

Swapnil Biswas

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[G Google Scholar](#) | [Portfolio](#)

RESEARCH INTEREST

Deep Learning, Medical Image Analysis, Computer Vision, Skin Lesion Segmentation, Explainable AI.

ACADEMIC PROFILE

M.S. in Electrical and Computer Engineering

Southern Illinois University Edwardsville

Completed 18 out of 33 credits

CGPA: 3.83/4.00

Illinois, USA

B.Sc. in Computer Science and Engineering | CGPA: 3.88/4.00 (Top 2%)

United International University

Oct 2023

Dhaka, Bangladesh

RESEARCH EXPERIENCE

Graduate Research Assistant

Southern Illinois University Edwardsville

Fall 2024 – Present

USA

- Enhanced skin lesion segmentation using SAM and MedSAM with transfer learning for improved diagnostic accuracy.
- Addressed class imbalance via synthetic data generation using CVAE, boosting VGG-16 classification performance.
- Upgraded CVIP software by replacing ONCRPC with Flatbuffers for 32/64-bit compatibility.
- Designed a hybrid image enhancement approach for canine bone cancer thermography.

Research Engineer

Institute for Advanced Research, United International University

Mar 2023 – Aug 2024

Dhaka, Bangladesh

- Led a project submitted for government RIC funding, designing a comprehensive agricultural solution to enhance productivity and sustainability for rural farmers through real-time data and personalized recommendations.
- Collaborated with physicians on the creation and validation of a Chronic Kidney Disease (CKD) dataset for early identification and risk analysis.
- Conducted a comparative analysis of Protein Secondary Structure Prediction using GNN vs. traditional ML techniques.

PROFESSIONAL EXPERIENCE

Graduate Teaching Assistant

Southern Illinois University Edwardsville

Summer 2025 – Present

USA

- Assisting with undergraduate courses, grading assignments, and providing academic support to students.

Junior Software Developer

Amirus

2023 – 2024

Dhaka, Bangladesh

- Contributed to development cycles by building features, fixing bugs, writing unit tests, and collaborating in Agile sprints.

Undergraduate Assistant and Grader

United International University

2022 – 2023

Dhaka, Bangladesh

- Graded assignments and assisted students with coursework and conceptual clarity.

PUBLICATIONS

- **S. Biswas**, S. M. M. Raza, T. H. Nguyen, R. W. LeAnder, S. E. Umbaugh. (2025). Advancing Skin Lesion Classification: The Role of SAM-Based Segmentation in Enhancing Convolutional Neural Network Performance. *Proc. SPIE 13605, Applications of Digital Image Processing XLVIII; 136050D*, San Diego, CA. DOI: [10.1117/12.3065735](https://doi.org/10.1117/12.3065735)
- S. M. M. Raza, **S. Biswas**, R. W. LeAnder, S. E. Umbaugh. (2025). LVM-Med-Based Thermographic Image Analysis for Canine Bone Cancer Detection. *Proc. SPIE 13605, Applications of Digital Image Processing XLVIII*, San Diego, CA. DOI: [10.1117/12.3060176](https://doi.org/10.1117/12.3060176)
- M. S. U. Hoque, **S. Biswas**, M. S. Sakib, R. Leander, S. E. Umbaugh. (2025). Hybrid Image Enhancement for Thermographic Imaging in Canine Bone Cancer Detection. *Thermosense: Thermal Infrared Applications XLVII*, Proc. SPIE 13470, 156–164. DOI: [10.1109/ICCTA64612.2024.10974770](https://doi.org/10.1109/ICCTA64612.2024.10974770)
- M. Islam, **S. Biswas**, M. S. Ahmed, M. J. Rahman, A. R. Hasan, A. Amin, et al. (2024). Analysis of MDE-Based Gamification Framework for Cognitive Evaluation. *34th International Conference on Computer Theory and Applications (ICCTA)*. DOI: [10.1109/ICCTA64612.2024.10974770](https://doi.org/10.1109/ICCTA64612.2024.10974770)
- Progga, P. H., Rahman, M. J., **Biswas, S.**, et al. (2024). A Bidirectional Siamese RNN for Accurate Gait Recognition. *Neurocomputing*, 605, 128313. DOI: [10.1016/j.neucom.2024.128313](https://doi.org/10.1016/j.neucom.2024.128313)
- Rahman, M. J., Ahmed, M. S., **Biswas, S.**, et al. (2024). CropCare: Intelligent Advisory System. *IEEE ICEEICT*. DOI: [10.1109/ICEEICT62016.2024.10534582](https://doi.org/10.1109/ICEEICT62016.2024.10534582)
- **Biswas, S.**, Ahmed, M. S., et al. (2023). Predicting Efficient CPU Scheduling Algorithm. *IEEE STI*. DOI: [10.1109/STI59863.2023.10464816](https://doi.org/10.1109/STI59863.2023.10464816)
- Progga, P. H., Rahman, M. J., **Biswas, S.**, et al. (2023). Informative Instance-Based KNN for Big Data. *IEEE I2CT*. DOI: [10.1109/I2CT57861.2023.10126147](https://doi.org/10.1109/I2CT57861.2023.10126147)
- Ahmed, M. S., **Biswas, S.**, et al. (2022). Machine Learning for Load Forecasting in Green Data Center. *IEEE STI*. DOI: [10.1109/STI56238.2022.10103320](https://doi.org/10.1109/STI56238.2022.10103320)

Under Review:

- ID: THMS-25-07-0568: **Data-Driven Approaches to Personalized Gamification: Recent Advances, Trends and Future Directions** submitted as a first author to IEEE Transactions on Human-Machine Systems.
- ID: b0296ccc6-b245-4737-9263-509faf9e92ea: **Personality-Based Preference Prediction in the Metaverse: From Personality Traits to User Engagement** submitted to Knowledge and Information Systems, Springer.

SELECTED PROJECTS

- **Learn and Share:** PHP-based online education platform with quizzes, e-books, and lectures.
- **Protibaad:** Anonymous crime-reporting system for public safety.
- **IoT-Based Elder Monitoring:** Wearable system for fall detection and tracking using ESP32 and GPS.
- **COVID-19 Public Safety System:** Arduino-based proximity and health monitoring system.

KEY SKILLS

- **Programming:** Python, Java, C, C++, JavaScript
- **Web Technologies:** HTML, CSS, PHP
- **Tools & Libraries:** PyTorch, TensorFlow, Scikit-learn, OpenCV, Pandas, NumPy, MySQL, LaTeX, Google Colab
- **Soft Skills:** Communication, Teamwork, Problem Solving, Leadership

HONORS AND AWARDS

- Research Grants for Graduate Students (RGGS) – Southern Illinois University Edwardsville
- Competitive Graduate Award (CGA) – Southern Illinois University Edwardsville
- Research Grant – Institute for Advanced Research, United International University
- University Merit Scholarship (2019–2023) – United International University

EXTRACURRICULAR ACTIVITIES

- President, Bangladesh Student Association (BSA), SIUE
- Medical Imaging Campaign Volunteer
- Computer Literacy Teacher for rural students
- Organized departmental academic tours
- Research Data Collection across universities