

# Golam Jilani

Carbondale, Illinois, USA

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🌐 golamjilani

## Academic Background

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### Southern Illinois University Carbondale

PH.D. IN COMPUTER SCIENCE; GPA: 4.00/4.00

Carbondale, Illinois, USA.

January 2025 - Present

### Shahjalal University of Science & Technology

BACHELOR OF SCIENCE IN COMPUTER SCIENCE & ENGINEERING; GPA: 3.51/4.00 (**3.73** IN THE LAST TWO YEARS)

Sylhet, Bangladesh.

May 2023

## Research Interests

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Generative AI; Medical Image Analysis; Computer Vision; Machine Learning; Natural Language Processing

## Research Experience

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### Graduate Research Assistant

Jan 2025 - Present

DEPARTMENT OF COMPUTER SCIENCE, SOUTHERN ILLINOIS UNIVERSITY CARBONDALE

Carbondale, Illinois, USA

- Introduced a 3D Convolutional Neural Network (3DCNN) framework, for early detection of germ-layer differentiation, capable of identifying mesoderm and non-mesoderm cells within nuclei video data.
- Extended a predicated logic-based relation-aware attention guidance method for text-to-image diffusion models to faithfully represent actions and possessions in prompts with diverse sentence structures.
- Proposed a new contrastive-inspired quality scoring (CQS) method for feature optimizing with high confidence synthetic lesion for improving lesion detection leveraging a denoising diffusion probabilistic model.
- Developed a DDPM-based diffusion model by modifying a UNet architecture for lesion-specific attributes synthesis in DBT, focusing on lesion patches only, as normal samples are abundant in a screening dataset.
- Integrated a classifier-guided filtering method for selection of high-confidence lesions suitable for direct integration into lesion-detection algorithms.

### Undergraduate Research Assistant (SUST Research Center)

Jul 2022 - Jun 2023

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING, SHAHJALAL UNIVERSITY OF SCIENCE & TECHNOLOGY

Sylhet, Bangladesh

- Constructed an acted facial expression dataset by native Bangladeshi participants.
- Preprocessed the data (annotation, cropping, and resizing) using OpenCV and face detection using RetinaFace.
- Performed cross-cultural experiments using deep learning models to explore the cultural differences in expressions across regions.
- Contributed to a research paper through writing and reviewing the manuscript.

## Publications

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- Golam Jilani**, Md Belayat Hossain, and Farhan Chowdhury. "Cross-3D Convolutional Models with Ensemble Approach for Identifying Germ Layers in Advancing AI-Driven Stem Cell Analysis", (In Preparation).
- Golam Jilani**, Md Belayat Hossain. "Contrastive-inspired feature optimization for generative diffusion-augmented learning in digital breast tomosynthesis", SPIE Medical Imaging 2026: Computer-Aided Diagnosis. (Accepted)
- Golam Jilani**, Md Belayat Hossain. "Generative Diffusion-Augmented Learning for Lesion Detection in Digital Breast Tomosynthesis: A Proof-of-Concept Study", IEEE International Conference on Systems, Man, and Cybernetics (SMC) 2025. (Accepted)
- Golam Jilani**, Samara Paul, and Sadia Sultana. "An efficient ensemble learning model integrating multi-branch sub-networks for facial expression recognition", Cognitive Computation and Systems 2025. URL: <https://doi.org/10.1049/ccs2.70000>

## Test Scores

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IELTS: 7.5 (L-8.5, R-8.5, W-6.5, S-7)

## Relevant Courses

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### Grad CS Courses:

Artificial Intelligence, Generative AI, Pattern Recognition, and Cyber-physical Systems.

### Undergrad CS Courses:

Machine Learning, Artificial Intelligence, Data Science, Data Structures and Algorithms, Cloud Computing, and Discrete Mathematics.

### Undergrad Math Courses:

Linear Algebra, Calculus, Complex Analysis, Statistics & Probability, Complex Variables, Laplace Transforms, and Fourier Series.

## Technical Skills

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**Languages:** Python, C, Java

**ML Frameworks:** PyTorch, TensorFlow (Keras)

**Databases:** MySQL, SQLite, MongoDB

**Web Development:** MERN Stack (MongoDB, Express.js, React.js, Node.js), Django

## Undergrad Project Experience

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### Development of an Ensemble Learning system for Facial Expression Recognition using smaller CNN models with Transfer Learning

Jan 2022 - Mar 23

#### UNDERGRADUATE THESIS

**Summary:** Our research aims to find an efficient way to recognize facial expressions (expression images from multi-angles) by ensembling smaller models without compromising accuracy. For this, we developed and trained a Facial Expression Recognition ensemble learning system using smaller CNN models with transfer learning, which achieved 97.55% accuracy on the benchmark dataset KDEF. We utilized transfer learning and advanced data augmentation to deal with overfitting problems and assessed the performance of Mixup and CutMix data augmentation on our benchmark datasets.

### DepressionTrend: Using Dynamic Word Embeddings to Analyze the Trends of Depression

2022

#### ACADEMIC PROJECT (SENIOR YEAR)

**Summary:** We aim to analyze the depression trends from social media texts using dynamic word embeddings, for which we collected a bulk amount of depression-related data (1M posts) crawling from Reddit and utilized NLTK for text processing. We preprocessed the data in a time-based approach: Incremental Window and Sliding Window. Pre-trained word embeddings like Skip-gram and GloVe are used to analyze trends related to depression utilizing semantic relationships encoded in word vectors. We are now monitoring the changes in word embeddings and also observing how depression and anxiety have shifted over the years using temporal data.

### Result Processing System (RPS): A web application for result processing

2021

#### ACADEMIC PROJECT (JUNIOR YEAR, COURSE: SOFTWARE ENGINEERING & DESIGN PATTERNS)

A web-based application implemented for interactions between teachers and students, where students can view their academic results and download the tabulation sheet, and teachers can view, enter, and edit the marks and generate the tabulation sheet. JavaScript, Django framework, and SQLite3 were used to develop this application.

## Academic Services

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### Co-organizer

#### IEEE ICMLA 2025 SPECIAL SESSION

2025

Special Session: Multi-modal Machine Learning in Practice: Algorithms and Applications (MAPLE2025)

### Reviewer

#### IEEE INTERNATIONAL CONFERENCE ON SYSTEMS, MAN, AND CYBERNETICS (SMC)

2025

## Leadership And Voluntary Activities

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March 2025 - Present

**Elected General Secretary of BSO**, (an official SIU Carbondale registered student organization)

Carbondale, Illinois, USA