Mazhar Hossain

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Education

- **Marquette University** Milwaukee, WI, USA
  Ph.D. in Computer Science *January 2026 – May 2031 (Expected)*
  Research: *mHealth, contactless physiological sensing, agentic AI, and EEG-based brain–computer interfaces*
- **Khulna University of Engineering & Technology** Khulna, Bangladesh
  B.Sc. in Electronics & Communication Engineering; CGPA: 3.00 / 4.00 *2014 – 2018*

Experience

- **Marquette University** Milwaukee, WI, USA
  Graduate Research Assistant, Department of Computer Science *January 2026 – Present*
  - Researching non-invasive PPG health monitoring with computer vision on face and fingertip video for contactless monitoring and remote biomarker estimation
  - Building multimodal patient monitoring frameworks for mental and physiological health
  - Analyzing neuro signals and their relationships with physiological indicators
  - Designed, built, and deployed **10+** live platforms and websites end to end, including an ISO/IEC 42001 AI governance platform and a multi-agent NeuroAI idea lab
  - Built mHealth study apps for participant enrollment, consent, data collection, and intervention messaging, alongside wearable sensor collection and insight dashboards

Cefalo Bangladesh Limited Dhaka, Bangladesh
- *Senior Software Engineer (promoted from Software Engineer)* *September 2021 – December 2025*
  Data Engineer (Contract) at Volue Insight, Norway (Remote)
  - Led the Urgent Market Data backend team and built a performance tracking dashboard in ClickUp
  - Built and managed **300+** batch ETL pipelines orchestrated with Apache Airflow on Apache Cassandra, migrating raw Python scripts to ingest **1M+** data points daily from **500+** sources
  - Redesigned data ingestion into a generalized YAML-based ETL framework, cutting development effort for new sources by **60%**
  - Implemented data-quality monitoring with Prometheus, Grafana, and Slack alerts, reducing incident response time by **35%**
  - Implemented automated data verification processes, reducing debugging time by **95%**
  - Optimized Django ORM relationship loading, reducing database queries by **51%** and processing time by **45%**
- **BJIT Limited** Dhaka, Bangladesh
  AI Engineer *October 2019 – August 2021*
  - Achieved the highest score (**87%**) among 15 trainee engineers in the AI training program
  - Built human and pose detection models with YOLOv3 and SSD, including a training project detecting human trespassing at train crossings
  - Led a small-object detection project for drones, achieving **74%** accuracy
  - Improved chatbot response accuracy by **43%** through model training and inference scripts
  - **GitHub Repository**

Technical Skills

- **Languages**: Python, JavaScript, SQL, Bash
- **ML & Computer Vision**: Deep Learning, PyTorch, TensorFlow, scikit-learn, NumPy, Pandas, OpenCV, MediaPipe, YOLOv3, SSD, Faster R-CNN, UNet, MODNet
- **LLMs & Agentic AI**: LangGraph multi-agent pipelines, RAG, prompt engineering, Hugging Face embeddings, Ollama, Langfuse, LLM-as-a-judge
- **NLP**: Transformers (BERT, JointBERT), RASA, SpaCy, NLTK
- **Backend**: Django, Django REST Framework, FastAPI, Flask, Node.js (NestJS), RESTful APIs, OpenAPI, gRPC, Event-Driven Microservices
- **Databases**: PostgreSQL, MySQL, MongoDB, Apache Cassandra, Redis, Qdrant, ChromaDB, FAISS
- **Data Engineering**: Apache Airflow, ETL, batch processing, Celery, Data Quality, SFTP automation, Selenium, BeautifulSoup, Scrapy
- **Cloud & DevOps**: AWS (EC2, S3, RDS, ECS, Lambda, SQS, IAM, CloudWatch), GCP (BigQuery, Bigtable, Pub/Sub), Azure Service Bus, Docker, CI/CD (GitHub Actions), NGINX, Prometheus, Grafana
- **Security & Testing**: OWASP Top 10, JWT, CSRF, RBAC, Prompt-Injection Protection, Audit Logging, Pytest

Soft Skills

- **Professional**: Leadership, Analytical Skills, Time Management, Teamwork & Coordination

Projects

- **ISO/IEC 42001 AI Governance & Trust Platform** — Marquette University
  Next.js, NestJS, Prisma, PostgreSQL, Redis, FastAPI, LangGraph, ChromaDB — *2026*
  - Built a TypeScript monorepo for a 38-control ISO/IEC 42001 catalog, covering AI system inventory, risk assessments, policies, attestations, lifecycle gates, evidence, and audit-ready reports on a 44-model Prisma schema
  - Developed a LangGraph control engine with RAG over evidence via MarkItDown, tree-sitter AI-SAST review of connected GitHub repositories, and document review producing reproducible, content-addressed verdicts
  - Added a human-in-the-loop review gate, live SSE progress, and a golden-eval harness gating prompt changes in CI, with DeepSeek and Langfuse tracing
  - Implemented Argon2id and TOTP MFA, AES-256-GCM secret encryption, CSRF-protected JWT sessions, RBAC, and three-layer tenant isolation including PostgreSQL row-level security
  - Added SSRF-hardened fetching, prompt-injection guardrails, secret redaction, a hash-chained audit log, and maker-checker deletion
- **NeuroAI Idea Lab** — Marquette University
  Python, Django, LangGraph, Celery, Redis, PostgreSQL, Ollama, Langfuse, PyTorch — *2026*
  - A research automation platform that turns a problem statement and papers into neuro-inspired ideas and PyTorch model code
  - Developed the backend and frontend and part of the infrastructure
  - Set up LLM monitoring and tracing of the agents' work
  - Evaluated model performance and worked on improving it, with automated evaluation of the outputs
  - Worked on improving the agents
- **D-Dream: AI Health Service Platform** — Marquette University
  Computer Vision, PPG, PostgreSQL, AWS EC2, S3 — *2026*
  - Deployed multiple AI health services with subscription-based, role-based access and participant data collection
  - One D-Dream service is being built in research collaboration with Children's Wisconsin
  - Developed UbiVital research into non-invasive estimation of white blood cell and immunization indicators from face and fingertip video
- **MODNet Background Remover**
  Python, PyTorch, MODNet, Flask, Docker, Pytest — *December 2020 – Present*
  - Removes and replaces portrait backgrounds entirely locally for still images, video, and live camera input; **140+** GitHub stars and 64 forks
  - Runs on NVIDIA GPU, Apple GPU, or CPU, with CPU and CUDA Docker images
  - **GitHub Repository**
- **ML Vision**
  Python, OpenCV, MediaPipe — *June 2022 – September 2022*
  - MediaPipe hand detection and face mesh demonstrations
  - OpenCV Haar-cascade face and eye detection, image inpainting, and image-to-text tools
  - **GitHub Repository**
- **ChatBot Development** — BJIT Limited
  NLTK, JointBERT, Keras, TensorFlow, SpaCy, RASA, CUDA, Flask, NoSQL — *March 2020 – December 2020*
  - Designed and developed a RASA chatbot with BERT-based intent classification and entity recognition
  - Prepared, preprocessed, and annotated intent- and entity-based datasets
  - Mapped responses and actions to intent and entity groups, with custom exception handling
  - Modularized the platform so uploaded datasets could create medical and customer-care chatbot profiles
  - Built Flask APIs for training, test metric generation, and real-time inference with Messenger integration
- **Small Object Detection** — BJIT Limited
  YOLOv3, UNet, Faster R-CNN, FPN, PyTorch, OpenCV, TensorBoard — *February 2020 – April 2020*
  - Worked with flying-object, aerial-image, and NOAA fish datasets
  - Used YOLOv3 for drones, UNet for aerial images, and Faster R-CNN for underwater fish
  - Applied color saturation, random crops, and image flipping for data augmentation
  - Used DarkNet, ResNet-101, and Inception-v2 for feature extraction
  - Built a Flask-based web API interface with TensorBoard reporting
  - **GitHub Repository**

Android App Projects (AI-Assisted Development)

- **D-Dream Study App** — Marquette University
  Android, Camera Video Capture — *2026*
  - Supports enrollment and face/fingertip video capture for the D-Dream platform

- Uses kid-friendly themes and animations to hold children's attention during fingertip recording

- **Smart Ring Vitals App** Marquette University
  Android, React, Smart Ring SDK, Bracelet SDK *2026*
  - Built on the vendor SDK to pair with smart rings and bracelets and read health vitals
  - Uploads measurements to the server and shows in-app insight dashboards for neuro-physiological monitoring

Certifications

- **OWASP Top 10:2021 in Python | SecureFlag** *September 2024 – September 2025*
  Secure Coding, Vulnerability Assessment, and Security Testing
  - **Link**: https://www.secureflag.com/s?f1a679f6-27b1-488a-9493-7cba93e24130
- **SQL for Data Science | University of California, Davis (Coursera)** *September 2024*
  Data Modeling, Database Design, Data Analysis, Data Quality, and SQL
  - **Link**: https://www.coursera.org/account/accomplishments/verify/9ZGFH9U5RJQM
- **Python 3 Programming Specialization | University of Michigan (Coursera)** *May 2019*
  Classes and Inheritance, Data Collection API, Pillow, Tesseract, and OpenCV
  - **Link**: https://www.coursera.org/account/accomplishments/specialization/QK9FAKF7JCBA
- **Deep Learning Specialization | DeepLearning.AI (Coursera)** *November 2018*
  Optimization, CNN, RNN, and LSTM
  - **Link**: https://www.coursera.org/account/accomplishments/specialization/FRL8YY38G773
- **Machine Learning | Stanford Online (Coursera)** *September 2018*
  Supervised and Unsupervised Learning, Bias, Variance, Clustering, PCA, and Recommender Systems
  - **Link**: https://www.coursera.org/account/accomplishments/verify/MENNNZ7DR22Z

Honors & Awards

- **Google Kick Start 2019** *2019*
  Best global rank: 1,677 in Round C; 2,132 in Round G and 2,423 in Round A
- **Stack Overflow Contributor** *July 2019 – Present*
  1,000+ reputation from 83 answers, contributing in Python, Pandas, and DataFrame topics