Md Maklachur Rahman

Final Year PhD Student in Computer Science
Texas A&M University, College Station, TX, USA
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Education

Texas A&M University (TAMU) — College Station, TX, USA
PhD in Computer Science | *Expected December 2026* — Jan 2022–Present
CGPA: 4.0/4.0

Kyungpook National University (KNU) — Daegu, South Korea
MS in Computer Science & Engineering — Sep 2018–Aug 2020
Outstanding MS Thesis Award - 2020

Chittagong University of Engineering & Technology (CUET) — Chittagong, Bangladesh
BS in Computer Science & Engineering — Mar 2009–Sep 2013

Manuscripts Under Review

1. **Md Maklachur Rahman** and Tracy Hammond. "Dual-Domain Cross-Modal Decoding for Clinical Text-Guided Medical Image Segmentation." Under review at the *29th International Conference on Medical Image Computing and Computer-Assisted Intervention* (MICCAI 2026).

2. **Md Maklachur Rahman**, Md Hasan Al Banna, and Tracy Hammond. "GET: Generative Embedding Translation for Medical Image Segmentation." Under review at the *29th International Conference on Medical Image Computing and Computer-Assisted Intervention* (MICCAI 2026).

3. **Md Maklachur Rahman**, Soon Ki Jung, and Tracy Hammond. "An Ultra-Lightweight U-Net for Skin Lesion Segmentation under Dataset Shift with Inference Scaling." Under review at *International Journal of Computer Vision* (IJCV). Extended journal version of the BMVC 2025 paper.

Selected Publications

1. **Md Maklachur Rahman**, Soon Ki Jung, and Tracy Hammond. "MambaLiteUNet: Cross-Gated Adaptive Feature Fusion for Robust Skin Lesion Segmentation." In *IEEE/CVF Conference on Computer Vision and Pattern Recognition* (CVPR 2026).

2. **Md Maklachur Rahman**, Soon Ki Jung, and Tracy Hammond. "AULUNet: An Adaptive Ultra-Lightweight U-Net Framework for Efficient Skin Lesion Segmentation in Resource-Constrained Environments." In *The 36th British Machine Vision Conference* (BMVC 2025), **Oral**, Top 3%.

3. Meet Arvindbhai Monpara, **Md Maklachur Rahman**, Tauhidul Alam, Jiangjiang Liu, and Jing Zhang. "Stranded Human Detection in Flooded Environments From UAV Imagery." In *2025 International Conference on Robotic Computing and Communication* (RoboticCC 2025).

4. **Md Maklachur Rahman**, Abdullah Aman Tutul, Ankur Nath, Lamyanba Laishram, Soon Ki Jung, and Tracy Hammond. "Mamba in Vision: A Comprehensive Survey of Techniques and Applications." arXiv preprint, 2024.

5. Deblina Mazumder Setu, Tania Islam, **Md Maklachur Rahman**, and Samrat Kumar Dey. "Towards Enhancing Healthcare Data Privacy: Integrating BioClinicalBERT With Polyalphabetic Cipher for Entity Recognition and Anonymization." *Engineering Reports*, 8(3), 2026.

6. **Md Maklachur Rahman**. "Target Focused Shallow Transformer Framework for Efficient Visual Tracking." In *Doctoral Consortium of the 38th AAAI Conference on Artificial Intelligence* (AAAI 2024), Vancouver, Canada.

7. **Md Maklachur Rahman** and Tracy Hammond. "Learning Random Noise Salient Feature Fusion Siamese Network for Low-Resolution Object Tracking." In *Student Abstract and Poster Program of the 38th AAAI Conference on Artificial Intelligence* (AAAI 2024), Vancouver, Canada.

8. **Md Maklachur Rahman** and Soon Ki Jung. "Siamese-Based Attention Learning Networks for Robust Visual Object Tracking." In *Visual Object Tracking in Challenging Situations*. IntechOpen, 2022. [**Book Chapter**]

9. **Md Maklachur Rahman**, Md Rishad Ahmed, Lamyanba Laishram, Seock Ho Kim, and Soon Ki Jung. "Siamese High-Level Feature Refine Network for Visual Object Tracking." *Electronics*, 2020.

10. **Md Maklachur Rahman**, Mustansar Fiaz, and Soon Ki Jung. "Efficient Visual Tracking with Stacked Channel-Spatial Attention Learning." *IEEE Access*, 2020.

11. Mustansar Fiaz, **Md Maklachur Rahman**, Arif Mahmood, Sehar Shahzad Farooq, Ki Yeol Baek, and Soon Ki Jung. "Adaptive Feature Selection Siamese Networks for Visual Tracking." In *26th International Workshop on Frontiers of Computer Vision* (IW-FCV 2020), Ibusuki, Japan. **Oral**. [**Best Student Paper Award**]

Full publication list: Google Scholar

Research and Professional Experience

Sketch Recognition Lab, Texas A&M University — College Station, TX, USA
Graduate Research Assistant / PhD Student — Jan 2022–Present

- Conduct research in medical image segmentation, computer vision, efficient and lightweight AI, and multimodal learning, with current work spanning text-guided, generative, and skin lesion segmentation.
- Develop compact segmentation frameworks for robust medical image analysis under dataset shift and limited-compute settings, leading to publications in CVPR 2026 and BMVC 2025, with ongoing work in clinical text-guided and generative segmentation.
- Mentor BS, MS, and junior PhD students on several research projects, including medical imaging, segmentation, and computer vision.

Center for Embedded Software Technology, Kyungpook National University — Daegu, South Korea
Researcher — Sep 2021–Dec 2021

- Developed an edge-oriented traffic perception pipeline for vehicle and pedestrian detection, tracking, and counting from intersection-camera imagery.
- Estimated position and velocity for two target classes across roadway, sidewalk, and crosswalk regions to support practical traffic-monitoring applications.

Visual AI Lab, Kyungpook National University — Daegu, South Korea
Research Assistant — Sep 2018–Aug 2020
Researcher — Sep 2020–Aug 2021

- Developed Siamese, attention, and sequence-modeling-based frameworks for robust visual object tracking under different challenges, such as occlusion, appearance variation, deformation, scaling, and background clutter.
- Contributed to tracking systems published in IEEE Access, Electronics, and IW-FCV, with emphasis on target discrimination and real-time-friendly inference.

Samsung Research Bangladesh, Samsung Electronics — Dhaka, Bangladesh
Software Engineer — Oct 2013–Jul 2016

- Worked on software validation, verification, and automation in an industrial R&D environment.
- Contributed to Tizen IDE verification and IoT/SWC/DMC test framework development to improve repeatability, reliability, and efficiency in system-level quality assurance.

Teaching Experience

Texas A&M University — College Station, TX, USA
Graduate Teaching Assistant | Programming Languages (CSCE 314) — Jan 2024–Present

- Supported instruction in Haskell and Java for an upper-level programming languages course.
- Designed and managed grading workflows and score distributions for quizzes, assignments, and exams.
- Held office hours and guided students on course concepts, debugging, and programming assignments.

Honors and Awards

- CVPR Broadening Participation Award, CVPR 2026 — Apr 2026
- Outstanding Reviewer, BMVC 2025 — Nov 2025
- TAMU CS Department Travel Grant — Nov 2025
- IEFS Graduate Scholarship, TAMU — Aug 2025
- AAAI 2024 Travel Award — Feb 2024
- Outstanding MS Thesis Award, KNU — Aug 2020
- Best Student Paper Award, IW-FCV 2020 — Feb 2020
- Brain Korea 21 Plus (BK21) Scholarship — Sep 2018 – Aug 2020
- KNU International Graduate Scholarship (Full KINGS) — Sep 2018 – Aug 2020
- University Merit Scholarship, CUET — Mar 2009 – Sep 2013

Professional Service

- **Conference Reviewer:** NeurIPS, CVPR, ECCV, AAAI, WACV, BMVC, Graphics Interface
- **Journal Reviewer:** Pattern Recognition, Pattern Recognition Letters, Computers in Human Behavior, Displays, Electronics, Entropy, IEEE Access, Neurocomputing

Selected Projects

- **Vision-Language Modeling for Medical Image Segmentation** [Oct 2025–Present]
  Developed a clinical text-guided segmentation framework integrating spatial cross-attention and frequency-aware text modulation, improving performance by 1.96 Dice and 2.67 mIoU over the strongest baselines on QaTa-COV19 and MosMedData+.
  Methods & Skills: PyTorch, Vision-Language Models, Multimodal Learning, Medical Image Segmentation.
- **Generative Modeling for Medical Image Segmentation** [Apr 2025–Present]
  Developed a lightweight latent-to-latent generative segmentation framework with 1.07M trainable parameters, outperforming GMS by 0.93 Dice, 1.26 IoU, and 0.81 px HD95, with an additional 3.51 Dice gain on BUS/BUSI cross-domain evaluation.
  Methods & Skills: PyTorch, Generative Modeling, Semantic Segmentation, Diffusion/VAE-Based Representation.
- **Ultra-Lightweight Architectures for Medical Image Segmentation** [Mar 2024–Present]
  Designed efficient segmentation architectures for resource-constrained skin lesion analysis, producing AULUNet and MambaLiteUNet with up to 85.32% mIoU / 92.08% DSC on ISIC2017 using only 0.029M parameters and 0.069 GFLOPs, and 93.09% average Dice across four dermoscopy benchmarks.
  Methods & Skills: PyTorch, Efficient AI, Deep Learning, Semantic Segmentation.
- **Efficient Visual Object Tracking under Challenging Conditions** [Mar 2019–Feb 2024]
  Developed Siamese-, attention-, and sequence-modeling-based tracking frameworks for robust target tracking under occlusion, appearance change, deformation, and background clutter, evaluated on OTB50/100, VOT2017, VOT2018, TC-128, and UAV123.
  Methods & Skills: PyTorch, Siamese Tracking, Attention Mechanisms, Visual Object Tracking.
- **Edge-Based Traffic Object Detection and Motion Estimation** [Sep 2021–Dec 2021]
  Developed an edge-oriented traffic perception pipeline for vehicle and pedestrian detection, tracking, and motion estimation from intersection-camera imagery, supporting position and velocity estimation across roadway, sidewalk, and crosswalk regions.
  Methods & Skills: Edge AI, Object Detection, Object and Lane Tracking.

Student Mentoring

- **Current and Recent Student Mentoring**
  - **Group Mentoring**, Sketch Recognition Lab (SRL), TAMU, Jan. 2026–Present.
    - **Group 1**, Nitya Khurana, Harrison Li, Yuqing Cao, and Ayaan Budhwani. Topic: Gender Bias in AI Models.

    - **Group 2**, Fawwaz Memon, Nethum Weerasinghe, Armaan Khatwani, and Vidhu Karthik. Topic: Segment Anything Model (SAM) for Medical Image Segmentation.
    - **Group 3**, Kaarthi Vedere, Ore Olayinka, Rivan Adhikari, and Rohan Doshi. Topic: Cross-Modality Translation (CT-to-MRI Generation).
  - **Rachit Patel**, BS in CS, TAMU, Sep. 2025–Present. Topic: Efficient Architectures for Medical Image Analysis.
  - **Phillip Ronin**, BS in CS, TAMU, Sep. 2025–Dec. 2025. Topic: Early-stage Guidance in ML, DL, and CV for Real-world Projects.
  - **Sayok Bose**, BS in CS, TAMU, Sep. 2025–Dec. 2025. Topic: Deep Learning Architectures for Medical Image Segmentation.
  - **Hemish Radadiya**, MS in CS, Lamar University, Co-mentoring, Jul. 2025–Dec. 2025. Topic: Aerial Detection of Individuals in Flooded Environments.
  - **Arunima Chowdhury**, MS in CS, TAMU, May. 2025–Dec. 2025. Topic: Transformer-based Models for Polyp Segmentation.
  - **Ashwin Parameswaran**, BS in CS, TAMU, Jun. 2024–Oct. 2025. Topic: Polyp Segmentation with Boundary-aware Feature Extraction.

- **Mentoring with Publication Outcomes**
  - **Deblina Mazumder Setu**, MS in CS, University of Barishal, Bangladesh, Co-mentoring, 2024–2026. Outcomes: *Engineering Reports* (2026), *Franklin Open* (2025), and *ICCIT* (2024).
  - **Meet Arvindbhai Monpara**, MS in CS, Lamar University, Co-mentoring, Jul. 2025–Dec. 2025. Outcome: *RoboticCC* (2025).
  - **Afrin Hayat**, BS in CS, University of Barishal, Bangladesh, Co-mentoring, 2024. Outcome: *ICCIT* (2024).
  - **Abhyudaya Singh Tak**, Visual AI Lab, Kyungpook National University, South Korea, Co-mentoring, 2022. Outcome: *MITA* (2022).