Animikh Aich

animikhaich.github.io || animikh@bu.edu || (857) 260-0017 || linkedin.com/in/animikh-aich || github.com/animikhaich

Professional Experience

Machine Learning Engineer (Contractor) Remote, USA
Moultrie Mobile, PRADCO - Outdoor Brands *June 2023 - Aug 2023*

- Designed Antler Segmentation & Counting Algorithm, seamlessly integrating Object Detection, Semantic Segmentation, and Pose Estimation using cutting-edge methodologies like Grounding DINO, SegmentAnything, and ViTPose+.
- Achieved remarkable Image Enhancement results by training Super Resolution GANs on curated wildlife photographs, upscaling 640x360 images to 2560x1440 resolution, delivering high-resolution reconstructions across diverse lighting conditions.
- Experimented with state-of-the-art 3D Reconstruction algorithms like HumanNeRF and BANMo aiming to generate intricate 3D digital replicas of antlers from single-camera sourced pictures and videos.
- Successfully demonstrated the feasibility of Animal Re-Identification for wild Bucks by building a proof-of-concept leveraging trail camera captured videos.

Computer Vision Engineer and Lead New Delhi, India
Wobot Intelligence (Wobot.ai - Backed by Sequoia Capital and Titan Capital) *June 2019 - June 2022*

- Spearheaded a team of 14 engineers to develop over 90 real-time video analytics solutions scaled on Cloud using Kubernetes for 200+ CCTV cameras, resulting in increased hygiene compliance by 2x in the food and hospitality industry.
- Enforced safety & hygiene compliance by developing multi-object detection & tracking, pose estimation, activity recognition, person re-identification, and face recognition algorithms, deployed across 3 continents reducing non-compliance by 25%+.
- Applied classification, object detection & tracking algorithms like ResNet, Inception, EfficientNet, EfficientDet, YOLO, Centroid Tracking, and OpenCV Tracking to satisfy product requirements based on available compute resources.
- Reduced data-to-production time by building development tools for data and models (using Python, TensorFlow, PyTorch & OpenCV) resulting in a 3x increase in productivity, positively impacting the team's efficiency and reducing time-to-market by 50%.
- Implemented Synthetic Dataset Generation for object detection, reducing labeled data requirements by 35% and accelerating computer vision model development, resulting in significant cost savings and faster time-to-market.
- Improved alert precision by up to 95% using ensemble models and temporal features reducing false positive alerts by 30%.

Academic Experience

Graduate Research Assistant Boston, MA
H2X Lab, College of Engineering (COE), Boston University, Advisor: Prof. Eshed Ohn-Bar *Jan 2023 - Present*

- Develop zero-shot Sim2Real using foundation models like SegmentAnything and DINOv2 to directly translate learned controls from CARLA simulator to the real world.
- Applied test-time dropout to Transfuser (Chitta et al.) pre-trained models to modify model architecture and performance, and to examine the correlation between online and offline evaluation metrics for 36 routes spanning 6 towns in the CARLA simulator.
- Experimented with sensor fusion using vision and LIDAR-based multi-modal conditional imitation learning incorporating auxiliary tasks such as depth estimation and semantic segmentation for autonomous driving in CARLA simulator.
- Explored RegNet and SampleRNN for audio generation from visual scenes for representation pre-training of navigation agents.

Graduate Research Assistant Boston, MA
BIT Lab, Computing & Data Sciences (CDS), Boston University, Advisor: Prof. Dokyun "DK" Lee *Feb 2023 - May 2023*

- Developed rule-based multi-modal algorithm that leverages text prompts, image tags, and visual features to assist causal inference on user art study, enabling deeper analysis of user behavior and preferences.
- Developed ViT and DINOv2-based models using PyTorch to identify AI-generated Deviant Art and achieved an accuracy of 92.04%.

Undergraduate Research Assistant Bangalore, India
RNS Institute of Technology, Advisor: Prof. Chetana Hegde *Feb 2018 - June 2019*

- Authored 4 research papers with 100+ citations; performed comparative study in preprocessing techniques and algorithmic survey in sentiment analysis, forecasting, and encoding.

Skills

- **Languages & Libraries**: TensorFlow, PyTorch, Albumentations, OpenCV, NumPy, scikit-learn, pandas, PIL, Matplotlib, Python, C++
- **Tools & Platforms**: Docker, CARLA, TensorRT, ONNX, Intel OpenVINO, Nvidia Triton, TensorFlow Serving, Linux, AWS, Azure

Education

- **Boston University, Graduate School of Arts & Sciences (GRS)** Boston, MA
  Master of Science (MS) - Artificial Intelligence (GPA: 3.90/4.00) *Expected May 2024*
  Courses: *Robot Learning & Vision (TA Fall '23), Computer Vision, Geometric Processing, Principles of Machine Learning, Data Science Tools*

- **Visvesvaraya Technological University (VTU), RNS Institute of Technology** Bangalore, India
  Bachelor of Engineering (BE) - Electronics & Communication Engineering *Aug 2015 - July 2019*
  Awards: *Best Outgoing Student - 2019; First Prize in State Project Competition for 'Automatic Helmetless Rider Detection using Deep Learning'*

PROJECTS

- **WoUtils (Wobot.ai)**: Backbone utility powering complete computer vision stack with 5300+ lines of code based on OpenCV, TensorFlow, Model Servers, and supporting frameworks. Designed to standardize training and inference pipeline while promoting code modularity. Used by 25+ developers increasing productivity by 3x and scaling applications up to 200+ cameras. *June 2022*
- **Handwash Detection (Wobot.ai)**: Novel, computationally-efficient algorithm to detect handwash duration using an overhead CCTV camera by combining spatial and temporal features using feature extraction and background subtraction respectively. Deployed globally for real-time inference across 160+ cameras to ensure staff adherence to health guidelines. *May 2022*
- **3D Text2LIVE (BU CS640)**: Zero-shot, text-driven appearance manipulation on multiple views of an object to generate 3D renderings. Combined NeRF with Text2LIVE to generate 3D renderings of an appearance edited object. *(Code) Dec 2022*
- **Ticket Grading (Wobot.ai)**: Intelligent algorithm to accurately assign a quantifiable metric (score) to measure the correctness of alerts raised by the inference of the CCTV feeds, by applying custom-trained ensemble models and/or 3rd party APIs. *June 2022*
- **Deep Convolutional Background Subtractor (Open Source)**: UNet Xception-style model trained to perform real-time background subtraction. Preprocessed COCO dataset by segmenting and cropping foreground objects to enforce model to learn background subtraction through Binary Segmentation. *(Code) (YouTube) Nov 2021*
- **No-Code Image Classifier Training Utility (Open Source)**: Containerized TensorFlow-based image classification training utility with Streamlit-based interface designed to choose between common architectures and optimizers for quick hyperparameter tuning, which drastically lowers experimentation time. Deployed with Docker. *(Code) (YouTube) June 2021*

PUBLICATIONS

- S. Kalwar, **A. Aich**, and T. Dixit, "LatentGAN Autoencoder: Learning Disentangled Latent Distribution" 2022 - arXiv preprint; Available: *DOI: 10.48550/arXiv.2204.02010*.
- **A. Aich**, A. Krishna, A. V, and C. Hegde, "Encoding Web-based Data for Efficient Storage in Machine Learning Applications" 2019 - ICInPro 2019 (IEEE); Available: *DOI: 10.1109/ICInPro47689.2019.9092264*.
- A. Krishna, A. V, **A. Aich**, and C. Hegde, "[Best Paper] Sentiment Analysis of Restaurant Reviews Using Machine Learning Techniques" 2019 - ICERECT 2018 (Springer); Available: *DOI: 10.1007/978-981-13-5802-9_60*.
- A. Krishna, **A. Aich**, A. V, and C. Hegde, "Analysis of Customer Opinion Using Machine Learning and NLP Techniques" 2018 - ICCS 2018 (Elsevier); Available: *SSRN: IJASSR, Volume 3, Issue 9, 2018*.
- A. Krishna, A. V, **A. Aich**, and C. Hegde, "Sales-forecasting of Retail Stores using Machine Learning Techniques" 2019 - CSITSS 2018 (IEEE); Available: *DOI: 10.1109/CSITSS.2018.8768765*.

AWARDS & RECOGNITION

- **Competition Winner**: Earned top honors in a 20-person class for virtual car racing with Reinforcement Learning, *EC500, BU* 2023
- **Best Striker (First Prize)**: Identified highest number of bugs in pre-launch product among 100+ members, *Wobot.ai* 2021
- **Winning Team**: Developed best solution for Hand Wash Detection with Facial Recognition among 10+ teams, *Wobot.ai* 2020
- **Best Outgoing Student**: Excelled in Academics (Paper Presentation) among 200+ peers, *RNS Institute of Technology* 2019
- **Letter of Appreciation**: Recognized among 200+ students for outstanding contributions, *RNS Institute of Technology* 2019
- **First Prize**: For "Automatic Helmetless Rider Detection" among 20+ finalist teams, *BITES BXSPA, IIIT-Bangalore* 2019
- **Best Paper Award**: Among 119 accepted papers for "Sentiment Analysis of Restaurant Reviews using ML", *ICERECT* 2018

VOLUNTEER EXPERIENCE

- **Reviewer, The Journal of Open Source Software** — Remote
  Review project paper submissions on Machine Learning, Computer Vision, and Python for the Journal. *June 2023 - Present*
- **Book Proposal Reviewer, Manning Publications Co.** — Remote
  Review proposals for books on Generative AI, Computer Vision, and Python. *Feb 2023 - Present*
- **Co-Founder & Instructor of Student Club - Technoids, RNSIT** — Bangalore, India
  Trained over 200 students on Python, Machine Learning, and Computer Vision. *2018 - 2019*