# Mahedi Hasan Rasel

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## Work Experience

#### **Business Automation Ltd**

Machine Learning Engineer

- Digitized handwritten prescriptions with OCR model, leveraging Generative LLM models for output formation andLayout-based document digitalization using LayoutLM and Donut model.
- Implemented Bangla Law Consultancy chatbot with interaction-based instruction dataset using Llamma-3, featuring Rag system and effective tokenization method.
- Extracted Land Records information using OCR, Bangla Document OSD functioning, and Name Entity Recognition employing the Mistral Model with 4-bit quantization for effective memory allocation.
- Executed BIDA and EBS Employee Behavioral Log Text Summarization enhancing efficacy in task-based accomplishment utilizing Mistral, Pegasus, and ML Models.
- Contributed to EBS Inshight-db database QnA using ChatGPT API and TAPAS model.

## InflexionPoint Technologies BD Ltd.

## Artificial Intelligence Engineer (intern)

- Excelled in various data-related tasks, including:
  - Data analysis
  - Feature engineering
  - Data preprocessing
  - Model Building
- Skilled in SQL for effective data handling.

## Skills

Programming Languages: • Python, • C, • C++, • Bash Scripting

**Machine Learning Frameworks:** • PyTorch, • Tensorflow, • HuggingFace • Transformers, • Scikit-Learn, • GenAI(RAG, Prompt Engineering, Fine Tuning)

Modules: • NLTK, • Spacy, • Pandas, • OpenCV, • Pillow, • Numpy, • Matplotlib, • Seaborn

Database: • MySQL, • PostgreSQL, • SQLite, • MongoDB

Web Frameworks: • Flask, • FastAPI, • Django

**DevOps / MLOps:** • AWS (VPC, EC2, Fargate, S3, Lambda), • Docker-compose, • CI/CD (Jenkins, GitHub Actions), • GNU/Linux, • Terraform, • Ansible, • Kubernetes, • SonarQube, • Amazon SageMaker, • Vertex AI, • Vast.ai (for AI model training)

## Education

#### BANGLADESH UNIVERSITY OF BUSINESS AND TECHNOLOGY, DHAKA

B.Sc. in Computer Science and Engineering

Relevant Coursework : Object Oriented Programming, Databases, Discrete Maths, Data Structures and Algorithms, Operating Systems, Computer Networks, Machine Learning, Cyber Security and Digital forensic, Data Mining, Pattern Recognition, Neural Network and Fuzzy systems

## Awards and Certificates

- Mentor at AI Comunity: Helping students and working professionals to get better at problem solving, coding and system design
- Data Engineering Nanodegree on Udacity
- · Modern Applications of Artificial Intelligence on BA-System
- · Fundamentals of Database Engineering on BA-System
- NLP Foundations on INeuron
- Machine Learning and Deep Learning Specialization on Coursera
- Top 10 Innovator Award from Digital Bangladesh Mela
- Digital Bangladesh Mela | Innovator
- Contestant Certification from ICPC 2021

Dec 2023 - Present

April 2023 - Nov 2023

JAN 2019 - APRIL 2023

CGPA: 3.38/4

## **Notable Projects**

 Automated Quality Control System for Precise Hole Detection and Measurement in Automotive Packaging Developed an automated computer vision system to detect and measure holes on product packaging for a Japanese automotive parts manufacturer, ensuring tolerance compliance and reducing manual inspection time.

## Automated Tool Inspection: Ensuring Accuracy in Industrial Manufacturing

This project addresses a critical challenge in industrial tool manufacturing: ensuring every tool is present and accounted for in production boxes. Using advanced image processing and a custom-trained CNN model, the software accurately detects a variety of tools, including screwdrivers, hammers, and other specialized equipment. This real-time inspection system is essential because even a single missing tool can lead to production delays, customer dissatisfaction, and costly rework. By automating this process, the software significantly improves quality control, reduces errors, and ultimately enhances the efficiency and reliability of the manufacturing process.

- Name Entity Recognition (NER) with MISTRAL, BERT, and FLAN T5 Name Entity Recognition (NER) system implemented using MISTRAL, BERT, and FLAN T5 models. These models can identify and classify entities such as persons, organizations, and locations within text data. Mistral, and Flan T5 models are fine-tuned on Cyber Security dataset for classifying the class of texts as well.
- Doctor's Handwritten Text Extraction from Medical Prescriptions This project automates extraction of handwritten medicine names from prescription images. Images are segmented, annotated, and compiled into a CSV file. A TrOCR model is trained for text recognition, and the extracted text is organized using the Gemma-7b language model. (Private repo)
- Resume Information Extractor from PDF

This web application extracts key details (name, email, phone, university, degree) from PDF resumes using OCR and named entity recognition. It uses Flask for the interface, PyTesseract for text extraction, and the GLINER model for information identification.

#### Intelligent Question Answering and Code Generation Chatbot for Tabular Data

This web application extracts key details (name, email, phone, university, degree) from PDF resumes using OCR and named entity recognition. It uses Flask for the interface, PyTesseract for text extraction, and the GLiNER model for information identification.

## **Publications**

## **Journal Articles**

A Stacked Ensemble Machine Learning Approach for the Prediction of Diabetes
 Authors: Khondokar Oliullah; Mahedi Hasan Rasel; Md. Manzurul Islam; Md. Reazul Islam; Md. Anwar Hussen
 Wadud; Md. Whaiduzzaman
 Journal of Diabetes and Metabolic Disorders, 603-617, 2024.

Conference Papers

Traffic Congestion Detection Using Machine Learning and Deep Learning

Authors: Mahedi Hasan Rasel; Hitesh Chakraborty; Shadia Jahan Mumu; Md Mahmudul Hasan; Sadia Afrin

#### Articles

- Understanding Optical Character Recognition (OCR)
- How to Fine-Tune an Embedding Model with Sentence Transformers
- Building an Integrated Data Pipeline for a Retail Shop

## References

**Ms. Sadah Anjum Shanto** Assistant Professor Department of CSE, BUBT Email: sshanto@bubt.edu.bd Relationship: Former Advisor and Mentor