

# Swapnil Biswas

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🌐  [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

Mar 2023 – Aug 2024

Institute for Advanced Research, United International University

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

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- 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: b0296cc6-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

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- **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

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- **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

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- 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

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- 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