

# SAKIB HASSAN

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## Education

### University at Buffalo

Jan. 2022 – Dec. 2025

*Bachelor of Science in Computer Science and Minor in Mathematics*

*Buffalo, NY*

## Relevant Coursework

- Artificial Intelligence
- Machine Learning
- Reinforcement Learning
- Algorithms Analysis
- Data Structures
- Database Management
- Modern Networking
- Systems Programming

## Experience

### University at Buffalo

January 2023 – May 2023

*Software Engineer Intern*

*Buffalo, NY*

- Developed a React and WebSocket-based app for real-time 3D sensor data visualization with dynamic user interactions.
- Integrated secure authentication with Amazon Cognito for enhanced security.
- Designed a DynamoDB solution with Python for efficient data transformation and epoch-based queries.
- Built a high-performance Python WebSocket server on EC2 for seamless IoT communication.

## Projects

### Double Deep Q-Learning Network | Python

October 2024

- Implemented a Double Deep Q-Network (DDQN) in Python to train an agent for the CartPole-v1 environment.
- Utilized PyTorch and Gym for neural network design and reinforcement learning simulation.
- Integrated replay memory and target network updates to enhance training efficiency and stability compared to DQN.
- Visualized performance metrics, including training rewards and epsilon decay, to evaluate model learning progression.

### Adversarial Attacks on MNIST | Python

May 2024

- Implemented FGSM and PGD attacks to evaluate adversarial robustness on the MNIST dataset.
- Loaded and preprocessed the dataset with PyTorch, including data transformations and creation of data loaders.
- Utilized a Huggingface pretrained model for inference and adversarial attack testing.
- Added adversarial perturbations to fool the model into incorrect predictions and visualized the impact on test samples.

### Clustering and Dimensionality Reduction | Python

April 2024

- Implemented K-Means with a 95.55 inertia score and visualized optimal clusters using inertia and silhouette plots.
- Reduced dimensions from 13 to 2 using PCA, improving interpretability while preserving key variance.
- Developed and evaluated a Naive Bayes classifier with 80.56% accuracy on real-world datasets.
- Utilized advanced data visualization techniques to effectively communicate insights.

### Semantic Search Chatbot | Python, Streamlit

September 2023

- Built an AI text analysis tool handling PDFs and text using LangChain and OpenAI embeddings and APIs.
- Enabled targeted content queries for efficient data extraction and analysis.
- Developed an intuitive interface with Python and Streamlit for seamless user interaction.

## Technical Skills

**Languages:** Python, Java, C, HTML/CSS, JavaScript, SQL

**Developer Tools:** VS Code, Git, Google Colab, Anaconda, Docker, Unity, IntelliJ, Emacs, Xpra

**Technologies/Frameworks:** PyTorch, CUDA, TensorFlow, Postgres, Streamlit, GitHub

## Awards / Extracurricular

### UB Hacking 2022 Winner

November 2022

*Financial Game*

*University at Buffalo*

- Won UB Hacking 2022 Best Freshman Hack and M&T Tech Awards for an educational financial literacy game.
- Designed an engaging game using Unity and itch.io to enhance financial understanding.
- Built a supporting website for the game using HTML and CSS for seamless integration.