

Krishnendu Ghosh

ASSISTANT PROFESSOR

Department of Computer Science and Engineering, Indian Institute of Information Technology Dharwad, Karnataka, India
☎ 9477456101, 7439423466 | ✉ kghosh.cs@gmail.com | 📍 KrishnenduGhosh | 📄 krishnendu-ghosh-44642117 | 📧 Krishnendu Ghosh

Professional Summary

Assistant Professor at Department of Computer Science and Engineering

February, 2024 - current

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY DHARWAD

Dharwad, Karnataka

Assistant Professor at Department of Computer Science and Engineering

July, 2022 – February, 2024

TECHNO INTERNATIONAL NEW TOWN

Kolkata, West Bengal

- **B.Tech. projects supervised:** Recommending and Analyzing Need for Green Energy, ePATHSHALA: Empowering Personalized and Adaptive Teaching for Holistic Student Learning Advancement.
- **Subjects taken:** Artificial Intelligence, Formal Language and Automata Theory, Machine Learning Applications, Python Lab, Problem Solving Lab, Object Oriented Programming Lab, Artificial Intelligence Lab, Data Structure Lab.

Assistant Professor at Department of Computer Science and Engineering

January, 2022 – July, 2022

SIKSHA 'O' ANUSANDHAN DEEMED TO BE UNIVERSITY

Bhubaneswar, Odisha

- **B.Tech. projects supervised:** Course-relevant Concept Identification from Video Lectures, Training Agents for Atari Breakout Game using Deep Neural Networks.
- **Subjects taken:** Theory of Automata, Programming Languages and Compilers.

Assistant Professor at Department of Computer Science and Engineering

July, 2013 – December, 2013

NATIONAL INSTITUTE OF TECHNOLOGY SIKKIM

Ravangla, Sikkim

- **Subjects taken:** Theory of Automata, Compiler Design, Computer Graphics Lab.

Assistant Professor at in School of Computer Engineering

June, 2012 – June, 2013

KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY (KIIT) DEEMED TO BE UNIVERSITY

Bhubaneswar, Odisha

- **B.Tech. projects supervised:** Online Ticket Booking System, Anonymous Onion Routing, Library Management System, ARP Sheath.
- **M.Tech. projects supervised:** Hindi Named Entity Recognition (NER), Word Sense Disambiguation (WSD) in Manipuri, Automatic text categorization for news bulletin data.
- **Subjects taken:** Object-Oriented-Programming, Operating Systems, Natural Language Processing, Object-Oriented-Programming Lab, Operating Systems Lab, Computer System Programming Lab.

Senior Scientific Officer at School of Information Technology

January, 2012 – June, 2012

INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR

Kharagpur, West Bengal

- **Project:** Development of Text to Speech Systems in Indian Languages: Phase II
- The project aims to make the system efficient by pruning the database and by ultimately developing a parametric text-to-speech synthesis system.

Senior Scientific Officer at School of Information Technology

June, 2009 – December, 2011

INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR

Kharagpur, West Bengal

- **Project:** Development of Text to Speech Systems in Indian Languages
- The project aims to build an unrestricted text-to-speech synthesis system in Bengali. Being trained with a corpus of about 10,000 phonetically balanced Bengali sentences from various domains, the system finally generates output with about 3.4 MOS. Different text and prosody analysis have been made to achieve the required level of intelligibility and naturalness.

Visiting Faculty

September, 2008 – June, 2009

GURU NANAK INSTITUTE OF PHARMACEUTICAL SCIENCE AND TECHNOLOGY

Kolkata, West Bengal

- **Subjects taken:** Programming using C, Operating Systems, Programming Lab.

Academic Summary

Ph.D. from Centre of Excellence in Artificial Intelligence

January, 2014 – December, 2021

INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR

Kharagpur, West Bengal

- **Advisor:** Dr Plaban Kumar Bhowmick and Dr Pawan Goyal
- **Thesis:** "Augmenting Learning Materials to Support Integrated and Multimodal Learning"

- This work presents an online learning platform offering two different modes of learning materials (textbooks and video lectures). Along with the original materials, we cater their augmentations to support integrated and multimodal learning paradigms. These augmentations, formed with freely available resources, are offered for learners with different learning styles (motivated or casual) and purposes (conventional or non-conventional). In course of developing these augmentation systems, we suggested numerous modules such as text segmentation, concept extraction, deficiency diagnosis, community detection, query generation, question retrieval, and structural reranking.

M.S. in School of Information Technology; DGPA: 8.6/10.00

July, 2009 – June, 2012

INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR

Kharagpur, West Bengal

- **Advisor:** Prof. Krothapalli Sreenivasa Rao
- **Thesis:** “Text Analysis for Bengali Text-to-speech Synthesis System”
- Novel contribution in the field of speech synthesis and natural language processing to convert graph sequences into phone sequences, predicting phrase breaks and resolving the ambiguities between different non-standard words present in Bengali text. Grapheme-to-phoneme conversion module generates pronunciation for a word. Phrase break prediction module predicts probable location of the phrase breaks in a sentence. Text normalization module converts the non-standard words (such as date, time, year, cardinal numbers & phone numbers) into standard words. Exhaustive analysis has been made for grapheme-to-phoneme conversion, and three techniques are developed – rule-based, subword based and memory-based conversion. For predicting phrase break locations, classification and regression tree-based and feed-forward neural network-based methods have been attempted. Non-standard words have been converted using rule-based and decision tree-based techniques. Finally, these submodules have been incorporated inside a Bengali text-to-speech system, and the improvement in the performance of the system proves the efficiency of these submodules.

B.Tech. in Computer Science; DGPA: 8.28/10.00

June, 2004 – June, 2008

TECHNO INDIA, WEST BENGAL UNIVERSITY OF TECHNOLOGY

Kolkata, West Bengal

- Project: “ReachHorizon - An Online Tourism Portal”
- Operating system: Windows 2000
- Database Used: Oracle 9i
- Web Technology used: JSP
- Project Description: The online tourism portal covers all possible details based on the aspects of a tour to customers and all administrative details for the owner team.

Higher Secondary (10+2) in Science; Percentage: 82.4%

2004

WEST BENGAL COUNCIL OF HIGHER SECONDARY EDUCATION

Kolkata, West Bengal

Secondary (10); Percentage: 87.9%

2002

WEST BENGAL BOARD OF SECONDARY EDUCATION

Kolkata, West Bengal

Events attended

- Attended Faculty Development Program organized by IEM on Applications on Blockchain Technology in January-February, 2024
- Attended Smart India Hackathon 2023 Final at Chandigarh Engineering College in December, 2023
- Attended Project Innovation Contest 2024 at Kalinga Institute of Information Technology University, Bhubaneswar in January, 2024
- Attended Faculty Development Program organized by IEM on Journey into Computing’s Future in December, 2023
- Attended Smart India Hackathon 2023 Final at Chandigarh Engineering College in December, 2023
- Attended Faculty Development Program organized by Department of Information Technology, Haldia Institute of Technology on Summer School on Emerging Technology in August, 2023
- Attended Faculty Development Program organized by NIT Jamshedpur on Machine Learning and its Applications in IoT, Computer Vision and Cloud Computing in July, 2023
- Mentored team ranked 9th in Smart Bengal Hackathon at RCCIIT, West Bengal in April, 2023
- Presented at International Conference on Career Prospects for CSE students at Tamluk Ramakrishna Mission, India in March, 2023
- Lectured at 23rd International Conference on Artificial Intelligence in Education at Durham University, UK in July, 2022
- Participated and ranked 4th at Samsung Innovation Award 2014 at IIT Kharagpur, Kharagpur in September, 2014
- Attended Faculty Development Program organized by Accenture India on Dot Net (Level 1 and 2) in January, 2013
- Attended WiSSAP 2011 organized by Indian Institute of Technology Guwahati on Speech Enhancement in January, 2011
- Attended WiSSAP 2010 organized by Indian Institute of Technology Bombay on Audio Content Analysis and Retrieval in January, 2010

Events organized

- Organized 2nd International Conference on Data Analytics and Insights at Techno International New Town, Kolkata in July, 2024
- Organized 1st International Conference on Data Analytics and Insights at Techno International New Town, Kolkata in May, 2023
- Organized Smart India Hackathon 2022 at Techno International New Town, Kolkata in August, 2022
- Convened a Cuda programming seminar at Techno International New Town, Kolkata in August, 2022
- Convened Make it to Germany at NIT Sikkim, Ravangla in September, 2013
- Organized Natural Interface Design at Indian Institute of Technology Kharagpur in July, 2009

Journal Publications

- “Augmenting Technical Articles: Linking Domain-relevant Concepts to QA Pairs Leveraging Question Retrieval,” **Krishnendu Ghosh**, in *Computers & Education*, Elsevier, 2024, IF: 12.0, Quartile: Q1. (submitted)
- “Recommending Personalized Video Lecture Augmentations with Tagged Community Question Answers,” **Krishnendu Ghosh**, in *International Journal of Artificial Intelligence in Education*, Springer, 2023, IF: 4.9, Quartile: Q1. (under revision)
- “Remediating Textbook Deficiencies Leveraging Community Question Answers,” **Krishnendu Ghosh**, in *Education and Information Technologies*, Springer, 2022, DOI: <https://doi.org/10.1007/s10639-022-10937-5>, IF: 5.5, Quartile: Q1.
- “Augmenting Video Lectures: Predicting Off-topic Concepts and Linking to Relevant Video Lecture Segments,” **Krishnendu Ghosh**, Sharmila N. Reddy, Yashasvi Kanchugantla, Pavan G. Rayapati, Plaban K. Bhowmick & Pawan Goyal, in *International Journal of Artificial Intelligence in Education*, Springer, 2021, <https://doi.org/10.1007/s40593-021-00257-z>, IF: 4.9, Quartile: Q1.
- “A Decision Tree Based Word Sense Disambiguation System in Manipuri Language,” Richard L. Singh, **Krishnendu Ghosh**, Kishorjit Nongmeikapam & Sivaji Bandyopadhyay, in *Advanced Computing, Academy & Industry Research Collaboration Center (AIRCC)*, 2014, DOI: 10.5121/acij.2014.5403.
- “Development of Syllable-Based Text to Speech Synthesis System in Bengali,” N. P. Narendra, K. Sreenivasa Rao, **Krishnendu Ghosh**, Ramu V. Reddy & Sudhamay Maity, in *International Journal of Speech Technology*, Springer, 2011, DOI: 10.1007/s10772-011-9094-4, IF: 0.4, Quartile: Q4.

Conference Publications

- “Statistical and Deep Learning Approaches for Individual Carbon Footprint Calculation in India,” Chayan Ghosh, Avigyan Chowdhury, Adil Ahamed, and **Krishnendu Ghosh**, in the proceedings of International Conference on Advances in Distributed Computing and Machine Learning (ICADCML), Vellore, 2024.
- “Boosting Rule-based Grapheme-to-Phoneme Conversion with Morphological Segmentation and Syllabification in Bengali,” **Krishnendu Ghosh**, Sandipan Mandal and Nilay Roy, in the proceedings of the 25th International Conference on Speech and Computer, Karnataka, 2023, DOI: https://doi.org/10.1007/978-3-031-48309-7_34.
- “Automatic Generation of Algebraic Representation for Physics Problems,” **Krishnendu Ghosh** and Sayantan Das, in the proceedings of the 3rd International Conference on Educational Technology and Online Learning, Ayvalık, 2023.
- “A Survey on Medical Image Diagnosis Systems: Problems and Prospects,” **Krishnendu Ghosh**, Tamesh Halder, Maitri Roy, Chandranath Biswas, Rintu K. Gayen, and Debashish Chakravarty, in the proceedings of the International Conference on Computational Intelligence, Data Science and Cloud Computing, Kolkata, 2022, DOI: https://doi.org/10.1007/978-981-19-1657-1_20.
- “Using Re-ranking to Boost Deep Learning based Community Question Retrieval,” **Krishnendu Ghosh**, Plaban K. Bhowmick & Pawan Goyal, in the proceedings of the IEEE/ACM International Conference on Web Intelligence, Germany, August, 2017, DOI: <https://doi.org/10.1145/3106426.3106442>.
- “Automatic Generation and Insertion of Assessment Items in Online Video Courses,” Amrith Krishna, Plaban K. Bhowmick, **Krishnendu Ghosh**, Archana Sahu & Subhayan Roy, in the proceedings of the 20th ACM International Conference on Intelligent User Interfaces Companion, USA, March, 2015, DOI: <https://doi.org/10.1145/2732158.2732183>.
- “Data-Driven Phrase Break Prediction for Bengali Text-to-Speech System,” **Krishnendu Ghosh** & K. Sreenivasa Rao, in the proceedings of IC3 2012, IIIT Noida, India, 2012, DOI: <https://doi.org/10.1007/978-3-642-32129-0>.
- “Subword based Approach for Grapheme-To-Phoneme Conversion in Bengali Text-To-Speech Synthesis System,” **Krishnendu Ghosh** & K. Sreenivasa Rao, in the proceedings of NCC 2012, India, January, 2012, DOI: 10.1109/NCC.2012.6176832.
- “Phrase Break Prediction for Bengali Text to Speech Synthesis System,” **Krishnendu Ghosh**, Ramu V. Reddy & K. Sreenivasa Rao, in the proceedings of ICON-2011: 9th International Conference on Natural Language Processing, India, 2011.
- “Development of Bengali Screen Reader using Festival Speech Synthesizer,” N. P. Narendra, K. Sreenivasa Rao, **Krishnendu Ghosh**, Ramu V Reddy & Sudhamay Maity, in the proceedings of Indicon 2011, India, 2011, DOI: 10.1109/INDCON.2011.6139376.
- “Memory-based Data-driven Approach for Grapheme-to-Phoneme Conversion in Bengali Text-to-Speech Synthesis System,” **Krishnendu Ghosh** & K. Sreenivasa Rao, in the proceedings of Indicon 2011, India, 2011, DOI: 10.1109/INDCON.2011.6139334.
- “Building Unit Selection Speech Synthesis in Indian Languages: An Initiative by an Indian Consortium,” Hema A. Murthy, Ashwin Bellur, Vinodh Viswanath, Badri Narayanan, Anila Susan, G. Kasthuri, Raghav Krishnan, K. Sreenivasa Rao, Sudhamay Maity, N. P. Narendra, Ramu V. Reddy, **Krishnendu Ghosh**, K. G. Sulochana, E. L. Abhilash, T. Sajini, M. Sasikumar, Bira C. Singh, Pranaw Kumar, P. Vijayaditya, E. Veera Raghavendra & Kishore Prahallad, in the proceedings of 13th Oriental COCODA, 2010.
- “Grapheme to Phoneme Conversion in Bengali for Festival based TTS Framework,” **Krishnendu Ghosh**, Ramu V. Reddy, N. P. Narendra, Sudhamay Maity, Shashidhar Koolagudi & K. Sreenivasa Rao, in the proceedings of ICON-2010: 8th International Conference on Natural Language Processing, India, 2010.

Book Chapter Publications

- “The Impact of Amyloidosis on Bones and its Relationship with Dementia,” **Krishnendu Ghosh**, Ricardo Fitas, Eshita Dey, and Munmun Patra, in Diagnosing Multiskeletal Conditions using Artificial Intelligence and Machine Learning to Aid Interpretation of Clinical Imaging, Elsevier, 2024. (submitted)
- “Natural Language Processing in Education: Transforming Teaching and Learning,” **Krishnendu Ghosh**, in Explainable AI in Education: Recent Trends and Challenges, Springer, 2024. (submitted)

Professional Affiliation

- Member of Institute of Researchers (InRes), International Association of Engineers (IAENG), and Computer Science Teachers' Association (CSTA) from 2022
- Associate Member of International Society for Development and Sustainability (ISDS) from 2022
- Member of Sports and Coding Club at Techno International New Town, Kolkata from 2022
- Reviewer at different Journals like Education and Information Technologies, International Journal of Changes in Education and a few international conferences from 2020
- President of the Computer Society and Member of various committees (PECI, CSA, CCE, LGEP) at NIT Sikkim, Ravangla in 2013
- Finance Co-chair & Technical Program Committee member at IEEE Students' Technology Symposium 2011
- Industry Relation Co-chair & Technical Program Committee member at IEEE Students' Technology Symposium 2010

Technical Proficiency

- Operating System: Windows, Linux
- Programming Language: Java, Python, C, C++, Perl, Cuda
- Web Development: HTML, JSP
- Tools: Lucene, Nutch, Solr, Eclipse, MATLAB
- Library: Keras, PyTorch, Pandas, TensorFlow, Scikit, Numpy, NLTK, Gensim, Wordnet

Research Interests

- Natural Language Processing
- Artificial Intelligence in Educational Technology
- Recommendation Systems on Sustainable Development

Personal Profile

- Date of Birth: 8th October, 1985
- Gender: Male
- Co-curricular Activities: Painting and reading story books.

Reference

Dr. Plaban Kumar Bhowmick

ASSISTANT PROFESSOR, CENTER FOR EXCELLENCE IN ARTIFICIAL INTELLIGENCE

Indian Institute of Technology Kharagpur

- Email: plaban@gmail.com
- Phone: +91 3222282114, +91 9475196286

Prof. Krothapalli Sreenivasa Rao

PROFESSOR, COMPUTER SCIENCE & ENGINEERING

Indian Institute of Technology Kharagpur

- Email: ksrao1969@gmail.com
- Phone: +91 3222282336, +91 9933750853

Dr. Pawan Goyal

ASSOCIATE PROFESSOR, COMPUTER SCIENCE & ENGINEERING

Indian Institute of Technology Kharagpur

- Email: pawang.iitk@gmail.com
- Phone: +91 3222282370, +91 9434202818