Rusab Sarmun

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Skills Summary

- **Language and Communication:** English & Bengali Proficiency, Technical Writing, Editing
- **Programming Languages/Platforms:** Python, SQL, C, MATLAB, LaTeX
- **Machine Learning Libraries/Frameworks:** Tensorflow, Pytorch, Keras, Scikit-learn, Numpy, Pandas
- **Data Annotation Tools:** Supervisely, Makesense, Labelme, Anylabeling, LabelImg, spaCy
- **Other Skills:** MS Office, SOLIDWORKS

Professional Experience

- **Qatar University Machine Learning Group**
  Research Assistant, Remote *2022-Present*
  - **Project Leadership:** Led and contributed to over 10 machine learning and deep learning projects in the biomedical domain.
  - **Research and Data Management:** Conducted comprehensive investigations, developed models and methodologies, annotated and preprocessed training data.
  - **Research Collaboration:** Collaborated with a diverse research community of over 40 researchers and doctors, fostering a multidisciplinary approach to biomedical research.
  - **Publication:** Authored and contributed to research papers, ensuring the dissemination of findings in reputable journals.
- **BiTechX LLC**
  Project Manager - Creative Team *2020-Present*
  - **Team Management:** Managed a team of 5 creative professionals, including designers, UX/UI designers, creative content writers, and quality assurance specialists.
  - **Client Communication:** Successfully communicated and coordinated with over 40 clients, primarily based in the USA and Canada.
  - **Project Oversight:** Oversaw project requirements gathering, task delegation, and ensured timely delivery of high-quality projects.
  - **Liaison Role:** Acted as the primary liaison between clients and the team, ensuring clear communication and efficient feedback implementation.

Education

- **University of Dhaka** Dhaka, Bangladesh
  Bachelors in Electrical and Electronic Engineering; CGPA: 3.55/4.00 *2017 - 2022*
  Major: *Computer,* ***Minor:*** *Communication,*
- **Notre Dame College** Dhaka, Bangladesh
  Higher Secondary Certificate; GPA: 5.00/5.00 *2016*
- **St. Joseph Higher Secondary School** Dhaka, Bangladesh
  Secondary School Certificate; GPA: 5.00/5.00; Achieved General Scholarship *2014*

Publications

- **Sarmun, R.**, Kabir, S., Prithula, J., Alqahtani, A., Zoghoul, S. B., Al-Hashimi, I., Mushtak, A., & Chowdhury, M. E. (2024). Enhancing Intima-Media Complex Segmentation with a Multi-Stage Feature Fusion-based Novel Deep Learning Framework. Engineering Applications of Artificial Intelligence, 133, 108050. https://doi.org/10.1016/j.engappai.2024.108050
- **Sarmun, R.**, Chowdhury, M. E., Murugappan, M., Aqel, A., Ezzuddin, M., Rahman, S. M., ... & Hasan, M. A.(2024).Diabetic Foot Ulcer Detection: Combining Deep Learning Models for Improved Localization. Cognitive Computation, 1-19. https://doi.org/10.1007/s12559-024-10267-3
- Bushra, F., Chowdhury, M. E., **Sarmun, R.**, Kabir, S., Said, M., Zoghoul, S. B., ... & Hasan, A. (2024). Deep learning in computed tomography pulmonary angiography imaging: A dual-pronged approach for pulmonary embolism detection. Expert Systems with Applications, 245, 123029.. https://doi.org/10.1016/j.eswa.2023.123029
- Kabir, S., Vranic, S., Al Saady, R. M., Khan, M. S., **Sarmun, R.**, Alqahtani, A., ... & Chowdhury, M. E. (2024). The utility of a deep learning-based approach in Her-2/neu assessment in breast cancer. Expert Systems with Applications, 238, 122051. https://doi.org/10.1016/j.eswa.2023.122051

Projects

- **Coronary Artery Segmentation from X-Ray Angiogram Images using Deep Learning**
  Research Project *2023*
  - Developed a precise coronary artery segmentation pipeline to aid early diagnosis of coronary artery disease.
  - Proposed a segmentation pipeline consisting of three blocks: angiographic image pre-processing for better contrast, coronary artery segmentation using the novel **Self-ONN-based** (Operational Neural Network) architecture, and outcome refinement for clearer results, named Coronary Artery Segmentation and Refinement Network (**CASR-Net**).
  - Utilized **UNet** with **DenseNet121** encoder and a modified **Self-ONN-based** decoder for coronary artery segmentation, facilitating context capture and precise localization.
  - Conducted extensive investigations to optimize each block and compared our approach with state-of-the-art segmentation networks such as **UNet**, **UNetPlusPlus**, **MAnet**, and **LinkNet** on a combined dataset of stenotic and healthy coronary arteries.
  - Investigated various refinement techniques, including contour filtering, deep learning-based refinement, and path line generation, to identify and remove false positive contours and discontinuities for more accurate representation of coronary arteries.
  - Achieved significant improvements in segmentation performance, with our proposed network and refinement techniques outperforming conventional segmentation networks, achieving 61.43% intersection of union **(IoU)** and 76.10% dice score coefficient **(DSC)**.
- **Diabetic Foot Ulcer Detection using YOLOv8 and FRCNN-Resnet101 Ensemble**
  Research Project *2022*
  - Developed a comprehensive deep learning-based system for detecting Diabetic Foot Ulcers (**DFUs**) from patients' feet images by reliably localizing ulcer points.
  - Employed various state-of-the-art object detection models like **YOLOv8** and **FRCNN-Resnet101** to detect ulcer points from foot images.
  - Enhanced prediction performance by strategically merging the detection outcomes via **weighted bounding box fusion (WBF)** ensemble method.
  - Designed a post-processing step to reduce overlapping bounding boxes, mitigating redundant detections and improving overall performance.
  - Trained and developed models using the **DFUC2020** dataset, comprising over 2000 images, utilizing the transfer learning approach to enhance network training and enable effective model development even with a smaller dataset.
  - Achieved a mean average precision (**mAP**) score of 86.4% at the **IoU** threshold of 0.5 on the **DFUC2020** dataset, significantly outperforming the former benchmark by 12.4%.
- **Computer Vision Based Batch-Billing System for Supermarket Products using YOLO**
  Undergraduate Thesis *2020-2022*
  - Utilized the **PyTorch** Framework and **OpenCV** library to detect products via a table-mounted webcam. Multiple products can be detected and billed simultaneously in real-time.
  - Created and annotated a custom dataset of 3056 images of 26 distinct products, then trained the **YOLOv5** models using a transfer learning approach.
  - Improved model performance through data augmentation with synthetic images and the application of ensembling techniques.
  - Incorporated a multiple **ArUco Marker** system to bill items based on weight.
  - Developed a GUI-based interface using the **PyQt5** framework for enhanced user convenience.
  - **Github link:** https://github.com/Rusab/Supermall-Checkout-system-yolov5

Awards

- **GPH Esho Robot Banai** — 2nd Runner-Up
  Maze Solver Segment, Channel-i Studio — *January 2019*
- **BUET Robofiesta** — 2nd Runner-Up
  Line follower Segment, Bangladesh University of Engineering and Technology — *July 2018*
- **NSU Technovation** — Champion
  Line follower Segment, North South University — *February 2018*
- **DRMC Science Festival** — Champion
  Line follower Segment, Dhaka Residential Model College — *February 2018*
- **DUSS Science Festival** — Champion
  Line follower Segment, University of Dhaka. — *August 2017*