Aninda Ghosh

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Education

MS. in Robotics & Autonomous Systems (AI) **Aug 2022 - May 2024**
Arizona State University, USA *GPA 3.78/4.0*
B.Tech. in Electronics and Communication Engineering **Aug 2012 - May 2016**
West Bengal University of Technology, India *GPA 8.97/10.0*

Skills

Programming Languages: Python, Embedded C, C++, JavaScript
Developer Tools: Linux, JTAG, GDB, Kubernetes, Docker, LXD (containerization), GIT, CUDA, Jira, Confluence, Jupyter Notebook
Frameworks & Software: PyTorch, Scikit-Learn, OpenCV, Pandas, NumPy, AWS, ROS, MBED OS 5 (MBED Studio), RTOS
Coursework: Artificial Intelligence, Embedded Machine Learning, Perception in Robotics, Applied Linear Algebra, Robotic Systems 1

Experiences

Arizona State University **May 2023 - Present**
Graduate Research Assistant ***Tempe, USA***
Technologies Used: GeoPandas, PyTorch, Python, OpenCV, NVIDIA GPUs

- Creating benchmark dataset from public unstructured data sources for Satellite Imagery-based Field Boundary Delineation.
- Working on **identifying and setting up evaluation metrics** (Instance Segmentation & Multi-Class Classification) for the collated datasets.
- The goal is to **release a benchmark dataset with evaluation metrics** in ML Commons Platform in collaboration with NASA (Harvest).
- Created a unified data format to deal with different types of data sources like **Google Earth Engine** and other publicly available sources.
- Formulated an **end-to-end Deep Learning pipeline** for CNN-guided SAM architecture.
- Released a Public Finetuning Repository for Segment Anything Model for downstream application (GitHub Link).

Praesus Technologies Pvt. Ltd. (Altor) **Nov 2020 - Jul 2022**
ML Researcher - Fractional CTO ***Bangalore, India***
Technologies Used: Python, Deep Learning, C++, RTOS, ARM Cortex SOC, NVIDIA Jetson Nano

- Facilitated founders to devise project plans and roadmaps.
- Grew the team from **5 to 20** in a tenure of 3 years.
- Customized **BERT (Transformer based) Deep Learning model for mobile accident detection** and IMU-based human activity recognition.
- Guided data team in AWS for self-supervised ML pipeline, integrating explainable supervised ensemble models.
- Headed efficient, reusable embedded software design, cutting **ARM M4 SOC project development time by 40%.**
- Developed a **custom bootloader (for nRF52 SOC) for OTA** support using CORDIO Bluetooth stack in MBED OS (GitHub Link).
- Built a **public repository of custom libraries** for various sensors and audio SOCs (GitHub Link).

L&T Technology Service Limited **Mar 2020 - Oct 2020**
Senior Application Engineer ***Bangalore, India***
Technologies Used: AWS, Python, Shell Script, Windows Batch Script

- Managed JAVA dev team **validating Micro-service architecture** POCs for Statuscope, enabling remote operation of MRI machines.
- Automated report generation using **Kafka, AWS Glue, and AWS Athena**, cutting reporting time 70% by eliminating manual processes.
- Facilitated a new team on **cloud deployments in Kubernetes** for analyzing Fit-Bit motion data.
- Improved the Kubernetes pod deployment by automating the process leveraging helm charts, thus improving the CICD pipeline.

Distronix LLC. **Jan 2017 - Feb 2020**
Senior Research and Development Engineer ***Kolkata, India***
Technologies Used: Embedded C, C++, RTOS, Python, Sensors, IIoT, ARM SOCs, Atmega SOCs, Raspberry Pi

- Led a team of 5 to manage small-scale manufacturing and deployments.
- Designed a **low-latency communication stack for 2G network**, achieving high data compression during transmission.
- **Ported open-source Pub-Sub stack to a custom RTOS** for efficient data transmission over Kafka stream.
- **Engineered low-level drivers for sensors** (IMU, DHT Temperature) based on UART, SPI, and I2C-based communication protocol.
- Used JTAG to debug **and reduce the memory footprint of an optimized codebase** for storage.

Projects

Bridging the gap between RGB and Event Cameras **Jan 2023 - May 2023**
Technologies Used: OpenCV, Python, PyTorch, Deep Learning, Scripting, Nvidia GPU

- Plagued by unlabeled data, baseline method converges the domain of labeled data in RGB domain to Event Cam Domain.
- Modified the backbone completely in the baseline model to ResNeXt–152 (64x4d) and implemented GELU for activation function.
- Improved the accuracy of the Baseline Deep Learning Model by 5% while also reducing the training time by 48% (GitHub Link).

DOBOT M1 SCARA based task performance **Jan 2023 - May 2023**

Technologies Used: Python, Robot Hardware, DOBOT M1, DOBOT M1 SCARA

- Performed Pick & Place with a Dobot M1 SCARA, showcasing the motion sequences of an Industrial Robot (YouTube Link).
- Executed Pick & Place routine on conveyor belt, showcasing DOBOT M1 synchronization for cube stacking via color recognition (YouTube Link).

Public Dataset of Car Models based on CARVANA Website **Aug 2022 - Dec 2023**

Technologies Used: OpenCV, PyTorch, PyGUI, PySocks

- Scraped CARVANA Website for diverse CAR Model images, valuable for Semantic and Instance Segmentation Models (GitHub Link).

Vision-X, A Smart Navigation System for differently abled people **Mar 2015 - Sep 2016**

Technologies Used: Embedded C++, OpenCV, Shell Script, ARM SOC, Raspberry Pi

- With the need of a self-sustained edge device for indoor navigation, developed a battery-operated edge device.
- Developed a machine vision pipeline to recognize objects and provide audio feedbacks (Demo Video) (GitHub Link).
- Implemented a Bayesian decision algorithm within an ARM Cortex Controller to detect Human, Stairs, Doors, and Free ground, optimizing indoor movement.

Publications

- Paul, Tuhin Utsab, and Aninda Ghosh. "Smart Support System for Navigation of Visually Challenged Person Using IoT." Data Engineering for Smart Systems, 2021, pp. 27–36., https://doi.org/10.1007/978-981-16-2641-8_3.
- Utsab Paul, Tuhin. "Brain Tumor Texture Analysis – Using Wavelets and Fractals." International Journal of Medical Imaging, vol. 4, no. 4, 2016, p. 23., https://doi.org/10.11648/j.ijmi.20160404.11.