

# RASEL MAHMUD

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## EDUCATION

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**University of Science & Technology of China (USTC)** Sept. 2023 – June 2026 (Exp.)

- **Major:** Master's in Software Engineering, GPA: 3.48 / 4.30 ( $\approx$  3.24 / 4.00, converted)
- **Thesis:** "The Design of an Adaptive-Resilience Autonomous Agentic AI System" (Supervisor: Dr. Guo Yan)
- **Coursework:** Design and Analysis of Algorithms, Advanced Engineering Practice, AI, Computer Vision, NLP, Blockchain, Information Security
- **Scholarship:** Achieved a competitive full-tuition scholarship covering tuition and stipend, 2023–2026

**Southwest Petroleum University (SWPU)** Sept. 2019 – June 2023

- **Major:** Bachelor in Electrical Eng. & Automation, GPA: 4.03 / 4.50 ( $\approx$  3.58 / 4.00, converted)
- **Thesis:** "MATLAB-based modeling and cruise control of modern vehicles" (Supervisor: Prof. Dr. Wang Yu)
- **Coursework:** Intro. of AI, Database, C, PLC, MATLAB, Computational Thinking, Complex Theory, Control System, Linear Algebra
- **Scholarship:** Awarded a fully-funded undergraduate scholarship covering tuition and dormitory, 2019–2023

## EXPERIENCE

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**Algorithm Assistant Intern, Deep Talent Company Ltd.** Sept. 2025 – Present *Hefei city*

- Led development of an Agentic-AI talent-acquisition platform, accelerating the core pipeline 50% and scaling it to 10k concurrent users.
- Leveraged Chrome DevTools Protocol (CDP) to instrument headless browsers in real time, delivering deterministic, reproducible agentic-AI workflows.
- Prototyped unified web-automation frameworks, redesigned chat-file format with backward-compatible search, and parallelized execution across four platforms for real-time frontend updates.

**AI Product Engineering Intern, Hefei Youchuanghui Tech. Co., Ltd.** Mar. 2025 – Aug. 2025 *Hefei city*

- Developed a novel batch-scheduling pipeline for AI irrigation that scaled to 50K+ jobs/day, reduced peak load 68%, and saved 30% water in pilots.
- Built one-click prototype that transforms a single prompt plus 5 business questions into deployable front-end code, enabling non-technical users to launch production-ready apps without writing a line.
- Implemented real-time speech-to-speech customer-service Voice AI backend, integrating OpenAI API with LiveKit orchestration to deliver sub-500 ms conversational latency.

## PUBLICATIONS

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**GRASP-ChoQ: Knowledge Graph-Based Retrieval Augmentation for Stance Detection in Political Texts with Chain-of-Questions Reasoning** ACL-IJCNLP 2025 (Accepted) *Link Authorship: 1st*

- Integrated GRASP-ChoQ with DeepSeek R1, achieving a 40% higher F1 score over zero-shot detection, demonstrating substantial improvements in retrieval augmentation for analyzing low-resource political

discussions.

- Curated and engineered datasets to enhance data quality and usability for downstream NLP tasks, enabling knowledge graph-based contextual reasoning in GRASP-ChoQ.
- Leveraged Knowledge Graphs, RAG with LLMs, Scrapy, and BeautifulSoup to enable efficient data extraction, curation, and contextual learning for enhanced reasoning.

### **FabricYOLO: A Comparative Analysis of Modern YOLO Architectures for Automated Fabric Defect Detection**

IEEE WIECON-ECE 2025 (Under Review) *Authorship: 2nd*

- Introduced FabricYOLO, a unified benchmarking framework that rigorously compares YOLOv5l, YOLOv8l, YOLOv9c, and YOLOv11l on the public TILDA fabric-defect dataset to provide industrially actionable evaluation.
- Identified YOLOv9c as the best-balanced model (F1 = 0.733, mAP@0.5 = 0.774), making it the recommended choice when optimizing both defect recall and overall detection performance.
- Showed YOLOv11l excels in precision (minimizing false positives) and that the observed accuracy improvements come with negligible computational cost, enabling practical performance-vs-cost trade-offs for deployment.

### **Semantic-Abstraction-Guided Hybrid State Reconstruction for Recovering Non-Deterministic Agent**

#### **Workflows**

ASE 2026 (Under Review) *Authorship: 1st*

- Developed a hybrid recover-and-resume architecture for stateful LLM agent workflows using checkpoint replay, automata-based structural prediction, and LLM semantic inference.
- Improved workflow resilience by enabling latent state reconstruction after failures, reaching 91.2% reconstruction accuracy and reducing semantic conflicts by 86.7%.
- Demonstrated effectiveness through 900-run synthetic evaluation and Shopify Admin API validation, achieving 94.7% task success in synthetic settings and 100% recovery success in real API tests.

## **PROJECTS**

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### **Agentic Web Spider**

[github.com/rm/webSpider](https://github.com/rm/webSpider)

- Developed job data scraper using Selenium and custom search engine for multiple job sites extraction.
- Managed authentication with cookies and sessions, ensuring access to restricted job platform data.
- Stored scraped data in structured CSV format and enriched it via API calls to external services.

### **nanoGPT**

[github.com/rm/nanoGPT](https://github.com/rm/nanoGPT)

- Fine-tuned the 1.5B parameters model on two public datasets: News and Quotes, using a consumer-grade Nvidia 4060 GPU.
- Implemented for News headlines and quotes generation, ensuring contextually accurate and coherent word sequences.
- Achieved high-quality text generation performance for both datasets, maintaining natural flow and relevance in generated content with MFU 3.77%.

### **Speech to Speech AI Agent**

[github.com/rm/S2S](https://github.com/rm/S2S)

- Developed an AI-powered mortgage assistant enabling real-time voice & video communication via WebRTC, with integrated live chat, screen sharing, and cross-device compatibility.
- Built intelligent voice interaction workflows using advanced speech-to-speech and NLP pipelines to deliver natural, domain-specific mortgage consultations.

- Engineered a multi-channel client platform combining AI-driven voice, text, and collaboration features to enhance user experience and streamline mortgage advisory services.

## SKILLS

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**Programming:** Python (numpy, pytorch, scikit-learn), C, Java, SQL, JavaScript, MATLAB

**Machine & Deep Learning:** Regression, Classification, Clustering, Neural Networks, CNNs, RNNs, Transfer Learning, LLM Engineering, and Agentic AI System

**Tools:** Overleaf / LaTeX, Jupyter, Docker, AWS / GCP, CI/CD for ML

**Communication Language:** Bengali: Native, English: Fluent, Hindi: Conversation, Chinese: HSK-3, Arabic: Read & Writing

## HONORS AND AWARDS

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**China Scholarship Council (CSC) Award – July 2023:** Secured competitive funding through the CSC, demonstrating excellence in research and academic achievement within the field of Software Engineering.

**The Belt and Road Scholarship (BRI):** For excellent academic results and extra-curricular activities, selected among all international students in November – 2022

**New History Of China Competition:** Competed among 5000 students national level in China and won 2nd position in October – 2021.

## EXTRA-CURRICULAR ACTIVITY

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**Board Member** - Foreign Students Association (FSA), July 2025- June 2026

- Supporting fellow international students academically, socially, and personally. Contributing ideas and efforts to build a stronger, vibrant, and inclusive international student community.
- Bridge communication between international students and the International College of USTC.
- Organizing student activities, cultural exchange events, and initiatives to enrich campus life.