

## EDUCATION

**Masters in Computer Science**, JOHNS HOPKINS UNIVERSITY, GPA - 3.84/4 May 2024

**Bachelors in Computer Engineering**, UNIVERSITY OF MUMBAI, GPA - 9.6/10 July 2022

**Relevant Courses:** Computer Vision, Object Oriented Software Engineering, Data Structures, Advanced Algorithms, Machine Learning, Cloud Computing, Software System Design, Natural Language Processing, Large Language Models, Augmented Reality

## TECHNICAL SKILLS

- **Programming Languages** – Python, Java, C#, C/C++, JavaScript, HTML/CSS, Kotlin, SQL
- **Frameworks and Libraries** – OpenCV, PyTorch, Scikit-learn, Pandas, NumPy, Matplotlib, TQDM, TensorFlow, NNI, Selenium, Bootstrap, ReactJS, Angular, NodeJS, Flask, HuggingFace, PyDicom, Sagemaker
- **Software Tools** – Docker, CVAT, VSCode, GPUs, MATLAB, Git, AWS (EC2, S3), Unity, MongoDB, MicroDICOM Viewer, MS Excel, Firebase

## PROFESSIONAL EXPERIENCE

**Computer Vision Engineer** | SURGICAL VISION SYSTEMS INC, BALTIMORE July 2024 - Present

- Spearheaded the creation of a comprehensive dataset comprising **7,800+ images of surgical instruments** using an Astra 2 camera for capturing both color and depth images, generating high-quality point clouds.
- Enhanced an existing pipeline using **ROS2 Iron**, Segment Anything (SAM), and **GroundingDINO** to accurately identify and locate surgical instruments. Successfully integrated robotic arm control to pick and place instruments within a **60-second** timeframe.
- Trained **YOLO11** and **SAM2** models on the dataset, achieving a mAP50 score of **93.6%** demonstrating significant detection accuracy.

**Machine Learning Research Engineer** | HEPIUS INNOVATION LAB, BALTIMORE Jan 2023 – May 2024

- Generated and managed a dataset from DICOM files, enabling the deployment of deep learning models (Yolov8, DETR, SSD) for tasks such as injury detection with detection accuracy as high as **99.5%** and detection up to **58 frames per second**.
- Developed and trained state-of-the-art models (SAM, TransUNet, DeepLabv3) for automated segmentation of anatomical structures within the spinal cord, gaining a mean IOU of **82%** for the spinal cord anatomy.
- Engineered a **Docker** and AWS cloud environment facilitating medical professionals' use of the Computer Vision Annotation Tool.

## PROJECTS

**LLM Prompt Recovery** | Python, PyTorch, Llama | [\[GitHub\]](#)

- Identified original prompts from outputs of large language models (LLMs) on a custom generalized dataset with a Rouge Score of **65%**.
- Implemented diverse model architectures including full Parameter efficient Fine-Tuning (**PEFT**), Representation Fine-tuning (**ReFT**), and Quantized Long Range Adaptation (**QLoRA**), achieving significant improvements in prompt recovery accuracy.

**LifeSavAR: An AR First Aid Guide** | Unity, C#, Mixed Reality Toolkit (MRTK) | [\[GitHub\]](#)

- Designed an AR application for Microsoft HoloLens for emergency medical guidance, automating testing for real-time assistance.
- Integrated Vuforia and MRTK for overlay on a Torso phantom, enhancing the real-time assistance capability for non-medical users.

**Predicting Ejection Fraction using Segmentation guided Video Vision Transformers** | Python, PyTorch, Computer Vision | [\[Poster\]](#)

- Transitioned the EchoNet-Dynamic and integrated segmentation with transformers to predict cardiac function with high accuracy.
- Accomplished a mAE of **5.81** in predicting Ejection Fraction and secured an AUC score of **91%**.

**Twitter Sentiment Analysis Platform: Covid-19 Insights** | NodeJS, IBM Cloud

- Developed a web platform leveraging **Node-Red** and **IBM Watson Services** to analyze sentiment and emotions in tweets on Covid-19 and lockdown from March '20 to Sept '20, offering a snapshot of public sentiment during the period.
- Developed a platform for real-time sentiment analysis, showcasing my ability to manage and implement automated testing solutions.

## AWARDS

**Joel Dean Excellence in Teaching Award** | JOHNS HOPKINS UNIVERSITY April 2024

**Best Project Award – LLM Prompt Recovery** | NLP Self Supervised Models May 2024

## PUBLICATIONS

**"Injury Localization and Anatomical Segmentation in Ultrasound Spinal Cord Images,"** [Publication in Progress]

- Presenting an ultrasound spinal cord dataset of **10,223 DICOM images**, benchmarking state-of-the-art object detection for injury localization and semantic segmentation models for anatomical labeling.
- Attained high-performance metrics in injury detection using Yolov8 with accuracies up to **99.5%** and excelled in segmentation of spinal cord anatomy in humans, achieving a Dice score of **84.66%**, demonstrating effective zero-shot generalization for clinical translation.

**"Mime3D - A Patient Monitoring System,"** ACCAI 2022. Published in IEEE Xplore [\[paper link\]](#)

- Engineered a system integrating **IMU sensors** and the **ESP32S NodeMCU WiFi** module to transmit data through Arduino to a remote server; this was subsequently relayed to a web interface with a **3D human model**, mirroring real-time human motions within Unity.
- Successfully emulated limb movements of volunteers from **Bhabha Atomic Research Center** engaged in sports activities.

**"Employee Attrition Using Machine Learning And Depression Analysis,"** ICICCS 2021. Published in IEEE Xplore [\[paper link\]](#)

- Employed the Goldberg Depression Questionnaire and harnessed a Random Forest Classifier algorithm on a custom dataset to predict employee attrition with **86%** accuracy.
- Designed a user-friendly **Flask-based website** for seamless visualization of the analysis results.