

# ASHFAQ AHAMED

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## SUMMARY

Passionate Biomedical Engineer with expertise in AI-driven medical imaging, machine learning, and bioinformatics. Dedicated to advancing medical AI research and developing innovative solutions for improved healthcare diagnostics. Skilled in deep learning, Python, and data analysis, aiming to bridge technology and medicine for impactful healthcare advancements.

## EXPERIENCE

- **Barola Technologies Pvt. Ltd.**  June 2023 - July 2023  
*Research and Development Intern* Chennai, India
  - Developed AI-based face mask detection software for healthcare applications.
  - Gained real-time experience in AI for medical imaging and healthcare research.
  - Collaborated with a multidisciplinary team to optimize AI-driven healthcare solutions.
  - Assisted in designing and testing machine learning models for detecting anomalies in medical images.
- **Retake Solutions Pvt.Ltd**  November 2023 - December 2023  
*Intern* Chennai, India
  - Worked on hardware-software integration for medical devices.
  - Developed skills in team management and project coordination.
  - Assisted in the design and testing of embedded systems for real-time healthcare applications.
  - Conducted research on optimizing sensor-based data acquisition for medical diagnostics.
  - Collaborated with engineers to troubleshoot and improve system performance.

## EDUCATION

- **SRM Institute Of Science and Technology** September 2021 - June 2025  
*B.tech in Biomedical Engineering* Chennai, India
  - Relevant Coursework: Medical Image Processing, Signal Processing, Machine Learning, Computer Vision, Embedded Systems, Biomedical Instrumentation.
  - CGPA: 7.13/10
- **Ebenezer Marcus Matriculation Higher Secondary School** May 2021  
*Higher Secondary Education* Chennai, India
  - Percentage: 87.08
- **Ebenezer Marcus Matriculation Higher Secondary School** March 2019  
*Secondary Education* Chennai, India
  - Percentage: 83.2

## PROJECTS

- **Project A: [MultiResUNet for Precise Segmentation of Optic Disc and Blood Vessels in Diabetic Retinopathy]** April 2023  
*Tools: [Python, TensorFlow, OpenCV, MultiResUNet]*
  - Developed a deep learning model using MultiResUNet for accurate segmentation of optic discs and blood vessels in retinal images.
  - Achieved percentage of 87 accuracy for blood vessel segmentation and percentage of 98 accuracy for optic disc.
  - Designed a custom data generator (DataGen) for efficient image preprocessing and mask annotation.
  - Integrated Dice Coefficient Loss to enhance segmentation performance.
  - Validated model performance using **\*\*IoU (Intersection over Union), precision-recall metrics, and cross-validation techniques\*\***.
  - Applied **\*\*post-processing techniques\*\*** such as morphological operations and thresholding to refine segmentation results.
  - Demonstrated the effectiveness of MultiResUNet by comparing its performance with U-Net and other baseline models.
- **Project B: [Automated Brain Tumor Segmentation in MRI Images using K-Means Clustering]** Nov 2024  
*Tools: [Python, OpenCV, NumPy, K-Means Clustering, Gaussian Blur, Thresholding, Matplotlib]*
  - Implemented Gaussian blur, K-means clustering, and post-processing techniques to segment brain tumors in MRI images.

- Achieved significant accuracy in segmenting gliomas using image processing techniques.
  - Developed a Python-based pipeline for preprocessing and feature extraction from MRI scans.
  - Enhanced segmentation accuracy by optimizing cluster selection and applying morphological operations.
  - Visualized segmented tumor regions using Matplotlib for better interpretability.
  - Automated the segmentation workflow to process multiple MRI scans efficiently.
- **Project C: [Diabetic Retinopathy Detection, Segmentation, and Classification]** Feb 2025  
*Tools: [Python, YOLOv8, MultiResUNet, ResNet-18, Flask, HTML, CSS, JavaScript, Custom Data Generator, Dataset Management]*
- Developed a web-based system integrating YOLOv8 (object detection), MultiResUNet (segmentation), and ResNet-18 (classification) for diabetic retinopathy analysis.
  - Trained on 904 images, achieving mAP Percentage of 85 for detecting hard exudates and hemorrhages Percentage of 98 accuracy for optic disc segmentation, and Percentage of 90 classification accuracy.
  - Used Dice Coefficient Loss and Adam Optimizer, improving segmentation performance (Dice Score: 0.92).
  - Implemented **real-time image analysis** using a **Flask-based web application**, enabling users to upload retinal images and receive **automated diagnoses**.
  - Designed a **custom annotation pipeline** using **CVAT (Computer Vision Annotation Tool)** for efficient dataset labeling and **automated annotation refinement**.
  - Utilized **morphological operations and thresholding techniques** for **post-processing**, reducing false positives in lesion detection.
  - Enabled severity classification of DR based on detected hard exudates and hemorrhages, aiding early diagnosis and treatment.

## PUBLICATIONS

C=CONFERENCE, S=IN SUBMISSION

- [C.1] A Ashfaq Ahamed, et al. (2024). **"MultiResUNet for Precise Segmentation of OpticDisc and Blood Vessels in Diabetic Retinopathy.** In *2024 10th International Conference on Communication and Signal Processing (ICCSP)*, pp-30-36. IEEE. 2024, Melmaruvathur, India. DOI: 10.1109/ICCSP60870.2024.10543496.
- [S.1] A Ashfaq Ahamed, et al. (2025). **Diabetic Retinopathy Detection, Segmentation and Classification Using YOLO v8, MultiResUNet and Resnet 18.** *2025 11th International Conference on Communication and Signal Processing (ICCSP)*.

## SKILLS

- **Programming Languages:** Python, SQL, HTML, MATLAB, Embedded C, CSS, JavaScript, Object Oriented Programming(OOP), AI and ML
- **Data Science & Machine Learning:** TensorFlow, PyTorch, OpenCV, Scikit-Learn, YOLOv8, MultiResUNet, CNN, ResNet-18
- **Soft Skills:** Project Management, Teamwork, Logical Thinking, Creative Thinking, Problem-Solving,, Time Management, Adaptability
- **Research Skills:** Deep Learning for Medical Imaging, Image Segmentation, Object Detection, Data Preprocessing, Model Evaluation, Scientific Writing

## CERTIFICATIONS

- **Introduction to Programming Using Python** Nov 2024
  - Learned fundamental Python concepts including **data types, loops, functions, and file handling**.
  - Developed hands-on experience with **basic algorithms, object-oriented programming (OOP), and debugging**.
  - Built small projects to apply Python programming in **data analysis and automation**.
- **Image Processing MatLabs** Nov 2024
  - Gained proficiency in **image preprocessing, filtering, and enhancement techniques** using MATLAB.
  - Learned to implement **edge detection, morphological operations, and histogram equalization** for medical and general image analysis.
  - Developed hands-on experience in **object segmentation and feature extraction** for computer vision applications.
  - Applied MATLAB's Image Processing Toolbox to analyze and process **medical images such as MRI and retinal scans**.
- **foundations of cybersecurity** June 2024
  - Gained a strong understanding of **network security, cryptography, threat detection, and risk management** principles.
  - Learned about **common cyber threats, ethical hacking techniques, and security best practices** to protect systems and data.

## LANGUAGES

English (Proficiency level), German (Elementary level), Tamil (Proficiency level),Urudu