb 2018 • Role: Volunteer/Organizer. • Conducting Programming Event, School of Technology Silchar, India Engineer's Day, Assam University Silchar Sept 2008

Silchar, India

Mar 2008

Conducted by AIMA

• Selected for Institutional Research Seed Grant NIT Rourkela Seed money for new faculties Jan 2024 • Achievement: Grant sanctioned o Budget: Rs. 2 lacs Selected for D & I Track Scholarship, ACM CoDS-COMAD'24 IIIT Bangalore, India IKDD/ACM CoDS-COMAD conference 2024 Jan 2024 • Achievement: Received the scholarship/travel grant to attend the conference in Diversity and Inclusion track. • Selected for D & I Track Scholarship, ACM CoDS-COMAD'23 IIT Bombay, India IKDD/ACM CoDS-COMAD conference 2023 Jan 2023 • Achievement: Received the scholarship among top 50 participants to attend the conference in Diversity and Inclusion track. • Selection for a Post-doctoral position (FEUP) Porto, Portugal Faculty of Engineering, University of Porto, QS (2022): 295 May 2022 • **Achievement**: Got offer from FEUP for a Post-doctoral position. • Project title: "Generating Artficial Data to Understand ML Algorithms". • ICDCIT-22, 1st PhD. Research Symposium KIIT-DU Bhubaneswar, India Conducted by KIIT-DU Bhubaneswar Jan 2021 • Achievement: Best thesis award. • Intra IIT Debate Competition IIT Guwahati, India Conducted by Youth Empowerment Club (YEC), IIT Guwahati Jan 2019 \circ **Achievement**: Winner 2^{nd} prize. • ADCOM'18-JAM-AI Design Challenge for Artificial Intelligence IIIT Bangalore, India Conducted on the sidelines of ADCOM'18 Conference Sept 2018 • Achievement: Winner (Team event). • Obtained Institute funding for pursuing research IIT Guwahati, India Dept. of CSE, IIT Guwahati Jan 2014 • Achievement: Regular Doctoral Research Scholar at the Dept. of CSE, IIT Guwahati. • Inter University Debate Competition Silchar, India Com Fest'08, Assam University Silchar Apr 2008 \circ **Achievement**: Winner 2^{nd} prize. • Inter School Essay Writing Competition Guwahati, India Feb 2002 Lions Club of Guwahati \circ **Achievement**: Winner 2^{nd} prize. Competitive Examinations Qualified • All India Engineering Entrance Examination (AIEEE) India Conducted by CBSE May 2006 • Graduate Aptitude Test in Engineering (GATE) India Conducted by IITs/IISc Mar 2012 North East India • North Eastern Regional Institute of Science and Technology (NERIST) Conducted by NERIST June 2006 • West Bengal Joint Entrance Examination (WBJEE) India Conducted by WBUT $June\ 2006$ • Sikkim Manipal Institute of Technology (SMIT) Entrance Examination India Conducted by SMU June 2006 • Management Aptitute Test (MAT) India

Feb 2010

• Book/Book Chapters:

Chapter title: "Density-Based Mining Algorithms for Dynamic Data: An Incremental Approach";
 Studies in Computational Intelligence (1028), Book: Intelligent Technologies: Concepts, Applications,
 and Future Directions, Chapter 13, pages 313-335, Springer (SCI), Panthadeep Bhattacharjee,
 Pinaki Mitra. DOI: 10.1007/978-981-19-1021-0. URL:
 https://link.springer.com/chapter/10.1007/978-981-19-1021-0_13

• Journals:

- o "BiMass: An approximate batch-incremental clustering using mass-based dissimilarity", pre-print version, Research-square, **Panthadeep Bhattacharjee**, Sandeep Vidyapu, Pinaki Mitra, March 2024. DOI: 10.21203/rs.3.rs-4053070/v1, URL: https://www.researchsquare.com/article/rs-4053070/v1
- "KAGO: An Approximate Adaptive Grid Based Outlier Detection Approach using Kernel Density Estimate", Pattern Analysis and Applications, Springer (SCI-e), Panthadeep Bhattacharjee, Ankur Garg, Pinaki Mitra, June 2021, ISSN 1433-7541, Volume 24, pages 1825-1846. DOI: 10.1007/s10044-021-00998-6, URL: https://link.springer.com/article/10.1007/s10044-021-00998-6
- "iMass: An Approximate Adaptive Clustering Algorithm for Dynamic Data Using Probability Based Dissimilarity", Frontiers of Computer Science (FCS), Springer/Higher Education Press (SCI-e),
 Panthadeep Bhattacharjee, Pinaki Mitra, October 2020, ISSN 2095-2236 (Online), Volume 15:
 Issue 2, pages 1-3 (152314). DOI:10.1007/s11704-019-9116-y, URL:
 https://link.springer.com/article/10.1007/s11704-019-9116-y
- "A Survey of Density Based Clustering Algorithms", Frontiers of Computer Science, Springer/Higher Education Press (SCI-e), Panthadeep Bhattacharjee, Pinaki Mitra, September 2020, ISSN 2095-2236 (Online), Volume 15: Issue 1, pages 1-27 (151308). DOI:10.1007/s11704-019-9059-3, URL: https://link.springer.com/article/10.1007/s11704-019-9059-3
- o "BISDBx: towards batch-incremental clustering for dynamic datasets using SNN-DBSCAN", Pattern Analysis and Applications, Springer (SCI-e), **Panthadeep Bhattacharjee**, Pinaki Mitra, July 2019, ISSN 1433-7541, Volume 23: Issue 2, pages 975-1009. *DOI*: 10.1007/s10044-019-00831-1, URL: link.springer.com/article/10.1007/s10044-019-00831-1
- "Designing of a tool for String Matching using Regular Expressions", International Journal of Computer Science and Network (IJCSN), D-LAR Labs Publisher, Panthadeep Bhattacharjee, Hussain Ahmed Choudhury, Nasima Akhtar Laskar, December 2013, ISSN 2277—5420, Volume 2: Issue 6, pages 103-107, DOI: 10.1.1.402.3783, URL: https://ijcsn.org/IJCSN-2013/2-6/IJCSN-2013-2-6-142.pdf
- "Optimal Design of a Bengali Virtual Keyboard seeking improved user perception for a better text entry rate (Human Computer Interaction)", UACEE International Journal of Advances in Computer Science and its Applications (IJCSIA), IRED Publisher, Panthadeep Bhattacharjee, Lalit Kumar Vashishtha, June 2013, ISSN 2250 3765, Volume 3: Issue 2, pages 308-312, DOI: 10.15224/978-981-07-5939-1-53, URL: http://journals.theired.org/journals/paper/details/1690.html

• Conferences/Workshops/Forums:

 "Incremental Mining Algorithms: Adapting to Dynamic Data", 24th International Conference of Advanced Computing and Communications (ADCOM'18) (Core Rank B), PhD Forum, Bangalore (India), ACCS, Panthadeep Bhattacharjee, Pinaki Mitra, September 2018, ISBN 978-93-5321-421-0, pages 110-113. URL: https://accsindia.org/adcom-2018-conference-proceedings/

- "Batch Incremental Shared Nearest Neighbour Density-Based Clustering Algorithm for Dynamic Datasets", 39th European Conference on Information Retrieval (ECIR'17) (Core Rank A), Aberdeen, UK, Springer, Panthadeep Bhattacharjee, Amit Awekar, April 2017, ISSN 1611-3349 (electronic), pages 568-574. DOI: 10.1007/978-3-319-56608-5, URL: https://link.springer.com/chapter/10.1007/978-3-319-56608-5_50
- "Optimal Design of a Bengali Virtual Keyboard seeking improved user perception for a better text entry rate (Human Computer Interaction)", 2nd International Conference on Advances in Information Technology (AIT'13), Bangkok (Thailand), IRED Publisher, Panthadeep Bhattacharjee, Lalit Kumar Vashishtha, April 2013, ISBN 978-981-07-5939-1, pages 135-139. DOI: 10.15224/978-981-07-5939-1-53. URL: https://seekdl.org/conference/paper/optimal-design-of-a-bengali-virtual-keyboard-seeking-improved-user-perception-for-a-better-text-entry-rate-h
- "Design of Optimal Virtual Keyboard in Bengali (Human Computer Interaction)", 2nd National Conference on Computing and Systems (NACCS'12), University of Burdwan, West Bengal (India),
 Panthadeep Bhattacharjee, Abhishek Das, Monalisa Sarma, Sanghita Bhattacharjee, March 2012, ISBN 978-93-80813-18-9, pages 163-171.

Articles Reviewed

- Reviewer of paper(s) id: SADH-D-24-01438, titled "Decoding EEG Data with Deep Learning for Intelligence Quotient Assessment" in Sadhana.
- Reviewer of paper(s) titled: "A Novel Distributed Computing Model Using Smartphone Computing As Services", IEEE-GCON 2023.
- Reviewer of paper(s) titled: "The COVID'19 Dashboard and Implementation of Face Mask Detection and Social Distancing Detection Algorithm is in need of your feedback"; "Automated Nuclei Analysis from Digital Histopathology is in need of your feedback", IEEE-ISACC 2023.
- Subreviewer of Paper id: 31, 33 in ICICSA 2022, NIT Silchar.
- Reviewer of Book Titled "Histopathological Image Analysis in Medical Decision Making" for Book Chapter 9: "Analysis of Color Image Encryption Using Multidimensional Bogdanov Map", ISBN13: 9781522563167, ISBN10: 1522563164, EISBN13: 9781522563174, pages: 305. DOI: 10.4018/978-1-5225-6316-7, URL: https://www.igi-global.com/book/histopathological-image-analysis-medical-decision/199088.
- Subreviewer of Paper id: 44,60,121,173 in IEEE ICTAI 2016, San Jose, California, USA.
- Reviewer of the Paper Titled "Clustering Large Data Sets with Incremental Estimation of Low-density Separating Hyperplanes"; Journal of Statistics and Computing (Springer), October 2021.

OUTREACH

• Technical session for ML-APP-24

NIT Rourkela

 $Summer\ school$

May 2024

- o Topic: Unsupervised Learning: K-Means and DBSCAN Clustering algorithm
- o Role: Invited speaker/Resource person.

• Introduction to Data Science Python (IDSP-24)

NIT Rourkela

May 2024

 $Summer\ school$

• Topic: Introduction to Machine Learning Algorithms: Linear Regression, Logistic

- Regression and K-Nearest Neighbors
- Role: Invited speaker/Resource person.

• Research Conclave on Global Transformation (ReconGT-24)

NIT Calicut

April 2024

 $Virtual\ mode$

- o Topic: Incremental Density-Based Clustering Algorithms: Looking beyond stereotypes
- Role: Invited speaker/Resource person.

• Symposium on Progress in High Performance Computing (PHPC-24)

NIT Rourkela February 2024

FTBI, NIT Rourkela

- Topic: Incremental Density-Based Clustering Algorithms: Looking beyond stereotypes
- Broad area: Application of HPC in ML
- Role: Invited speaker/Resource person.

• Short Term Course (AMLST-24)

NIT Rourkela

January 2024

Dept. of EEE, NIT Rourkela

- o Topic: Societal and technological impact courtesy a robust incremental clustering algorithm
- o Broad area: Application of ML in Sustainable Technologies
- Role: Invited speaker/Resource person.

• Faculty Development Programme (FDP'23) & Workshop

IIIT Kottavam

June 2023

Dept. of CSE, IIIT Kottayam

- o Topic: Machine Learning with focus on unsupervised incremental learning algorithm
- o Broad area: NextGen Computing for Big Data Applications
- Role: Invited speaker/Resource person.

• Workshop on Computer Architecture and Machine Learning

SITM Guwahati

September 2022

Scholar's Institute of Technology and Management

- $\circ\,$ ${\bf Topic}:$ Incremental Density-Based Clustering Algorithm
- o Broad area: Machine Learning
- $\circ\,$ Role: Invited speaker/Resource person.

• 2^{nd} Global Conference On Advanced Nanotechnology & Nanomaterials

Virtual Event

June 2022

Peers Alley Conferences

- o Topic: A survey of density based clustering algorithms
- Broad area: Harnessing Light on Nanotechnology Breakthroughs
- $\circ\,$ Role: Invited a cademic speaker, presenter.

Talks and Presentations

• Faculty Development Programme (FDP'21)

KIIT-DU, Bhubaneswar

Organized by School of Computer Engineering, KIIT-DU

June 2021

- **Topic**: Computer Science related.
- Broad area: Image processing; Computer architecture; Information security etc.
- o Role: Attendee.

• XEROX Research Center India Open (XRCI Open 2015)

XRCI, Bangalore

Jan 2015

- Organized by XRCI, Bangalore
 - **Topic**: "An Emotion Detection Model for Touch Users".
 - Broad area: Human Computer interaction.
 - o Role: Presenter.

• Inter-Research-Institute Student Seminar (IRISS'15)

BITS Pilani, Goa

Feb 2015

Organized by BITS Pilani, Goa

- Topic: "A Predictive Model to Detect Emotion for Touch Users".
- o Broad area: Human Computer interaction.
- o Role: Presenter.

• 2nd Indian Workshop on Machine Learning (iWML'16)

IIT Kanpur

Organized by Dept. of CSE, IIT Kanpur

July 2016

• **Topic**: "Incremental Shared Nearest Neighbor Density-Based Clustering Algorithms for Dynamic Datasets". URL: https://www2.cse.iitk.ac.in/~iwml/2016/papers/iWML_2016_paper_21.pdf

o Broad area: Machine Learning.

o Role: Presenter.

• IEEE Workshop on Computational Intelligence

IIT Kanpur

Theories, Applications and Future Directions. Conducted by IEEE CIS, IIT Kanpur

July 2013

- **Topic**: "A Genetic Algorithm based approach to optimize the performance of an Onscreen Keyboard". URL: https://www.iitk.ac.in/eeold/archive/courses/2013/ci/Workshop-Proceedings/talks.php
- o Broad area: Human Computer Interaction.
- o Role: Presenter.

EXTRA CURRICULARS

- Gold medal in Table-Tennis Singles (Faculty category), Umang 2023, IIIT Guwahati.
- Best bowler's award in Inter Hostel Cricket Tournament 2006, Assam University Silchar.
- Interest in Cricket, Astrophysics.

Panthadeep Bhattacharjee

September 9, 2024