

Taiabur Rahman

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EDUCATIONS

MSc, ERASMUS+ Joint MSc in Medical Imaging & Applications (MAIA) Sep 2022 -Aug 2024

4th semester Master Thesis- Mouse Brain Segmentation using Deep Learning: Feb 2024 -Jun 2024

National Institute of Health and Medical Research (INSERM)

The goal of my project is to develop and implement a deep learning model capable of automatic segmenting mouse brain tissues into these 24 regions of interest in a 3D volume, with the NeuroGenetics of Mouse Models (NGMM) group collaboration with the Institute of Molecular Chemistry of the University of Burgundy (ICMUB), the research environment of the University of Bourgogne.

Supervisor: Pr Fabrice MERIAUDEAU, Alain Lalande, Stephan Collins

1st, 2nd and 3rd academic semester:

University of Burgundy-France, University of Cassino- Italy & University of Girona-Spain,

Field of Study: Attended three different university as a mobility student and gain knowledge on Digital Signal Processing, Medical Sensors, Machine and Deep Learning, Advance Image Analysis and Medical Image Segmentation and Registration, Computer Aided Diagnosis, Computer Aided Surgery and Medical Robotics, E-Health as well as hands-on practical session.

Summer School on Biomedical Imaging EXCITE, ETH Zurich

Sep 2023

Swiss Federal Institute of Technology Zurich (ETH Zurich) & University of Zurich, Switzerland

Field of Study: Attended lecture series and hands-on practical session on Fluorescence microscopy, Electron microscopy, Super resolution microscopy, pre-clinical animal SPECT/CT imaging and overview of CT and MR image acquisition and post-processing in radiology on biomedical image analysis as well as obtained 4 ECTS.

Winter School 2023

Feb 2023

University of Cassino and Southern Lazio-Italy

MSc, Software Engineering (SE)

Sep 2018 –Aug 2020

Tianjin University, School of Computer Software, China

BSc, Computer Science & Engineering (CSE)

Oct 2010 -Feb 2014

Bangladesh University (BU), Bangladesh

PROFESSIONAL TRAINING

Oracle Certified Professional (OCP)

Nov 2017

IBCS-PRIMAX Software (Bangladesh) Ltd., Bangladesh

Professional Web Design & Development

Oct 2014

BASIS Institute of Technology & Management (BITM), Bangladesh

EMPLOYMENT HISTORY & EXPERIENCE

Assistant IT Manager & Full Stack developer: Vision Eye Hospital, Bangladesh Dec 2020 -Aug 2022

Higher Education Research Assistant

Sep 2018 –Jan 2020

Tianjin University, School of Computer Software, China

Web Application Developer

Oct 2019 -July 2020

SystemBind Consulting & IT Services Inc. (Remote Job), Canada

Software Engineer: Vision Eye Hospital, Bangladesh

Oct 2017 -Aug 2018

Web Application Developer: Make Good Media. (Remote Job), Canada

July 2016 -Jan 2017

Software Engineer: Apronix Ltd, Bangladesh

Oct 2017 -Aug 2018

Software Engineer: Coderment Ltd, Bangladesh

Apr 2014 -July 2017

TECHNICAL SKILLS

Programing Languages: Python*, MATLAB, C++, PHP*

Machine learning: PyQt5*, SciPy, Scikit-Learn, NumPy*, Pandas*, Matplotlib*, OpenCV*

Deep Learning: PyTorch*, Tensorflow*

Web Application Tools: JavaScript, jQuery*, Vue.js/CLI*, RESTful API*, Git*, Json, XML

DevOps: GCP, AWS (EC2*, RDS, Load Balancing, Auto Scaling, S3*, CloudFront, Route53*, and CI/CD CodeDeploy), DigitalOcean*

Web Server: Apache*, Nginx*.

Databases: SQL, Oracle, MySQL*, SQLite

* Proficient

LANGUAGE SKILLS

Languages: Bengali- Mother tongue, English – B2, Chinese – A1, French- A1, Italiano-A1

ACADEMIC PROJECTS

Deep Learning-Driven Automated Segmentation of High-Resolution 3D Histological Mouse Brain volumes

Feb-Jun 2024

Developed a deep learning pipeline for automated segmentation of high-resolution 3D histological mouse brain images, enhancing the understanding of genetic impacts on brain structure. Utilized advanced neural networks, including nnU-Net and SAM, achieving a Dice Similarity Coefficient of up to 0.99 for binary segmentation and 0.87 for multi-class segmentation. Demonstrated rapid processing capabilities, significantly increasing the efficiency and scale of neuroscientific research.

Elastix-Based CT Image Registration for COPD Lung Analysis

Jun 2024

Utilized Elastix to register CT lung scans from COPD patients, focusing on aligning images from inhalation and exhalation phases to analyze lung health. The project involved evaluating rigid, affine, and BSpline transformations for their effectiveness in image registration, emphasizing preprocessing techniques. This research contributes to enhancing medical imaging practices in managing COPD, based on data from the COPDgene study.

3D Human Brain Tissue Segmentation Using Advanced Deep Learning Techniques

Jun 2024

Developed a brain tissue segmentation project at the University of Girona using a 2D U-Net model with a ResNet34 backbone, addressing MRI image variability within the IBSR18 dataset. Enhanced segmentation of white matter, gray matter, and cerebrospinal fluid using metrics like Dice Coefficient and Hausdorff Distance, and improved model performance through data augmentation

Deep Learning-Based Skin Lesion Classification: A Computer-Aided Diagnostic

Jun 2024

This project focuses on using deep learning techniques for the classification of skin lesions. Utilizing the ISIC dataset, it addresses binary and multiclass classification challenges through data preprocessing, augmentation, and neural networks like InceptionNet and EfficientNet. The project highlights the effectiveness of transfer learning in improving diagnostic accuracy, showcasing significant achievements in both binary and multiclass lesion classification.

Automated Skin Lesion Classification: A Comprehensive Analysis of Transfer Learning and Machine Learning Techniques (Group Project)

Jun 2023

The classification of skin lesions (benign, melanoma, and seborrheic keratosis) using deep learning models and hybrid models (a combination of pre-trained and machine learning models) was done along with a comparison of the Balanced Multiclass Accuracy (BMA) of each model. The hybrid model, which combines Xception and Random Forest, produced a BMA score of 80%, which was the best.

Classification Challenge: Alzheimer's Disease Classification Using MRIs and Gene Expression Data

Jun 2023

To categorize Alzheimer's disease (AD), mild cognitive impairment (MCI), and control (CTL), a classification system using feature engineering and machine learning approaches was developed. Carried out a comparison analysis of the AUC and MCC scores across different categorization models.

Regression Challenge: Using Linear Regression and KNN Model

Jun 2023

Developed a regression algorithm using linear regression and KNN regression and Root Mean Square Error (RMSE).

Bibliography Review: Comparative study with Automated Kidney Image Segmentation Based on Traditional & Deep Learning approach.

Sep 2022 -Jan 2023

Studied research articles and prepared a review report on Automated Kidney Image Segmentation Based on Traditional & Deep Learning approaches and observed the advantages and drawbacks of each method.

Traffic (signal light) Simulation and Violation Alert

Sep 2022 -Jan 2023

[Git] [Python, pyGame]

INDUSTRIAL PROJECTS

Hospital Information Management System [PHP, Laravel, Vue CLI, MySQL, AWS]

Hospital management system is a web base system that helps manage the information related to health care and aids in the job completion of health care providers effectively. They manage the data related to all departments of healthcare such as prescription, financial, investigation, pharmacy, pathology. Up to this point, Bangladeshi 5 hospitals that use this ERP system.

Franchise Store Management System [PHP, Codeigniter, MySQL, Bootstrap, jQuery, Ajax]

Control inventory levels across all your locations/stores, warehouses in real-time, so that it can make better purchase decisions & ready for sales at any time. Transfer stock/inventory between stores/warehouse is much easy that can maintain right stock level at each store.

B2B Ecommerce system [PHP, Laravel, Codeigniter, MySQL, Bootstrap, jQuery, Ajax]

This type of ecommerce typically involves larger orders and longer sales cycles than B2C (Business-to-Consumer) ecommerce, as the purchases are often made by businesses for resale or to be used in the production of other goods and services.

CHALLENGE AND CODING CONTESTS

HACKUPC 2024

May 2024

Automated brain tissue segmentation using OpenAI technologies
The Faculty of Informatics of Barcelona (FIB)
Polytechnic University of Catalonia · Barcelona Tech – UPC

Datathon IA4care

Apr 2024

Automated 3D Microscopic Volume Analysis for Hippocampus Segmentation in Mouse Brain.
Eseo - Grande School D'ingénieurs
University of Burgundy, Dijon, France

CI Image registration challenge

Jan 2024

3d volume Image registering CT lung scans of COPD patients.
University of Girona, Spain

bitsxlaMarató 2023

Dec 2023

AI base solution for Sexual and Reproductive health Hackathon
Faculty of Informatics of Barcelona (FIB), Barcelona Supercomputing Center (BSC), Spain

Lleidahack, HackEPS 2023

Nov 2023

Ultimate 24-Hour AI based Solution Hackathon
Polytechnic School of the University of Lleida, Spain

Classification challenge

May 2023

Alzheimer's disease using MRIs and gene expression data.
Italian National Research Council, Italy

Quazi Azher Ali SAARC Programming Contest

Dec 2014

Problem solving contest using programming language.
Bangladesh University, Bangladesh

LINKS

<https://github.com/taiaburbd?tab=repositories> | <https://www.linkedin.com/in/taiabur-rahman/>

SCHOLARSHIPS AND AWARDS

Tianjin Government Scholarship

I received the Tianjin Government Scholarship in 2018, 2019, and 2020 while studying at Tianjin University in China. This scholarship was awarded by the local government of Tianjin, China, to support my studies during those respective years.

REFERENCES

Fabrice MERIAUDEAU

ICMUB Laboratory,
CNRS UMR 6302
Professor, University of Burgundy
Fabrice.Meriaudeau@u-bourgogne.fr

Alain Lalande

Professor, University of Burgundy
Spectroscopy-NMR Department
Children's Hospital - CHU de Dijon
Alain.Lalande@u-bourgogne.fr