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Prospective PhD Student | AI Engineer

SUMMARY

Prospective PhD applicant in Computer Science with experience building AI-powered software systems. My research interests lie at the intersection of AI, Software Engineering, and Human-Computer Interaction, with a focus on building reliable and trustworthy AI-assisted systems. My recent research includes detecting AI-generated code and images and conducting an empirical study of how AI-assisted development tools affect software engineers.

EDUCATION

Bachelor of Science in Computer Science and Engineering
Shahjalal University of Science and Technology **2013–2017**
CGPA: **3.53/4.00** (Final-year/Last two semester GPA: **3.70/4.00**)
WES-EVALUATED GPA: **3.60/4.00**

RESEARCH INTERESTS

ML/AI Systems, Software Engineering, Cybersecurity, Generative AI, Trustworthy AI, and Human-Centered systems

RESEARCH PROJECTS AND PUBLICATIONS

1. **Question Classification Using Support Vector Machine with Hybrid Feature Extraction** (Published)
   My undergraduate thesis focused on question-answering systems, including question classification and Wikipedia data scraping. Developed an SVM-based classifier to categorize factoid questions into predefined coarse-grained categories using hybrid feature extraction.
   Publication: S. M. H. Nirob, M. K. Nayeem and M. S. Islam, "Question classification using support vector machine with hybrid feature extraction method," *20th ICCIT*, Dhaka, Bangladesh, 2017
   DOI: https://doi.org/10.1109/ICCITECHN.2017.8281790

2. **Evaluating Handcrafted Features and Gradient-Boosted Classifiers for AI-Generated Image Detection** *(Accepted and presented at iConeect 2026)*
   Conducted a large-scale empirical evaluation of handcrafted visual descriptors (HOG, LBP, DCT, GLCM, Wavelet) for detecting AI-generated images. Investigated feature fusion techniques with LightGBM to improve classification performance while maintaining model interpretability and calibration.
   Preprint: S. M. H. Nirob, et al., "Handcrafted Feature Fusion for Reliable Detection of AI-Generated Images," *arXiv preprint*, 2026. DOI: https://doi.org/10.48550/arXiv.2601.19262

3. **Beyond Whitespace: Evaluating Machine-Generated Code Detectors Under Formatting Shifts** (*submitted*)
   Developed and evaluated interpretable handcrafted feature-based models alongside CodeBERT embedding models for distinguishing human-written and AI-generated source code. The study investigates structural code patterns and embedding representations for robust AI-generated code detection.
   Preprint: S. M. H. Nirob, et al., "Whitespaces Don't Lie: Feature-Driven and Embedding-Based Approaches for Detecting Machine-Generated Code," *arXiv preprint*, 2026.
   DOI: https://doi.org/10.48550/arXiv.2601.19264

4. **Impact of AI-Assisted Software Development Tools on Software Engineers in Bangladesh** (*Ongoing*)
   Conducting a survey-based empirical study on how AI-assisted software development tools affect productivity, skill development, and career perceptions among software engineers in Bangladesh. Designed the survey instrument and am collecting responses for statistical analysis across experience levels and organization types.

PROFESSIONAL EXPERIENCE

Re:cruit • **Full-Stack Software Engineer** **2024 – Present**

- Contributed to healthcare and developer-productivity platforms including Osmind (YC S20) and Gerald (YC W21), focusing on system architecture, usability, maintainability, and scalable user-facing systems.
- Designed, developed, and deployed production-scale AI systems, developer platforms, and cloud applications across multiple client projects.
- Developed AI-enabled applications including Awaken, Thybrid and Sierra Romeo. Responsibilities included software architecture, AI integration, backend systems, and technical leadership.

Toptal • **AI Engineer** **2025 – 2026**

- Built AI-powered customer service systems integrating large language models, WhatsApp-based conversational interfaces, product recommendation workflows, and structured business data retrieval.
- Developed real-time chatbot moderation and analytics systems using the YouTube API to support live-stream engagement, automated monitoring, and analysis of user interaction patterns.
- Designed production software involving secure authentication, cloud storage, AI chatbot interfaces, administrative dashboards, and privacy-sensitive system design.

re:tune (retune.so) • **Founding Engineer** **2022 – 2024**

- Designed and developed a large-scale AI chatbot platform integrating large language models, embedding-based retrieval, semantic search, data ingestion, and knowledge-grounded response generation.
- Worked on practical challenges in deployed generative AI systems, including hallucination reduction, retrieval reliability, response quality, and user trust in AI-generated answers.
- Built and scaled production RAG/LLM infrastructure, including retrieval, embeddings, backend services, and reliability for a platform reaching ~20k active users.
- Worked closely with users through demos, technical onboarding, and community support, gaining practical insights into human-AI interaction.

Replo • **Software Engineer** **2021**

Designed reusable UI components and drag-and-drop interfaces, gaining experience in visual programming environments, software engineering tools, and human-centered developer workflows.

AlgoMatrix **2018 – 2020**

Built mobile and backend software systems across iOS, web, and API layers, developing a strong foundation in end-to-end software engineering and human-computer interaction (HCI).

iHealthScreen (ihealthscreen.org) • **intern** **2017**

Contributed to software and research for diabetic screening by supporting retinal image processing workflows, gaining early experience with applied AI/healthcare technology.

PROJECTS AND ADDITIONAL RESEARCH EXPERIENCE

- **Language Identification from Text Documents:** Applied Multinomial Naive Bayes and Logistic Regression to character and word n-gram features from the DSL dataset for language identification.
- **Data Harmonization Dashboard:** Built a pre-RAG platform for uploading CSV/Excel files, mapping inconsistent source data into a standardized schema, storing and reviewing harmonized records in a database, and indexing them in Pinecone with OpenAI embeddings for downstream search and retrieval.
- **Web3 Monitoring Prototype:** Developed an event-monitoring system using the Twitter API to track blockchain project announcements and deliver automated alerts.
- **AnyConnect:** Collaborated on integrating AI-enabled edge devices with mobile applications, focusing on real-time communication and user interaction.

TECHNICAL SKILLS

- **Programming:** JavaScript/TypeScript, Python, C/C++, Java, SQL
- **Software and Infrastructure:** React, Next.js, Node.js, Docker, GCP, databases, cloud deployment
- **Generative AI:** LLMs, RAG, embeddings, AI agents, LangChain, LangGraph, Pinecone, OpenAI API, Anthropic, Google AI, ElevenLabs, prompt engineering, vector search, chatbot workflows
- **Machine Learning:** PyTorch, scikit-learn, Hugging Face, XGBoost, LightGBM, CatBoost, pandas
- **Research Methods:** Experimental design, survey design, feature engineering, statistical analysis, model evaluation

TEACHING AND COMMUNITY LEADERSHIP

- **Competitive Programming Trainer** **2016–2017**
  Trained more than 100 university students in competitive programming and prepared them for national and international contests. Solved more than 1,000 problems across platforms including UVA, Codeforces, and Topcoder.
- **Hackathon and Programming Contest Judge** **2022–2024**
  Designed programming problems for 5 national inter-university contests (500+ teams), helped sponsor a national hackathon and served as a judge.

COMPETITIONS AND AWARDS

- **Top 10 Placements in National Programming Contests**
  Achieved three top-10 finishes in national programming contests and a top-20 finish at the ICPC Asia Dhaka Regional among more than 120 teams.
- **Scholarships**
  Received a full tuition waiver and monthly stipend for sustained academic excellence throughout secondary education and earned a first-year university scholarship awarded to top-performing students.

TEST SCORES

- **TOEFL** 99 (R-22, L-26, S-25, W-26)
- **GRE** - 311 (Verbal-154, Quant-157, AWA-3)