

Md. Tahmid Islam Tomal

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RESEARCH INTERESTS

Computer Vision, Representation Learning, Efficient Vision-Language Models, Continual Learning

EDUCATION

Bangladesh University of Engineering and Technology (BUET)

Bachelor of Science in Computer Science and Engineering

Dhaka, Bangladesh

Feb 2020 – Mar 2025

- **Honors:** Dean's List Award for academic excellence.
- **English Proficiency:** TOEFL iBT 96
- **GRE:** 313/340 (Quantitative: 163, Verbal: 150)

RESEARCH EXPERIENCE

Diagnosing Prototype Estimation in Frozen-Feature Few-Shot Class-Incremental Learning: Training-Free Geometry Selection and Unlabeled-Query Prototype Rectification

WACV 2027 – Algorithms Track, Accepted

Manuscript

- Studied 16 encoder–dataset pairs to identify the main source of error in frozen-feature FSCIL. Found that few-shot prototype estimation errors have a greater impact than downstream classifier fitting.
- Developed ShrinkSel, a training-free method for selecting prototype radius and covariance shrinkage using base-class data. Outperformed shared LDA on 15 of 16 encoder–dataset pairs (0.04–1.52 percentage points).
- Proposed Query Prototype Rectification (QPR), which uses unlabeled queries to refine novel-class prototypes. Achieved 1.21–2.03 percentage-point improvements with CLIP ViT-B/16 across three datasets.
- Evaluated against more than 12 baselines under matched features and supports. Verified generalization across multiple encoder families and additional datasets, including Aircraft and DTD.

Augmenting YOLOv3 with Attention for Road Crack Detection

Undergraduate Thesis

Advisor: Dr. Md. Monirul Islam

- Explored several attention modules with YOLOv3 and compared their effectiveness for road-crack detection.
- Integrated multi-head self-attention with positional encoding to better capture long and irregular crack patterns.
- Evaluated the attention-enhanced models on approximately 26K RDD2020 images and achieved a 7.4% improvement in mAP@50 over the reproduced baseline.

PROFESSIONAL EXPERIENCE

Machine Learning Engineer

Panjeree Publications Ltd. — Publications Intelligence Department

Oct 2024 – Present

Dhaka, Bangladesh

- Integrate AI capabilities into Bangladeshi edTech Praxix Academy using a multi-agent RAG pipeline, for educational content generation, question answering, and student assessment.
- Build OCR and VLM pipelines for Bengali educational materials containing legacy fonts, scanned pages, diagrams, and handwritten text.
- Develop an automated assessment system for handwritten Bengali exam scripts using visual understanding, rubric-based evaluation, and answer verification.
- Maintain a hierarchical RAG system over ~500K records using PostgreSQL, hierarchical indexing, and semantic retrieval.
- Design a LangGraph-based agent harness with routing, memory, retrieval, tool execution, verification, and output post-processing.
- Automate curriculum-to-publication workflows and deploy AI services using FastAPI, Docker, Kubernetes, Redis, and MinIO, reducing manual processing time by approximately 80%.

- Built a price-comparison website for UK retail products, allowing users to compare prices and product information across multiple stores.
- Integrated and deployed a LayoutLMv3-based document understanding system for extracting structured information from UK voucher images. Applied few-shot domain adaptation, bounding-box normalization, and spatial shuffling to handle limited labelled data and complex multi-column layouts, achieving 91% extraction accuracy.
- Developed Selenium-based scraping pipelines that collected millions of grocery product records from UK retail websites.

SELECTED PROJECTS

Healthbook	React.js, Django, MySQL, TailwindCSS	Source Code
• Developed a full-stack doctor-patient prescription data management system with React.js and Django to streamline patient-doctor interactions and improve treatment tracking efficiency. • Developed personal and locality-based health insights by analyzing aggregated patient data, providing healthcare providers with actionable information on regional health trends and patient needs.		

TECHNICAL SKILLS

Languages	: Python, C, C++, Java, JavaScript, Bash, L ^A T _E X
GenAI	: VLMs, RAG Pipelines, LangChain, LangGraph, LoRA, Prompt Engineering, Quantization, Transfer Learning.
Deep Learning: & Data	PyTorch, TensorFlow, Scikit-Learn, Pandas, NumPy, Matplotlib, Seaborn, Hugging Face, OpenCV, YOLO.
Web & Frameworks	Spring, NextJs, TailwindCSS, OpenGL, Selenium, Django.
MLOps & Infrastructure	Docker, Kubernetes, FastAPI, Vector Databases, Redis, MinIO, AWS (EC2/S3), CI/CD.
Tools & Platforms	Git, GitHub, PostgreSQL, Navicat, Wireshark, Cisco Packet Tracer, Autopsy, Bison, Flex, NS-3.