

Khan Fashee Monowar

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📁 Portfolio | 🏠 Google Scholar
👤 ResearchGate | 📍 Rajshahi, Bangladesh

EDUCATION

Rajshahi University of Engineering & Technology (RUET)

B.Sc. in Computer Science & Engineering; **CGPA: 3.08/4.00**

On Last 60 hours credit : **CGPA: 3.47/4.00**

Rajshahi, Bangladesh

Jan 2016 – Feb 2022

New Govt. Degree College

Higher Secondary School; **GPA: 5.0/5.0**

Rajshahi, Bangladesh

Jun 2013 – Jun 2015

UNDERGRADUATION THESIS

Title: Lung Opacity Classification with Convolutional Neural Networks Using Chest X-ray [\[Link\]](#)

Supervisor: Dr. Md Al Mehedi Hasan and Nahin Ul Sadad

WORK EXPERIENCE

Genistat AG, SELISE Digital Platforms

Data Scientist

Zürich, Switzerland (Remote)

Sep 2022 – Present

- **Developed Smart Content-aware Video Cropping System:** Developed a system that automatically crops live-streaming FIFAE videos, ensuring that the soccer ball and relevant contents remains consistently visible in the frames. The goal was to provide an excellent user experience, allowing users to enjoy relevant and engaging scenes(celebration, attacking, kickoff, replay, etc) optimized for vertical smartphone video (portrait) mode, specifically for a social media platform. To achieve this, we have done extensive research into the detection of small objects using object detection models and also to develop a unique cropping algorithm. To realize our objectives, we initiated the project by **preparing vast image data from FIFAE videos and annotating them. Then, we trained a cutting-edge object detection model using the transfer learning method. Later, we developed our unique cropping algorithm utilizing signal processing techniques which takes the object detection model inference result as input.** The cropping algorithm provides a seamless, smooth and contextually relevant cropped video experience, with a continuous focus on the appropriate scenes.
- **Implemented Action-spotting Technology to Extract Events From Videos:** We conducted a project focused on developing a system for extracting game event time frames from FIFAE live stream videos. We adopted a **cutting-edge action-spotting deep learning architecture, collected and annotated 200 FIFA esports game videos, trained and fine-tuned the model with optimized hyperparameters.** The model's performance, evaluated against a dedicated test dataset, met production standards, resulting in a successful deployment for version 1.0, supported by comprehensive documentation.
- **Implemented Object Detection For Efficiently Extraction of Particular Objects:** Led the efforts in collecting and processing datasets and successfully trained a high-performance **object detection** model for the specific task of identifying similar category objects in live video streams.
- **Worked on Improving Text Recognition Accuracy in specific Task Using PaddleOCR:** Collected, annotated and **preprocessed custom dataset to train PaddleOCR to solve particular tasks.** Led the configuration and hyperparameters fine-tuning process for optimal performance. Collaborated with the team to iteratively improve the model.

Synesis IT Ltd.

AI Programmer, AI R&D Team

Dhaka, Bangladesh

Feb 2021 – Aug 2022

- **Bengali Handwritten OCR:** Conducted initial research on building full-scale Bengali handwritten OCR from scratch using own dataset. Led the data collection (over 250k handwritten characters), processing and character classification training phases.
- **Information Extraction from Document Image:** Conducted research on extracting information from structured and unstructured document images using Bengali and English OCR, Amazon Textract, Bengali and English name entity recognition (using Spacy 3.0) techniques. Led the collection of unstructured document data, cleaning, and NER training processes.
- **Developed Table Data Extraction System From Image:** Developed a data extraction system using Amazon Textract and Python for accurately retrieving relevant table data from image.

RESEARCH EXPERIENCE

Undergraduate Researcher

RUET, Rajshahi, Bangladesh

Aug 2019 – Feb 2021

- Worked under the esteemed supervision of: **Dr. Md. Al Mehedi Hasan, Professor, Department of Computer Science and Engineering, RUET, Rajshahi, Bangladesh** and **Dr. Jungpil Shin, Professor of Computer Science and Engineering, University of Aizu, Aizuwakamatsu, Japan.**
- Researched efficient Chest X-ray interpretation using deep learning techniques for rapid and accurate detection of cardiothoracic and pulmonary abnormalities. Trained and evaluated various deep CNN architectures, with the Xception model achieving up to **91.0% AUC and 83.95% accuracy for lung opacity detection**. Particularly successful in distinguishing lung opacity from normal X-rays (**99.1% AUC, 97.19% sensitivity, 95.71% accuracy**). Investigated potential for developing an automated lung opacity detection system.
- Developed a **lightweight convolutional neural network architecture from scratch to detect pediatric pneumonia** using a particular dataset, achieving superior diagnostic performance compared to off-the-shelf models, with a top AUC of **99.0%** and test accuracy of **94.6%**.
- Conducted multiple research on multiclass multilabel medical image classification domain.

PUBLICATIONS

- **Monowar, Khan Fashee, Md Al Mehedi Hasan, and Jungpil Shin. "Lung opacity classification with convolutional neural networks using chest x-rays."** In 2020 11th International Conference on Electrical and Computer Engineering (ICECE), pp. 169-172. IEEE, 2020. [\[Link\]](#)
- **Monowar, Khan Fashee, Md Al Mehedi Hasan, and Jungpil Shin. "A lightweight convolutional neural network model for child pneumonia classification."** In 2021 International Conference on Information and Communication Technology for Sustainable Development (ICICT4SD), pp. 269-273. IEEE, 2021. [\[Link\]](#)
- **Ahamed, Md Atik, Kazi Amit Hasan, Khan Fashee Monowar, Nowfel Mashnoor, and Md Ali Hossain. "ECG heartbeat classification using ensemble of efficient machine learning approaches on imbalanced datasets."** In 2020 2nd International Conference on Advanced Information and Communication Technology (ICAICT), pp. 140-145. IEEE, 2020. [\[Link\]](#)

SELF PROJECTS

NIH Chest X-ray-14 Multilabel Multiclass Classification:

- Developed a Keras 2.3.0-based diagnostic model capable of detecting 14 distinct diseases from chest X-rays. Employed both training and test-time data augmentation methods.
- Utilized the MobileNet architecture to process a dataset exceeding 100,000 chest X-ray images, incorporating a weighted binary cross-entropy loss function for training.
- Implemented GRAD-CAM for visualizing affected areas in chest X-ray images pertaining to pneumonia disease.

Image Forgery Detection:

- Developed an image tampering detection system using a blend of deep learning and image processing techniques, capable of identifying "Copy Move and Splicing" forgery in a wide range of image formats, including both lossy and lossless.
- Specialized in training and fine-tuning various pre-trained models to achieve high-precision forgery detection, incorporating Error Level Analysis (ELA) preprocessing for enhanced accuracy.

Credit Card Fraud Detection using Neural Networks:

- Developed a credit card fraud detection system using neural networks, addressing data imbalance issues in a large transaction dataset.
- Utilized data preprocessing, oversampling, and model training techniques to achieve outstanding precision and recall rates for accurate fraud identification.

Airline Tweet Data Sentiment Analysis

- Conducted in-depth research on customer sentiment in the US airline industry.
- Implemented Transformer models and various machine learning algorithms to improve performance and accuracy in sentiment analysis.

AI-based Dhaka Traffic Detection Challenge 2020

- AI-based Dhaka Traffic Detection Challenge participant, showcasing problem-solving skills.
- Developed a YOLO V5 object detection model using PyTorch, demonstrating AI and computer vision expertise.
- Contributed to dataset expansion through data collection and annotation, and improved test accuracy via rigorous preprocessing and augmentation, covering 21 distinct traffic-related object classes

AWARDS & ACHIEVEMENTS

- **Technical Scholarship, Bangladesh, 2016, 2018:** Government Scholarship for outstanding public engineering students.
- **Ranked 93rd out of 5060 participants (Top 1.85%)** in HackerEarth Machine Learning challenge: Adopt a buddy in HackerEarth in 2020.
- **Ranked 885th position out of 3314 participants** in Kaggle SIIM-ISIC melanoma classification competition in 2020.
- **Achieved Champion position at Regional Math Olympiad, 2011** in Junior Category.
- **Achieved 4th position in Regional Astronomy Olympiad, 2014** and was selected for National Astronomy Olympiad, 2014.

SKILLS

Programming Languages: Python, C, C++, MATLAB, SQL, MySQL, OpenGL, Assembly, PHP

Libraries : OpenCV, Keras, PyTorch, TensorFlow, Pandas, Scipy, Scikit-learn, Plotly, Matplotlib

Technologies: Heroku, Amazon Textract, Spacy, Laravel 5

IDE & Tools: Visual Studio Code, PhpStorm, CodeBlocks, Jupyter, Kaggle, Google Colab, PyCharm, Overleaf, ChatGPT, GitHub, Google Sheets

Version Control: Git, BitBucket

Languages: English (Proficient), Bengali (Native)

CERTIFICATIONS

- **Convolutional Neural Networks in TensorFlow:** *deeplearning.ai, Coursera.* [\[Credentials\]](#)
- **The Nuts and Bolts of Machine Learning:** *Google, Coursera.* [\[Credentials\]](#)
- **Crash Course on Python:** *Google, Coursera.* [\[Credentials\]](#)
- **AI for Medical Diagnosis:** *deeplearning.ai, Coursera.* [\[Credentials\]](#)
- **Foundations of Cybersecurity:** *Google, Coursera.* [\[Credentials\]](#)
- **Database Management Essentials:** *University of Colorado System, Coursera.* [\[Credentials\]](#)

REFERENCES

Dr. Md. Al Mehedi Hasan

Professor & Head of the Department,

Dept. of Computer Science & Engineering (CSE),

Rajshahi University of Engineering & Technology (RUET),

Rajshahi, Bangladesh.

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