

AKM Shahariar Azad Rabby

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US Permanent Resident — no visa sponsorship required

CS Outstanding PhD Student Award, UAB — 2026

Research Identity

Research Areas (Information Technology):

- **Applied AI & Data Analytics for IT Systems:** machine learning for decision support, long-tail learning, model evaluation and calibration.
- **Deployable AI Systems (MLOps):** scalable model serving, GPU inference optimization, reliability/latency-aware deployment, cloud/container workflows.
- **Intelligent Vision & Document Understanding:** computer vision for medical imaging, infrastructure monitoring, and OCR/document pipelines.
- **Responsible Data Use in High-Stakes Domains:** privacy-aware clinical/enterprise AI, human-in-the-loop validation, and robust external evaluation.

Dissertation: *Precise Segmentation of Thin, Elongated, and Underrepresented Structures*. Advisor: Dr. Chengcui Zhang. Defense: April 2026. **CS Outstanding PhD Student Award, 2026.**

Vision: My research develops constraint-driven machine learning methods that bridge algorithmic innovation and deployable systems. I focus on thin/minority-class segmentation in medical imaging and structural monitoring, with emphasis on multi-institutional validation, topology/connectivity preservation, and real-world feasibility under memory/latency budgets.

Research Contributions (Selected)

- **COPDxNet:** Led architecture design and multi-site validation of a lightweight 3D CNN (10.6M parameters) for population-scale COPD detection from inspiratory chest CT. Trained on COPDGene (21 centers, 13K+ CT scans), achieving AUC 0.92 internally with external validation on SPIROMICS (AUC 0.92) and NLST (AUC 0.82). Primary corresponding author; manuscript under review at *The Lancet Digital Health*.
- **STRIPE: Directional Feature Extraction for Pulmonary Fissure Segmentation:** Independently designed directional encoder-decoder for pulmonary fissure segmentation (AFM + DDA; LCNet-100 encoder; UNet++-like decoder). Systematic ablation established encoder-level directional modeling preserves thin-structure continuity. Evaluated on 50 COPDGene CT scans (5-fold CV), achieving Dice=0.873 and HD95=0.72 mm with 5.15M parameters. Manuscript in preparation.
- **THREAD: Efficient Topology-Preserving Network for Thin Structure Segmentation:** Topology-preserving architecture with Directional Attention Bridge (DAB), Sobel-initialized Topology-Preserving Gate (TPG), and Cascaded Directional Refinement (CDR). On Crack500, achieved F1=0.7940 and cIDice=0.8231 with 48.6% fewer FLOPs than comparable methods; 92 FPS on GPU and 29.6 FPS on Raspberry Pi 5 (~19× faster than SSMs). Cross-domain transfer: Dice=0.866 on pulmonary fissures without domain-specific retraining. Manuscript in preparation.
- **dCrack++ / dCrack61K:** Conceptualized Edge-Guided Attention (EGA) for minority-class crack segmentation; curated dCrack61K benchmark (61,943 images, 36 sources, 2,000+ corrected annotations). Cross-domain transfer: F1=0.8251 on CHASE_DB1 retinal vessels without vessel-specific training. IEEE IRI 2025.
- **Bengali OCR Systems:** Collaborative research with industry partners; first-author IEEE/CVF WACV Workshops 2024 paper on Bengali OCR enhancement; co-authored EMNLP 2023 Industry Track paper establishing a gold-standard OCR dataset.
- **Ekush Dataset:** Created a large-scale Bangla handwritten character dataset (673K instances, 242 classes); Best Paper Award RTIP2R 2018.

Education

Ph.D. in Computer Science, University of Alabama at Birmingham (UAB) Aug 2021 – Apr 2026
Dissertation: *Precise Segmentation of Thin, Elongated, and Underrepresented Structures*. Advisor: Dr. Chengcui Zhang. **CS Outstanding PhD Student Award, 2026.**

M.S. in Computer Science, University of Alabama at Birmingham (UAB) Aug 2021 – Apr 2023
Coursework: Machine Learning, Deep Learning, Data Science, Cloud Computing, Algorithms.

B.S. in Computer Science & Engineering, Daffodil International University Jan 2015 – Dec 2018
Thesis: *Ekush: Bangla Handwritten Character Data Repository for NLP Research*.

Selected Publications

bold = my name; **14 first-author papers** of 45+ total — 1,000+ citations; h-index 17; i10-index 25. Full list: [Google Scholar](#).

*This section highlights primary research in Medical AI and Computer Vision. For the complete reverse-chronological research record of 45+ publications, including early-career work in Applied ML, please see the **Appendix**.*

1. **Rabby, A.S.A.**, Chaudhary, M.F.A., Saha, P., Nakhmani, A., Zhang, C., Barr, R.G., Reinhardt, J.M., Bhatt, S.P., Bodduluri, S. “Light Convolutional Neural Network for Detecting Chronic Obstructive Pulmonary Disease: A Multicenter Model Development and External Validation.” *medRxiv*, 2025. (Under review at *The Lancet Digital Health*.)
2. **Rabby, A.S.A.**, Zhang, C., Nakhmani, A., Bodduluri, S., Bhatt, S.P. “STRIPE: Directional Feature Extraction for Pulmonary Fissure Segmentation.” Manuscript in preparation.
3. Saha, P., Chaudhary, M.F.A., **Rabby, A.S.A.**, Bodduluri, S., Nakhmani, A., Zhang, C., Bhatt, S.P. “Machine Learning Based Detection of True Ventilatory Restriction.” *Respiratory Medicine*, 2025.
4. **Rabby, A.S.A.** & Zhang, C. “dCrack: Enhancing Fine-Grained Crack Segmentation with Edge-Guided Attention.” *IEEE International Conference on Information Reuse and Integration (IRI)*, 2025.
5. **Rabby, A.S.A.**, Ali, H., Islam, M.M., Abujar, S., & Rahman, F. “Enhancement of Bengali OCR by Specialized Models and Advanced Techniques for Diverse Document Types.” *IEEE/CVF WACV Workshops*, 2024.
6. Ali, H., **Rabby, A.S.A.**, Islam, M.M., Mahamud, A.K.M., Hasan, N., Rahman, F. “Gold Standard Bangla OCR Dataset: Data Preprocessing and Annotation Processes.” *EMNLP Industry Track*, 2023.

Research & Professional Experience

Research Scientist, University of Alabama at Birmingham (UAB) Jun 2026 – Present
Center for Lung Analytics & Imaging Research (CLAIR) & Knowledge Discovery and Data Mining Lab
Birmingham, AL | Supervisor: Dr. Surya P. Bhatt

- *NIH R01 HL151421 – Fissure Integrity Score*: Developing a quantitative pulmonary fissure integrity metric for COPD structural phenotyping, leveraging STRIPE segmentation masks to assess fissure completeness and continuity on multicenter chest CT.
- Lead ongoing research on deployable medical imaging AI, including multicenter COPD detection (COPDxNet) and pulmonary fissure segmentation (STRIPE).
- Support multi-institutional clinical validation, manuscript development, and scalable GPU inference infrastructure for large-scale 3D CT analysis.

Blazer Fellow & Graduate Research Assistant (Part-Time), UAB Aug 2021 – May 2026
Center for Lung Analytics & Imaging Research (CLAIR) & Knowledge Discovery and Data Mining Lab
Advisor: Dr. Chengcui Zhang

- *NIH R01 HL151421 (PIs: Bhatt, Nakhmani) – COPDxNet*: Led architecture design and multi-site validation of a lightweight 3D CNN (10.6M parameters) for population-scale COPD detection. AUC 0.92 internally and

0.92 / 0.82 across independent external cohorts (SPIROMICS, NLST); 21 centers, 13K+ CT scans. Primary corresponding author; manuscript under review at *The Lancet Digital Health*.

- *NIH R01 HL151421 (PIs: Bhatt, Nakhmani) – STRIPE*: Independently designed directional encoder–decoder for pulmonary fissure segmentation (AFM + DDA; LCNet-100 encoder; UNet++-like decoder). Evaluated on 50 COPDGene CT scans (5-fold CV): Dice=0.873, HD95=0.72 mm; 5.15M parameters. Primary author; manuscript in preparation.
- *Thin-Structure Segmentation – THREAD (in preparation)*: Conceptualized topology-preserving architecture (DAB + TPG + CDR) achieving F1=0.7940 and cDice=0.8231 with 48.6% fewer FLOPs than comparable methods. Benchmarked at 92 FPS on GPU and 29.6 FPS on Raspberry Pi 5 (~19× faster than SSMs). Cross-domain transfer: Dice=0.866 on pulmonary fissures without domain-specific retraining.
- *Independent Research – dCrack++ / dCrack61K*: Conceptualized Edge-Guided Attention for minority-class crack segmentation; curated dCrack61K benchmark (61,943 images, 36 sources, 2,000+ corrected annotations); cross-domain F1=0.8251 on CHASE_DB1 retinal vessels. IEEE IRI 2025.
- *NSF SaTC #2154589 (PI: Zhang)*: Developed computer vision preprocessing (image registration, target localization) for robust ballot tabulation (IEEE IRI 2023).
- *Infrastructure*: Architected scalable ML inference pipelines using Triton Inference Server for large-scale 3D medical imaging analysis.

Senior ML Engineer (Part-Time), Apurba Technologies

Nov 2025 – Present

Remote collaboration from Birmingham, AL

- *Kagoj.ai (Bangladesh Government national AI platform)*: Fine-tuned Qwen2.5 VLM via LoRA with FP8 quantization and Flash Attention 2; deployed via vLLM on single L40S GPU serving 30K daily active users at 1K–2K peak RPS (p50=84ms, p95=91ms).
- *Platform Engineering*: Led 13-engineer team re-architecting platform into event-driven microservices (Kafka) for high-throughput document processing.
- *Clinical AI Deployment*: Architected HIPAA-compliant RAG pipeline with PHI handling for automated medical bill auditing at Dorsal.fyi (acquired by Promise, Feb 2026). Ongoing research collaboration resulted in joint publications (EMNLP, ICPR, WACV Workshops, EACL).

Machine Learning Engineer → Team Lead, Apurba Technologies

Oct 2019 – Aug 2021

Built multi-stage CNN OCR pipeline for ocr.bangla.gov.bd, Bangladesh Government national Bangla document digitization platform. Deployed Triton Server with ONNX achieving 18.6× inference speedup; led team from 3 to 10+ engineers; scaled services to 10,000+ daily requests with 99.5% uptime.

Artificial Intelligence Engineer (Contract), Genex Digital

Apr 2019 – Oct 2019

Developed MIRA (telecom chatbot, IBM-mentored) and Sarah (multilingual banking chatbot: Bangla, English, Banglish).

Teaching & Mentoring

Teaching Interests (Information Technology)

- Data Analytics & Machine Learning for IT
- Cloud Computing & Scalable AI Services (MLOps, model serving, monitoring)
- Database Systems & Data Engineering Foundations
- Applied Cybersecurity for Data-Driven Systems (privacy, secure deployment)
- Applied Computer Vision & Document Intelligence
- Large Language Models & Generative AI

Credentialed Course Instructor – Medicine, UAB Heersink School of Medicine

Fall 2026

- **Course taught**: AIM 646: LLM Development in Medicine (3-credit graduate course, Marnix E. Heersink)

Institute for Biomedical Innovation / AI in Medicine).

- **Topics:** tokenization, text classification, sentiment analysis, prompt-based applications, fine-tuning for domain-specific healthcare use cases, and responsible AI (ethics, privacy, regulatory).
- **Format:** In-person + online sections.

Lecturer (Part-Time), Daffodil International University

Jan 2019 – Dec 2020

- **Courses taught:** CSE 412 (Artificial Intelligence) and CSE 413L (AI Lab). Class size: 50+ students per semester.
- **Pedagogical Innovation:** Shifted from theory-heavy lectures to project-based learning; emphasized Python/PyTorch implementations, debugging via loss curves, and end-to-end prototypes.
- **Mentorship:** Supervised undergraduate capstone projects; guided students toward peer-reviewed publications.

Courses Prepared to Teach

- **Building LLMs for Medical Data** (Proposed Graduate Course: LLM fine-tuning, RAG, HIPAA-aware deployment for clinical workflows)
- **Deployable AI Systems** (Proposed Graduate Course: Containerization, Model Serving, SLA Management)
- Introduction to Machine Learning (undergraduate/graduate)
- Deep Learning for Computer Vision (graduate)
- Medical Image Analysis (graduate seminar)
- Applied AI Systems (undergraduate/graduate)
- Introduction to Artificial Intelligence (undergraduate)
- Efficient/Scalable Machine Learning (graduate)

Also prepared to teach core CS/IT undergraduate courses (programming, data structures, algorithms, databases, networking), consistent with SACSCOC faculty credential guidelines.

Research Mentoring

- **Direct Research Advising:** Mentored 13 undergraduate students to *first-author* peer-reviewed publications (IEEE ICCNT, IEEE SMART, IEEE ICICCS, Springer IEMIS/CMDE/SCTA). Multiple mentees now pursuing PhDs at U.S. institutions.
- **Lab Management:** Research Supervisor, DIU NLP & ML Lab (2019–Present). Coordinated research activities for multiple cohorts; established dataset curation protocols and publication workflows.
- **Curriculum Development:** Developed introductory Python and ML training materials for undergraduate students (100+ participants).
- **Workshop Organization:** Organized and co-instructed WVLL Workshop @ IEEE/CVF WACV 2024; Lead Organizer, WVLL 2026, University of North Texas (IEEE submission pending).

Grants & Funded Research

NIH/NHLBI R01 HL151421

2022–Present

“Structural Determinants of Disease Progression in COPD”

PIs: Surya Bhatt, MD & Arie Nakhmani, PhD

Role: Research Scientist (Jun 2026–Present); Graduate Research Assistant (2022–May 2026)

Contribution: Lead developer of COPDxNet and STRIPE; multi-site validation across 21 centers; primary corresponding author on Lancet Digital Health submission. STRIPE: Dice=0.873, HD95=0.72 mm; 5.15M params; manuscript in preparation.

NSF SaTC #2154589

2022–2027

“Collaborative Research: Bubble Aid: Assistive AI to Improve the Robustness and Security of Reading Hand-Marked Ballots”

PI: Chengcui Zhang, PhD | \$1.2M collaborative award (UAB sub-award: \$397,302)

Role: Graduate Research Assistant (Year 1)

Contribution: Developed computer vision preprocessing pipeline (image registration, voting target localization); co-authored IEEE IRI 2023 publication.

Fellowships & Awards

Fellowships

- **CS Outstanding PhD Student Award, UAB** (2026) — *Departmental highest distinction, awarded in recognition of research excellence*
- Blazer Fellowship, UAB (2021–2022) - Annual fellowship for outstanding first-year doctoral students
- UAB Graduate Dean’s Scholarship (2022) - Competitive merit-based award
- CVPR 2022 Travel Grant - Competitive travel award from premier international conference
- Barrett R. and Oceana A. Bryant Endowed Awards (2022, 2024)

Research Awards

- Best Paper Award, RTIP2R 2018: “Ekush: A Multipurpose & Multitype Comprehensive Database”
- Best Paper Award, IEMIS 2023 (UEM Kolkata)
- Best Student Research Award (2018, 2019), DIU Computer Science & Engineering
- 1st Runner Up, 3-Minute Research Pitch Competition, SBCL 2022

Academic Service

Conference Organization & Leadership

- Workshop Organizer: Workshop on Vision-Based Understanding for Low-Resource Languages (WVLL), IEEE/CVF WACV 2024
- Organizer: International Winter Conference on Vision, Language & Learning (WVLL 2026), University of North Texas, Nov 2026 (IEEE submission pending approval)
- Webmaster: UAB Graduate Student Government (2024–2025)

Peer Review (verified)

- Verified reviews: 33+ (Web of Science/Publons).
- *Journals:* IEEE TDSC (9), IJMDem (6), IEEE TMM (3).
- *Conferences:* ACM Multimedia (6), WACV (4), ICMLA (3), AAAI (1), CVPR (1).

Research Artifacts & Datasets

- **Ekush** (rabby.dev/ekush): Bangla handwritten character dataset (673K instances, 242 classes).
- **dCrack61K** (GitHub): Crack segmentation benchmark (61,943 images, 36 sources, 2,000+ corrected annotations). Associated dCrack++/EGA model (IEEE IRI 2025).
- **ISHARA-LIPI** (isharalipi.sanzidscloud.com): Multipurpose Bangla Sign Language dataset (1,800 images, 36 classes).

Professional Memberships

- IEEE Member (2021–present)
- American Thoracic Society (ATS) Member (2023–present)
- Bangladesh Society for Private University Academics (BSPUA) Member (2022–present)

Technical Skills

Research: Medical image analysis, minority-class segmentation, clinical validation, efficient inference

Frameworks: PyTorch, TensorFlow, MONAI, Transformers, vLLM, timm

Deployment: Docker, Triton Inference Server, TensorRT, ONNX Runtime, AWS, HIPAA-compliant pipelines

Emerging AI: RAG pipelines, LLM deployment, VLM fine-tuning (LoRA), FP8 quantization

Languages: Python, C++, SQL, Bash, $\LaTeX$

References

- **Dr. Chengcui Zhang** (Dissertation Advisor), Professor of Computer Science; SIRI Fellow; Deputy Editor-in-Chief, IEEE Transactions on Multimedia, UAB - czhang02@uab.edu
- **Dr. Sandeep Bodduluri**, Assistant Professor, Pulmonary, Allergy, and Critical Care Medicine and Electrical and Computer Engineering; Director of AI, Center for Lung Analytics and Imaging Research, UAB - sbodduluri@uabmc.edu
- **Dr. Fuad Rahman**, Adjunct Professor of Biomedical Engineering, University of Arizona; Founder & CEO, Apurba Technologies - fuad@apurbatech.com

Appendix: Complete Publication List

The following sections detail the complete reverse-chronological research record (45+ items).

A. Journal Articles

- J1. Saha, P., Chaudhary, M.F.A., **Rabby, A.S.A.**, Sthanam, V., Nakhmani, A., Zhang, C., Bhatt, S.P. “Machine Learning Based Detection of True Ventilatory Restriction.” *Respiratory Medicine* (Elsevier), 2025.

B. Peer-Reviewed Conference Papers

- C1. Hasan, M.M., Islam, S.M.J., **Rabby, A.S.A.**, Rahman, F. “Beyond Characters: Position-Aware Metric and a Lightweight LLM for Low-Resource Bangla Punctuation Restoration.” *IEEE International Conference on Big Data (Big Data)*, 2025.
- C2. **Rabby, A.S.A.**, Zhang, C. “dCrack: Enhancing Fine-Grained Crack Segmentation with Edge-Guided Attention.” *IEEE International Conference on Information Reuse and Integration (IRI)*, 2025.
- C3. Akanda, M., Ahmed, M., **Rabby, A.S.A.**, Rahman, F. “Optimum Deep Learning Method for Document Layout Analysis in Low Resource Languages.” *ACM Southeast Conference*, 2024.
- C4. Zhao, F., Zhang, C., Saxena, N., Wallach, D., **Rabby, A.S.A.** “Ballot Tabulation Using Deep Learning.” *IEEE International Conference on Information Reuse and Integration (IRI)*, 2023.
- C5. Das, A., **Rabby, A.S.A.**, Kowsar, I., Rahman, F. “A Deep Learning-based Unified Solution for Character Recognition.” *International Conference on Pattern Recognition (ICPR)*, 2022.
- C6. Islam, M.M., Das, A., **Rabby, A.S.A.**, Hasan, N., Rahman, F. “Towards Building a Bangla Text Recognition Solution with a Multi-Headed CNN Architecture.” *IEEE International Conference on Big Data (Big Data)*, 2021.
- C7. Rahman, F., Rahman, A., **Rabby, A.S.A.**, Rifat, M.J.R., Banik, M., Islam, M., Islam, A., Aziz, N.A., Meyer, R., Kriak, J., et al. “Disease Modeling with a Forest Deep Neural Network Utilizing NLP and a Virtualized Clinical Semantic Network.” *IEEE International Conference on Tools with Artificial Intelligence (ICTAI)*, 2021.
- C8. Islam, M.S., Khushbu, S.A., **Rabby, A.S.A.**, Bhuiyan, T. “A Study on Dengue Fever in Bangladesh: Predicting the Probability of Dengue Infection with External Behavior.” *IEEE International Conference on Intelligent Computing and Control Systems (ICICCS)*, 2021.
- C9. Ferdous, J., Karmaker, S., **Rabby, A.S.A.**, Hossain, S.A. “MatriVasha: A Multipurpose Comprehensive Database for Bangla Handwritten Compound Characters.” *Emerging Technologies in Data Mining and Information Security (IEMIS)*, Springer, 2021.
- C10. Sany, M.H., Keya, M., Khushbu, S.A., **Rabby, A.S.A.**, Masum, A.K.M. “An Opinion Mining of Text in COVID-19 Issues Along with Comparative Study in ML, BERT & RNN.” *International Conference on Deep Learning, Artificial Intelligence and Robotics*, Springer, 2021.
- C11. Islam, M.M., **Rabby, A.S.A.**, Hasan, N., Nahar, J., Rahman, F. “A Novel Bangla Font Recognition Approach Using Deep Learning.” *IEMIS*, Springer, 2021.
- C12. **Rabby, A.S.A.**, Islam, M.M., Hasan, N., Nahar, J., Rahman, F. “A Novel Deep Learning Character-Level Solution to Detect Language and Printing Style from a Bilingual Scanned Document.” *IEEE International Conference on Big Data (Big Data)*, 2020.
- C13. **Rabby, A.S.A.**, Islam, M.M., Hasan, N., Nahar, J., Rahman, F. “Borno: Bangla Handwritten Character Recognition Using a Multiclass Convolutional Neural Network.” *Future Technologies Conference (FTC)*, Springer, 2020.
- C14. **Rabby, A.S.A.**, Islam, A., Rahman, F. “Establishing a Formal Benchmarking Process for Sentiment Analysis

for the Bangla Language.” *Future Technologies Conference (FTC)*, Springer, 2020.

- C15. **Rabby, A.S.A.**, Islam, M.M., Hasan, N., Nahar, J., Rahman, F. “Language Detection using Convolutional Neural Network.” *IEEE International Conference on Computing, Communication and Networking Technologies (ICCCNT)*, 2020.
- C16. Roy, K., Hasan, M., Fuhad, K.M.F., Mohammed, N., **Rabby, A.S.A.**, Hasan, N., Nahar, J., Rahman, F. “Bangla Part of Speech Tagging Using Contextual Embeddings and Oversampling Techniques.” *Future Technologies Conference (FTC)*, Springer, 2020.
- C17. Jamal, S., Bappy, T.H., **Rabby, A.S.A.** “Brazilian Forest Fire Analysis: An Unsupervised Approach.” *Soft Computing Techniques and Applications*, Springer, 2020.
- C18. Jamal, S., Bappy, T.H., Pervin, R., **Rabby, A.S.A.** “Weather Status Prediction of Dhaka City Using Machine Learning.” *Computational Methods and Data Engineering*, Springer, 2020.
- C19. Islam, A., Rahman, F., **Rabby, A.S.A.** “Sankhya: An Unbiased Benchmark for Bangla Handwritten Digits Recognition.” *IEEE International Conference on Big Data (Big Data)*, 2019.
- C20. Hasan, H.M.R., **Rabby, A.S.A.**, Islam, M.T., Hossain, S.A. “Machine Learning Algorithm for Student’s Performance Prediction.” *IEEE ICCNT*, 2019.
- C21. **Rabby, A.S.A.**, Mamata, R., Laboni, M.A., Abujar, S., Hossain, S.A. “Machine Learning Applied to Kidney Disease Prediction: Comparison Study.” *IEEE ICCNT*, 2019.
- C22. Islam, M.M., **Rabby, A.S.A.**, Arfin, M.H.R., Hossain, S.A. “PataNET: A Convolutional Neural Networks to Identify Plant from Leaf Images.” *IEEE ICCNT*, 2019.
- C23. Sheikh, M.H., Mim, T.T., Reza, M.S., **Rabby, A.S.A.**, Hossain, S.A. “Detection of Maize and Peach Leaf Diseases Using Image Processing.” *IEEE ICCNT*, 2019.
- C24. Masum, A.K.M., Abujar, S., Talukder, M.A.I., **Rabby, A.S.A.**, Hossain, S.A. “Abstractive Method of Text Summarization with Sequence to Sequence RNNs.” *IEEE ICCNT*, 2019.
- C25. Khan, T.A., Islam, M.S., Ullah, S.M., **Rabby, A.S.A.** “A Machine Learning Approach to Recognize Junk Food.” *IEEE ICCNT*, 2019.
- C26. Arif, M.A.I., Sany, S.I., Nahin, F.I., **Rabby, A.S.A.** “Comparison Study: Product Demand Forecasting with Machine Learning for Shop.” *IEEE International Conference System Modeling and Advancement in Research Trends (SMART)*, 2019.
- C27. Al Mamun, M.A., Kadir, I., **Rabby, A.S.A.**, Al Azmi, A. “Bangla Music Genre Classification Using Neural Network.” *IEEE SMART*, 2019.
- C28. Abdullha, A., Habib, Y., Masum, M.R.I., **Rabby, A.S.A.** “Countries Condition of Forestation and Trees Percentage using Machine Learning.” *IEEE SMART*, 2019.
- C29. **Rabby, A.S.A.**, Haque, S., Islam, M.S., Abujar, S., Hossain, S.A. “Ekush: A Multipurpose & Multitype Comprehensive Database for Bangla Handwritten Characters.” *International Conference on Recent Trends in Image Processing and Pattern Recognition (RTIP2R)*, Springer, 2018. **[Best Paper Award]**
- C30. Islam, M.S., Khushbu, S.A., **Rabby, A.S.A.**, Hossain, S.A. “Ishara-Lipi: The First Complete Multipurpose Dataset for Bangla Sign Language.” *International Conference on Bangla Speech and Language Processing (ICBSLP)*, IEEE, 2018.
- C31. Islam, M.S., Mousumi, S.S.S., Jessan, N.A., **Rabby, A.S.A.**, Abujar, S., Hossain, S.A. “Ishara-Bochon: The First Multipurpose Open Access Dataset for Bangla Sign Language Isolated Digits.” *RTIP2R*, Springer, 2018.
- C32. Haque, S., **Rabby, A.S.A.**, Laboni, M.A., Neehal, N., Hossain, S.A. “ExNET: Deep Neural Network for Exercise Pose Detection.” *RTIP2R*, Springer, 2018.
- C33. Haque, S., **Rabby, A.S.A.**, Islam, M.S., Hossain, S.A. “ShonkhaNet: A Dynamic Routing for Bangla Handwritten Digit Recognition Using Capsule Network.” *RTIP2R*, Springer, 2018.

- C34. Haque, S., Shahinoor, S.A., **Rabby, A.S.A.**, Abujar, S., Hossain, S.A. “OnkoGan: Bangla Handwritten Digit Generation with Deep Convolutional Generative Adversarial Networks.” *RTIP2R*, Springer, 2018.
- C35. Islam, M.S., Mousumi, S.S.S., **Rabby, A.S.A.**, Hossain, S.A. “A Simple and Mighty Arrowhead Detection Technique of Bangla Sign Language Characters with CNN.” *RTIP2R*, Springer, 2018.
- C36. **Rabby, A.S.A.**, Abujar, S., Haque, S., Hossain, S.A. “Bangla Handwritten Digit Recognition Using Convolutional Neural Network.” *Emerging Technologies in Data Mining and Information Security*, Springer, 2018.
- C37. **Rabby, A.S.A.**, Haque, S., Abujar, S., Hossain, S.A. “EkushNet: Using Convolutional Neural Network for Bangla Handwritten Recognition.” *Procedia Computer Science* (Elsevier), Vol. 143, pp. 603-610, 2018.
- C38. Islam, S., Mousumi, S.S.S., **Rabby, A.S.A.**, Hossain, S.A., Abujar, S. “A Potent Model to Recognize Bangla Sign Language Digits Using Convolutional Neural Network.” *Procedia Computer Science* (Elsevier), Vol. 143, pp. 611-618, 2018.
- C39. **Rabby, A.S.A.**, Haque, S., Islam, S., Abujar, S., Hossain, S.A. “BornoNet: Bangla Handwritten Characters Recognition Using Convolutional Neural Network.” *Procedia Computer Science* (Elsevier), Vol. 143, pp. 528-535, 2018.
- C40. **Rabby, A.S.A.**, Haque, S., Shahinoor, S.A., Abujar, S., Hossain, S.A. “A Universal Way to Collect and Process Handwritten Data for Any Language.” *Procedia Computer Science* (Elsevier), Vol. 143, pp. 502-509, 2018.

C. Industry Track Papers

- IT1. Islam, S.M.J., Hasan, M.M., Ovi, M.H., **Rabby, A.S.A.**, Rahman, F. “BornoDrishti: Leveraging Vision Encoders and Domain-Adaptive Learning for Bangla OCR on Diverse Documents.” *18th Conference of the European Chapter of the Association for Computational Linguistics (EACL) Industry Track*, 2026 (Accepted; to appear).
- IT2. Ali, H., **Rabby, A.S.A.**, Islam, M.M., Mahamud, A.K.M., Hasan, N., Rahman, F. “Gold Standard Bangla OCR Dataset: Data Preprocessing and Annotation Processes.” *EMNLP Industry Track*, 2023.

D. Workshop Papers

- W1. **Rabby, A.S.A.**, Ali, H., Islam, M.M., Abujar, S., Rahman, F. “Enhancement of Bengali OCR by Specialized Models and Advanced Techniques for Diverse Document Types.” *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) Workshops*, 2024.
- W2. Mollah, S., Mohammed, R., Wasek, M., **Rabby, A.S.A.**, Rahman, F., Mohammed, N. “Automated Mapping of Healthcare Concepts to a Standardized Healthcare Taxonomy.” *Tiny Papers @ ICLR*, 2023.

E. Preprints & Under Review

- P1. **Rabby, A.S.A.**, Chaudhary, M.F.A., Saha, P., Sthanam, V., Nakhmani, A., Zhang, C., et al. “Light Convolutional Neural Network to Detect Chronic Obstructive Pulmonary Disease (COPDxNet): A Multicenter Model Development and External Validation Study.” *medRxiv* (Under Review), 2025.
- P2. **Rabby, A.S.A.**, Zhang, C., Nakhmani, A., Bodduluri, S., Bhatt, S.P. “STRIPE: Directional Feature Extraction for Pulmonary Fissure Segmentation.” Manuscript in preparation, 2026.
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F. Conference Abstracts / Presentations

- A1. **Rabby, A.S.A.**, Saha, P., Nakhmani, A., Reinhardt, J.M., Zhang, C., Bhatt, S.P., Bodduluri, S. “COPDxNet: An End-to-End Deep Neural Network for COPD Detection.” *American Thoracic Society (ATS) International Conference*, 2024.