Sajeeb Das

+880 1537224180 | hi5.sajeeb@gmail.com | sajeeb007.github.io/hi5sajeeb/ | github.com/sajeeb007 | linkedin.com/in/hi5sajeeb

Computer science graduate adept in software development, Python, deep learning, and applying ML techniques to build intelligent, high-quality solutions.

EDUCATION

National Institute of Technology, Rourkela, *B.Tech in Computer Science and Engineering* | Odisha, India
GPA: 8.1 / 10 | Gradecard — June 2024

Winner: IIT Bombay Techfest & NIT Rourkela Innovation E-cell Hackathon
Funding: NIT Warangal Firefly Startup Incubation
Courses: DSA | Database Engineering | OS | Computer Networks | Machine Learning | Deep Learning | Distributed System

EXPERIENCE

Qualcomm, *Software Engineer Intern (QDSP Team)* | Onsite (Hyderabad, India) — May 2023 - July 2023

- Enhanced power measurement accuracy for SNPE and QNN SDK, leading to a 30% reduction in energy consumption for ML models by providing the team with actionable insights for optimization.
- Created and implemented a robust algorithm for measuring and visualizing Inference/watt for machine learning models run on QNN and SNPE SDK, increasing analysis efficiency by 40%.
- Found and fixed critical bugs, improving system reliability by 25%.
- Authored comprehensive process documentation in the internal directory; improved team efficiency by 20% and facilitated seamless knowledge transfer across departments, reducing onboarding time for new hires by 50%.
- Developed comprehensive test cases and curated playlists for efficient testing, reducing testing time by 30%.
- Demonstrated effective remote collaboration with the cross-functional team in San Diego, successfully integrating the barebone power module developed there with the local efforts in Hyderabad.

National Institute of Technology, Rourkela, *Research Assistant* — Aug 2023 - June 2024

- Collaborated closely with Prof. Tapas Kumar Mishra to pioneer advancements in machine translation for low-resourced Indic languages. Our research focused on integrating sophisticated linguistic features into Transformer models, leveraging cutting-edge techniques to enhance translation quality and accuracy.
- Successfully integrated advanced linguistic features such as part-of-speech tagging, named entity recognition, and lemmatization into Transformer models, leading to a 35% improvement in translation quality.
- Employed OpenNMT-py to train our models on the comprehensive English-Indic Samanantar Dataset, achieving state-of-the-art results in translating low-resourced languages.
- Conducted extensive experiments and rigorous evaluations, resulting in more reliable and accurate machine translation outputs.
- Presented research findings at internal seminars and contributed to academic papers, enhancing the visibility and impact of our work in the computational linguistics community.

Instructor, *Chittagong Junior Coders* | Online (Bangladesh) — 2021-2023

- Inspired and engaged students from Bangladesh in the field of coding through collaboration with the Facebook group "Chittagong Junior Coders," teaching programming to students ranging from 2nd to 10th grade using the C programming language.
- Made coding more accessible and enjoyable for young learners in a region with limited resources and opportunities for programming education.
- Built a strong foundation in coding principles and problem-solving skills, igniting a passion for technology and innovation among students.
- Honed teaching abilities and demonstrated a commitment to community service, nurturing the next generation of programmers.
- Volunteered time and knowledge to create a supportive learning environment, empowering young minds to explore and excel in technology.

SKILLS

Languages	Python, C/C++, SQL, Git, Bash, LaTeX
Machine Learning	Pandas, Numpy, Spacy, Matplotlib, Scikit-Learn
Web Development	MongoDB, Express, ReactJS, Node, RESTful API
Software	Linux, Blender
ML Frameworks	Pytorch, Opennmt-Py

PROJECTS

License Plate Recognition System

- Developed a license plate detection system by implementing image processing techniques to identify and locate license plates on vehicles.
- Converted images to grayscale and then to binary to simplify the detection process, applying connected component analysis (CCA) to identify and label connected regions in the binary image.
- Used morphological processing and edge detection to enhance the identification of potential license plate regions, refining the results by filtering based on characteristics such as shape and size.
- Implemented vertical projection to further distinguish license plate regions from other similar objects like headlamps or stickers.
- Segmented characters on the identified license plates using CCA and resized each character to a standard 20px by 20px for recognition.
- Applied supervised machine learning for character recognition, utilizing Support Vector Classifiers (SVC) with a training dataset of character images to achieve high accuracy in predicting license plate characters.
- Validated the model with 4-fold cross-validation and saved the trained model for future predictions.

Traffic Signs Classification with a Convolutional Network

- Classified traffic signs from the German Traffic Sign Dataset, consisting of 39,209 training images and 12,630 test images, each 32×32 pixels in RGB color space.
- Addressed class imbalance through data augmentation techniques including flipping, rotation, projection, and jittering, extending the dataset to 63,538 images.
- Applied preprocessing steps such as scaling pixel values to [0, 1], one-hot encoding labels, and localized histogram equalization to enhance feature extraction.
- Utilized grayscale images to simplify the model, leveraging only the Y channel from the YCbCr color space for improved performance.
- Designed a convolutional neural network (CNN) with 3 convolutional layers and 1 fully connected layer, incorporating multi-scale features and dropout regularization to prevent overfitting.
- Implemented L2 regularization and early stopping with a patience of 100 epochs to optimize training and prevent overfitting.
- Trained the model in two stages: pre-training with an extended dataset and fine-tuning with a balanced dataset, achieving a test set accuracy of 99.33%.
- Visualized learned filters from the first convolutional layer to analyze feature detection, and evaluated model performance by reviewing misclassified examples and out-of-scope predictions.

Custom Image Processing Filters

- Engineered a suite of advanced image processing filters, including **Blur**, **Grayscale**, and **Edge Detection**, tailored specifically for BITMAP images, utilizing the **C programming language**.
- Executed complex algorithms based on **Microsoft Bitmap Guide**, ensuring precise manipulation and transformation of image data.
- Implemented **multithreaded processing** to optimize performance and reduce computational overhead, achieving a significant improvement in processing speed and efficiency.
- Developed comprehensive test cases to validate the accuracy and reliability of each filter, ensuring high-quality outputs.

Project Ebony Webwiz - Web Dev Club

- Designed and developed a **comprehensive, dynamic website** dedicated to aggregating and organizing a wide array of resources for learning web development, aimed at students and enthusiasts.
- Implemented a robust **content management system (CMS)** using **React.js** and **Node.js**, facilitating seamless updates and maintenance of the website's extensive resource library.
- Incorporated **advanced search and filter functionalities**, enabling users to easily find relevant resources based on their specific learning needs and preferences.
- Designed an **intuitive and responsive user interface** with a focus on user experience, employing **modern web design principles** and ensuring compatibility across various devices and browsers.

Achievements

- Awarded the **Study in India Government Scholarship** by the Ministry of External Affairs, providing full financial support for the entire duration of Bachelor's studies at NIT Rourkela (NITR).
- Secured funding from the **NIT Warangal Startup Incubation Center** for the development of our startup, focused on an innovative **EV Vehicle Ecosystem** app, supporting its growth and implementation.