



Gunjan Dhanuka

Roll No.: 200101038

B.Tech - Computer Science and Engineering

Minor in Robotics and Artificial Intelligence

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EDUCATION

Degree/Certificate	Institute/Board	CGPA/Percentage	Year
B.Tech. Major	Indian Institute of Technology, Guwahati	9.02 (Current)	2020-Present
Senior Secondary	CBSE Board	97.6%	2020
Secondary	ICSE Board	97.5%	2018

RESEARCH EXPERIENCES AND PROJECTS

Carnegie Mellon University, USA

Research Intern under the supervision of Dr. Min Xu in Xu-Lab

May 2022 - Ongoing
Pittsburgh, USA (Remote)

- Performing **Video Anomaly Detection** on real-world benchmark datasets like UCF-Crime and ShanghaiTech, with an **improvement of over 1.62%** over the existing State-of-the-art methods.
- Using **Feature-level Knowledge Distillation** to reduce model complexity, along with **Disentangled Attention** for the temporal processing, to compensate for the small dataset size of UCF-Crime.

Indian Institute of Technology, Guwahati

Bachelor Thesis Project under Dr. John Jose in Multi-core ARchitecture and Systems (MARS) Lab

July 2023 - Ongoing
Guwahati, India

- Working on analyzing the impact of **Hardware Trojan (esp. Black Hole Router Attack)** on **Network-on-chip** systems.
- Studying impact on the cache operations along with the CPU throughput using the **gem5 simulator** in **C++ and Python**, and coming up with possible detection and mitigation techniques for such attacks.

University of New South Wales (Sydney) & CSIRO Australia

Research Intern under Dr. Rohitash Chandra (UNSW) & Dr. SS Vasan (Science Leader, CSIRO)

Nov 2021 - May 2022
Sydney (Remote)

- Extracted and visualized **graph representation** of Protein Structures of various virus strains of **SARS Cov-2**.
- Analyzed **Node and Edge Centralities** in the graph to correlate and predict significant mutations in the strains.

INDUSTRIAL EXPERIENCE

Rubrik Inc.

Software Engineering Intern in the RSC-P Platform team

May 2023 - July 2023
Bengaluru, India

- Implemented **Multi-Node Scaling Support in RSC-P Cluster**(Rubrik Security Cloud - Private) using **Kubernetes**.
- Developed a **Command Line Interface (CLI) in Golang** for the users to add/remove nodes to an existing RSC-P Cluster, view cluster status, and perform live updates using **Gravity**, a k8s management service.
- Devised and implemented a **Leader-Worker architecture** to **pin the stateful services** like Object Storage, Database, and Messaging Queue on the leader node, while **scaling the stateless services automatically** to the newly joined nodes.

KEY PROJECTS

Route Planning and Optimization with Volume Estimation for Last-Mile Deliveries

Inter-IIT Tech Meet, 2023 (held at IIT Kanpur)

Feb 2023
GitHub link

- Performed **volumetric weight estimation** of objects using a stereoscopic RGB Camera setup and developed an **end-to-end physical system** to measure the dimensions of the object with **very low latency** and **95%** accuracy.
- Used **Deep Neural Networks** to classify the shape of the object, for background removal to estimate **Pixel Per Metric ratio**, and using **Similarity Scaling** and **Background Averaging** to predict accurate object height.
- Optimized the Last-Mile-Delivery problem by devising **Optimal Rider Routes**, incorporating **Dynamic Pickups** and forming rider-bags using **3-D Bin Packing heuristics**. Improved scalability by using a iterative **Sweep Clustering Algorithm**.

Model Extraction Attack for Video Classification Models

Inter-IIT Tech Meet, 2022 (held at IIT Kharagpur)

Mar 2022
Final Report Link | GitHub Link

- Developed **Swin-T** and **MoViNet-A2-Base** model extraction pipelines through synthetic query generation.
- Trained **Temporal Segment Networks (TSNs)** and **EfficientNet-LSTM** models in Greybox and Blackbox setting
- Used *Kinetics-400* and *Kinetics-600* action video classification datasets to obtain victim model similarity.

NanoC Compiler

Guide: Prof. Sukumar Nandi | Compilers Lab, IIT Guwahati

May 2022
GitHub Link

- Developed a compiler for NanoC, a subset language of C having essential features like **I/O management, error-handling, and control statements** using **Lex, Bison, and C++**.
- Implemented generation of **assembly language quads** for the given code and an executable for the same.

xv6: Unix-based Operating System

Guide: Prof. John Jose | Operating Systems Lab, IIT Guwahati

May 2022
GitHub Link

- Implemented a **SJF** and **Round-Robin** based **hybrid scheduling algorithm** and tested for CPU and I/O bound tasks.
- Incorporated **lazy memory allocation & dynamic page swapping** based on LRU policy for active processes.

OTHER PROJECTS

Semantic Word Embeddings Visualizer - Word2Vec

Self Project

May 2022

[GitHub Link](#)

- Deployed **Gensim Word2Vec model** with custom parameter tuning, **interactive semantic similarity plots**, and **training-on-the-fly** features. Option to upload custom text corpus or tabular conversational data also provided to the user.
- Performed **Dimensionality Reduction** on the Word Vectors to map them to 2D and 3D space using **PCA & TSNE**.

VR Electronics Lab Simulator

Guide: Prof. Samit Bhattacharya / VR and AR Systems Course, IIT Guwahati

Mar 2022

[GitHub Link](#)

- Created a **VR based** simulation lab on **Unity** using **SpiceSharp** to simulate the electric circuit, with unlimited components support, electron-flow animation and adaptable bulb intensity, using **C#** to implement the logic.
- Employed **Depth-First Search** from each battery to iterate component-wise, allowing **multiple circuit** simulations.

Majuli Island Virtual Tour (Govt. Funded Project)

Guide: Prof. Samit Bhattacharya / Software Engineering Lab, IIT Guwahati

May 2022

[GitHub Link](#)

- Developed a **VR application** for a **3D tour** of Majuli Island using **300+ 360°images** and videos in **Unity** for Oculus Rift, also implementing interactive objects, movement, and maps for navigation and teleportation using **C# scripts**.

Sentiment-based Reinforcement Learning for Stock Trading

Self Project

Jul 2022

[GitHub Link](#)

- Performed **Text Summarization** and **Sentiment Analysis** of scrapped News Articles using **PEGASUS** model. Trained the **A2C model** on a custom environment in **OpenAI gym** using **scrapped data**, adding **SMA, RSI and OBV** indicators.

Covid Management System

Research and Industrial Conclave Hackathon, IIT Guwahati (First prize)

Jan 2022

[GitHub Link](#)

- Developed a **Django based web application** for students, faculty, doctors, and shopkeepers of the IITG, which facilitated scheduling appointments, online medicine shopping, and **real-time monitoring** of individual patient status.

TECHNICAL SKILLS

Programming languages: C, C++, Python, Golang, Javascript
ML/AI: Pytorch, Tensorflow, Numpy, Pandas, Matplotlib

Software Dev: Django, Flutter, Firebase, React*, Node.js*
Miscellaneous: MySQL, Git, Shell, Latex, Kubernetes

ACHIEVEMENTS

Research Conclave Hackathon IITG	Awarded with the first prize for the best solution to manage on-campus Covid outbreak.	2022
Amazon ML Challenge	Secured a rank of 26 from over 5000 teams in a two-day competition.	2023
Amazon ML Summer School	Selected from more than 17,000 students in India.	2022
Reliance Foundation Scholarship	Selected as one among 37 students across India in CS & AI.	2021
JEE Mains 2020	Secured All India Rank 382 out of approx. 900,000 candidates.	2020
JEE Advanced 2020	Secured All India Rank 469 out of approx. 250,000 candidates.	2020
KVPY Fellowship	Selected as KVPY Scholar out of 40,000 candidates in the SX Stream.	2020

RELEVANT COURSEWORK

- **Computer Science:** Compilers Lab, Machine Learning, Operating Systems, Computer Networks, Software Engineering, Data Structures & Algorithms, Formal Languages & Automata Theory, Database Management Systems, Computer Architecture & Organization, VR & AR Systems, System Software Lab, Smart Systems (Sensors) Lab, Computer & Network Security, Hardware Security, Parallel Algorithms, Deep Learning Specialisation (Coursera).
- **Mathematics:** Linear Algebra, Calculus, Probability Theory & Random Processes, Mathematical Finance.
- **Robotics and AI:** Introduction to Robotics, Mechatronics, Robotic Vision and Control, Fundamentals of AI

LEADERSHIP POSITIONS

- **Coding Club, IIT Guwahati**
 - **Secretary (2022-23):** Overall leadership of one of the largest college coding clubs of India (~10,000 followers, 100 members) and its activities, which included conducting national-level hackathon, preparing programming courses, conducting live workshops, and releasing summer projects. Conducted CodePeak (~5000 participants, nationwide Open Source event) and Ethos (~1500 participants, largest hackathon in North-East India).
 - **Co-ordinator (2021-22):** Raised awareness about opensource activities on campus by conducting live Git-GitHub workshop, and coordinating the conduction of CodePeak.
- **Computer Science and Engineering Association(CSEA), IIT Guwahati**
 - **Treasurer (2023-Present):** Managing the finances along with the overall planning and execution of CSEA's activities, especially driving the planning of a new Undergraduate Research Program.
 - **Technical Executive (2022-23):** Organising guest talks, research awareness sessions, hackathons, and coding contests to enhance the coding culture on the IITG Campus.

EXTRACURRICULARS

- **Quizzing:** Won the fifth prize in India Quiz at Inter-IIT Cultural Meet 2023 and was a National Finalist at Aqua Regia School Quiz 2016 (top 8 teams among 2.4 lakh students).
- **Trekking:** Completed the Valley of Flowers and Brahmatal Treks in the Himalayas, and several short treks in the Western Ghats.