Niyar R Barman

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Education

- **National Institute of Technology** — Silchar, India
  Bachelor of Technology - Electronics and Communication Engineering — *Expected 2025*
- **Indian Institute of Technology** — Madras, India
  Bachelor of Science - Programming and Data Science — *Expected 2025*
- **Don Bosco School** — Guwahati, India
  AISSE / AISSCE — *2008 - 2020*

Skills Summary

- **Languages**: Python, JavaScript, C, C++
- **Frameworks**: PyTorch, TensorFlow, Keras, Scikit, Django, ReactJS, NextJS, React Native
- **Tools**: Docker, Git
- **Platforms**: Linux, Web, Windows, AWS, GCP

Experience

- **Research Intern** — Remote
  Artificial Intelligence Institute of UofSC, United States — *Jan 2023 - Present*
  - Conducted research on AI written text detection methods, specifically focusing on Perplexity and Negative Log Likelihood among six different methods.
  - Calculated sentence-level and paragraph-level perplexity and negative log likelihood values for a a custom dataset comprising human text and AI-generated text from 15 language models (LLMs). Generated perturbations of the original dataset to evaluate the effectiveness of a detection method using negative log likelihood.
  - Developed a novel metric called ADI to provide a comprehensive understanding of the detectability of Large Language Models.

Open Source Contributions

- **PyTorch**: Contributed to PyTorch (pytorch/examples) by independently developing and implementing Vision Transformer using only native PyTorch libraries, trained on the CIFAR-10 dataset.

Key Projects

- **SwiftGPT**:
  - Developed SwiftGPT, a natural language generation model based on the GPT-2 architecture, specifically trained on a Taylor Swift songs dataset to generate new song lyrics in Taylor Swift's writing style.
  - Implemented a custom BigramLanguageModel using PyTorch, incorporating multi-head self-attention and feed-forward layers. Conducted 5000 training iterations with an AdamW optimizer and monitored train and validation loss to fine-tune the model for creative songwriting.
- **MapSnap**:
  - Developed MapSnap, a web application that leveraged the Segformer model for real-time semantic segmentation of satellite images. The application generated masked outputs that highlighted affected areas.
  - Successfully fine-tuned the Segformer model using the IARAI landslide4sense dataset, resulting in accurate and efficient identification of landslide-prone areas.
- **DiagnoAI**:
  - Fine-tuned the BERT transformer model to detect 24 common diseases and generate probability scores for the top 3 diseases.
  - Curated and labeled a comprehensive dataset of 1200 symptom descriptions associated with 24 diseases, which was used for training and validating the model.
- **FloodMent**:
  - Utilized deep learning and computer vision techniques to build a model for identifying and segmenting flooded areas in aerial images.
  - Implemented a fully Convolutional U-Net architecture to generate semantic segmentation maps.

Honors and Awards

- **Neurathon 2023 Winner**: Awarded first place in Neurathon, the annual machine learning hackathon organized by the Machine Learning Club at NIT Silchar.
- **Un-Flood Assam Hackathon - 4th Place**: Secured the fourth position in the highly competitive Un-Flood Assam Hackathon organized by the Ministry of Electronics & Information Technology.