

Panthadeep Bhattacharjee

FULL CURRICULUM VITAE

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PRESENT AFFILIATION

- **National Institute of Technology, Rourkela**

Department of Computer Science and Engineering, NIT Rourkela

Rourkela, India

July 2023 – Present

- **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 these algorithms are made in batches as well as point-based manner. 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 are recalibrated to reduce the time complexity, while the lesser intensive components are kept intact.

In addition to developing incremental algorithms, 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 researchers/colleagues from other institutes (viz. VISUS lab/University of Stuttgart, CSE/IIT Guwahati, CSE/IIIT Guwahati, CSE/IIIT Raichur, UCG-United Consulting Group GmbH, Frankfurt) with the intention of producing tangible research outcomes. Moreover, I am also involved in writing project(s) for possible funding from various organizations.

- Visit here for details.

EXPERIENCE

- **Indian Institute of Information Technology, Guwahati**

Assistant Professor, Computer Science and Engineering

Guwahati, India

July 2022 - July 2023

- **Courses taught:** Continual Learning, Cloud Computing Lab, Software Engineering, Software Engineering Lab

- **Kalinga Institute of Industrial Technology (KIIT) Deemed to be University**

Assistant Professor (II), School of Computer Engineering

Bhubaneswar, India

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

Bhubaneswar, India

June 2012 - Dec 2013

- **Courses taught:** Introduction to Computing/C language, C Programming Lab, Principles of Programming 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**

PhD. in Computer Science and Engineering

Guwahati, India

Jan 2014 - Feb 2020

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

- **National Institute of Technology Durgapur**

Master of Technology in Computer Science and Engineering

Durgapur, India

Aug 2010 - May 2012

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

- **Assam University Silchar**

Bachelor of Technology in Information Technology

Silchar, India

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%.
- **Recognition:** Secured an overall 3rd rank in that respective batch after the completion of programme.

- **Cotton College**

Higher Secondary (12th)

Guwahati, India

July 2003 - Mar 2005

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

- **Happy Child High School**

Matriculation (10th)

Guwahati, India

June 2003

- **Board:** Board of Secondary Education Assam (SEBA).
- **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

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

PROJECTS

- **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.
- **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.
- **Role:** Developer.
- **Tools used:** HTML, PHP, MySQL, WAMP Apache Server, AJAX, JavaScript.

- **Virtual Keyboard in Bengali**

Durgapur, India

Dept. of CSE, NIT Durgapur

May 2011 - May 2012

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

PRACTICAL TRAINING

- **MED TECH 2022, AIIMS, Guwahati**

Guwahati, India

Dept. of Orthopaedics, AIIMS Guwahati

November 2022

- **Training goal:** Workshop on various advances in medical science.
- **Role:** Delegate, participant.
- **Tools used:** Visual demonstration.

- **Indian Institute of Technology, Guwahati**

Guwahati, India

Students Academic Board (SAB), IIT Guwahati

Apr 2022

- **Training goal:** Workshop on Python for Scientific Computing and Data Science.
- **Role:** Learner, participant.
- **Tools used:** Visual demonstration.

- **Indian Statistical Institute, Kolkata**

Kolkata, India

Machine Learning Unit

Aug 2015

- **Training goal:** Workshop on Big Data, Hadoop, Map-Reduce, Machine Learning.
- **Role:** Learner, participant.
- **Tools used:** Visual demonstration.

- **KIIT Deemed to be University**

Bhubaneswar, India

School of Computer Engineering

Sept 2013

- **Training goal:** Workshop on MATLAB, to gather a hands on experience.
- **Role:** Learner, participant.
- **Tools used:** Matlab.

- **Excoflare Software Technologies Pvt. Ltd**

Guwahati, India

Guwahati Branch

June 2009 - July 2009

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

SKILLS

- **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

- **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*
 - **Role:** Coordinator.
- **Technical Program Committee member, IEEE GCON-2023** IIT Guwahati
Dept. of CSE, IIT Guwahati *June 2023*
 - **Role:** Paper reviewer.
- **Students Gynkhana Council (SGC) elections** IIIT Guwahati, India
IIIT Guwahati *April 2018*
 - **Role:** Electoral officer.
- **Technical Program Committee member, IEEE ISACC-2023** Silchar, India
Dept. of CSE, Assam University Silchar *Feb 2023*
 - **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*
 - **Role:** Host, frame questions.
- **Workshop on "Cyber Security", School of Technology** Silchar, India
Assam University Silchar *Mar 2008*
 - **Role:** Host.

AWARDS AND HONOURS

- **Selected for Institutional Research Seed Grant** NIT Rourkela
Seed money for new faculties *Jan 2024*
 - **Achievement:** Grant sanctioned
 - **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 Artificial 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*

 - **Achievement:** Winner 2nd 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*

 - **Achievement:** Winner 2nd prize.

- **Inter School Essay Writing Competition** Guwahati, India
Lions Club of Guwahati *Feb 2002*

 - **Achievement:** Winner 2nd 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 Eastern Regional Institute of Science and Technology (NERIST)** North East India
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 Aptitude Test (MAT)** India
Conducted by AIMA *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:**

- “*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>
- “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. URL: <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.402.3783&rep=rep1&type=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. 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://www.seekdl.org/conferences/get/paper/1301.html>
- “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) 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

- **Symposium on Progress in High Performance Computing (PHPC-24)** NIT Rourkela
FTBI, NIT Rourkela *February 2024*
 - **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
Dept. of EEE, NIT Rourkela *January 2024*
 - **Topic:** Societal and technological impact courtesy a robust incremental clustering algorithm
 - **Broad area:** Application of ML in Sustainable Technologies
 - **Role:** Invited speaker/Resource person.
- **Faculty Development Programme (FDP’23) & Workshop** IIT Kottayam
Dept. of CSE, IIT Kottayam *June 2023*
 - **Topic:** Machine Learning with focus on unsupervised incremental learning algorithm
 - **Broad area:** NextGen Computing for Big Data Applications

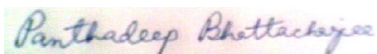
- **Role:** Invited speaker/Resource person.
- **Workshop on Computer Architecture and Machine Learning** SITM Guwahati
September 2022
Scholar's Institute of Technology and Management
 - **Topic:** Incremental Density-Based Clustering Algorithm
 - **Broad area:** Machine Learning
 - **Role:** Invited speaker/Resource person.
- **2nd Global Conference On Advanced Nanotechnology & Nanomaterials** Virtual Event
June 2022
Peers Alley Conferences
 - **Topic:** A survey of density based clustering algorithms
 - **Broad area:** Harnessing Light on Nanotechnology Breakthroughs
 - **Role:** Invited academic speaker, presenter.

TALKS AND PRESENTATIONS

- **Faculty Development Programme (FDP'21)** KIIT-DU, Bhubaneswar
June 2021
Organized by School of Computer Engineering, KIIT-DU
 - **Topic:** Computer Science related.
 - **Broad area:** Image processing; Computer architecture; Information security etc.
 - **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.
 - **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".
 - **Broad area:** Human Computer interaction.
 - **Role:** Presenter.
- **2nd Indian Workshop on Machine Learning (iWML'16)** IIT Kanpur
July 2016
Organized by Dept. of CSE, IIT Kanpur
 - **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
 - **Broad area:** Machine Learning.
 - **Role:** Presenter.
- **IEEE Workshop on Computational Intelligence** IIT Kanpur
July 2013
Theories, Applications and Future Directions. Conducted by IEEE CIS, IIT Kanpur
 - **Topic:** "A Genetic Algorithm based approach to optimize the performance of an Onscreen Keyboard". URL: <https://www.iitk.ac.in/eold/archive/courses/2013/ci/Workshop-Proceedings/talks.php>
 - **Broad area:** Human Computer Interaction.
 - **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

March 18, 2024