Mohammed Hayat

Senior AI Engineer | Machine Learning Researcher | Technical Leader

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PROFESSIONAL SUMMARY

Senior AI Engineer and technical leader with 7+ years of experience building production AI systems, autonomous agents, and ML infrastructure. Former CTO/CAIRO with proven expertise leading SOC II Type 1 & 2 audits, establishing applied AI research programs, and architecting scalable AI products from 0 to 1. Deep technical expertise in State Space Models, transformer architectures, agentic AI systems, and long-context reasoning.

TECHNICAL SKILLS

AI/ML Frameworks & Models: Langchain, LlamaIndex, Redis, State Space Models (Mamba, S4), LLMs, JAX, Python, Hugging Face Transformers, Browser agents, Reasoning/planning agents

Programming Languages: Python (14 endorsements), Ruby (11 endorsements), C++, Matlab

Cloud & Infrastructure: AWS, GCP, Azure, Elastic, Cloud architecture, Distributed systems

AI Development: FastAPI, Vector databases, Model fine-tuning, Context window expansion, External model memory systems

Security & Compliance: SOC II Type 1 & Type 2 audits, Security architecture, Data governance, Compliance frameworks, Drata

Research Specializations: Autonomous agents, Long-context models, Tool-use AI systems, Agentic architectures, State Space Models

Languages: English (Native), Arabic (Native)

PROFESSIONAL EXPERIENCE

Co-Founder & CTO/CAIRO │ Abstract

January 2019 - August 2025 (6 years 8 months) │ New York, NY

Led all technical development and AI research for VC-backed AI-tech startup building the first AI Regulatory Task Force for government policy analysis.

Technical Leadership & Infrastructure:

- Architected and built Abstract CA product from 0 to 1, leading idea-to-production development and engineering

- Successfully led SOC II Type 1 & Type 2 audits, implementing comprehensive security controls, access management, audit logging, and compliance frameworks

- Designed and implemented proprietary data processing technology for AI models to analyze government policies

- Built scalable backend infrastructure supporting complex AI workloads and regulatory data pipelines

AI Research & Product:

- Established applied AI research wing achieving 100% product acceptance rate through cutting-edge research in browser agents, reasoning/planning agents, State Space Models, context window expansion, and external model memory systems

- Led research initiatives exploring novel model architectures to address AI limitations in regulatory analysis

- Developed AI models and systems for uncovering risks and opportunities in changing government policies

- Pioneered approaches to long-context AI applications before widespread industry adoption

Technical Stack & Tools: PyTorch, Python, AWS, AI model development, distributed systems

EDUCATION

Bachelor of Science in Electrical Engineering

Minor in Applied Mathematics

Loyola Marymount University

Relevant Coursework: Machine Learning, Signal Processing, Linear Algebra, Probability Theory, Optimization, Control Systems

RESEARCH & PROJECTS

Hanford - Autonomous SSM-Based AI Agent

August 2025 - Present

Building next-generation autonomous AI agent powered by State Space Models for long-horizon reasoning and self-extending capabilities.

- Architected and developed full-stack AI agent system using Python/FastAPI with novel SSM-based architecture addressing transformer limitations in agentic use cases

- Implemented sophisticated multi-model pipeline combining Llama-3.3-70b, Mamba-SSM, Qwen3-Coder-A35B, and Claude-Sonnet-4.5 for specialized agent capabilities including conversation, tool calling, tool building, and verification

- Designed self-extension system enabling agents to autonomously build, test, and deploy custom tools for new workflows

- Developed advanced agent features: inbox monitoring, candidate evaluation, automated scheduling, meeting rescheduling, and communication tone optimization based on user behavior patterns

C Squared - AI-Powered Newsletter Aggregation

Built AI-powered newsletter aggregation tool.

- Led comprehensive research into models capable of processing >15 newsletters with minimal information loss

- Evaluated and benchmarked multiple model architectures (transformers, early SSMs) for production viability

- Research insights on long-context limitations directly informed development of Hanford's SSM-based approach

SecureTheVibe - AI Security Testing Agent

Developed AI agent for automated penetration testing of rapidly-prototyped projects, identifying security vulnerabilities in vibe-coded applications using automated security analysis.

KEY ACHIEVEMENTS & IMPACT

- **Successfully led SOC II Type 1 & Type 2 audits** as CTO, establishing enterprise-grade security and compliance practices

- **Achieved 100% product acceptance rate** through applied AI research in browser agents, reasoning systems, and novel architectures

- **Raised $10M in total funding** for Abstract, scaling from seed to growth stage

- **Built production AI systems from scratch** handling autonomous task execution, tool building, and multi-channel communication
- **7+ years in AI/ML space** starting at Fakespot (acq. by Mozilla) with deep expertise spanning transformers, SSMs, and agentic architectures since 2019
- **Technical thought leader** on limitations of transformer architectures for agentic use cases, pioneering SSM-based alternatives
- **Proven startup operator** with experience taking products from 0 to 1 in highly regulated industries

HONORS & AWARDS

Forbes 30 Under 30 LA

Issued by Forbes | August 2023

Engineering Entrepreneur Student of the Year

Issued by LMU College of Business Administration | April 2020

PROFESSIONAL ORGANIZATIONS

Tau Beta Pi Engineering Honor Society

Member | November 2019 - Present

Tau Sigma Honor Society at LMU

Member | February 2018 - Present