IBRAHIM ABDULKARIM

AI/ML Engineer | Research-Focused Software Engineer | Rapid Learner

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PROFILE SUMMARY

Self-taught software engineer with strong foundation in mathematics (linear algebra, calculus, probability, statistics) and rapidly growing expertise in machine learning (Transformers, PyTorch, neural networks). Proven ability to independently build complex technical systems reaching millions of users and rapidly master emerging technologies. Seeking to contribute to frontier AI research through the OpenAI Residency by applying engineering execution, rapid learning velocity, hands-on ML experimentation, and research-oriented mindset to challenging problems in deep learning and AI alignment.

AI / ML SKILLS

Machine Learning Frameworks & Libraries

- **Deep Learning:** PyTorch, TensorFlow, Neural Networks, Transformers, Attention Mechanisms
- **ML Libraries:** HuggingFace Transformers, Scikit-learn, NumPy, Pandas, Matplotlib
- **ML Concepts:** Gradient Descent, Backpropagation, Loss Functions, Fine-tuning, RLHF (basic), Training Pipelines
- **Model Architectures:** Transformer models, Encoder-Decoder architectures, Self-Attention, Multi-Head Attention

Data Science & Analysis

- **Data Processing:** NumPy, Pandas, dataset preprocessing, feature engineering, data augmentation
- **Statistical Analysis:** Probability theory, statistical inference, hypothesis testing, probabilistic reasoning
- **Visualization:** Matplotlib, Seaborn, TensorBoard for training metrics

ML Engineering & Tools

- **Compute:** CUDA, Google Colab, GPU workflows, distributed training concepts
- **Experimentation:** Experiment design, hyperparameter tuning, model evaluation, loss curve analysis
- **MLOps:** Version control (Git), model checkpointing, reproducible experiments

TECHNICAL SKILLS SUMMARY

Languages: Python (primary), JavaScript/TypeScript, Solidity, SQL
ML Stack: PyTorch, Transformers, HuggingFace, Scikit-Learn, NumPy, Pandas, CUDA
Concepts: Neural Networks, Attention Mechanisms, RLHF, Gradient Descent, Backpropagation, Statistics, Probability, Linear Algebra

Development: React.js, Next.js, Node.js, Express, GraphQL, RESTful APIs
Systems: Distributed systems, high-scale architectures, database design, cloud deployment
Tools: Git, Docker, Linux, Jupyter, VS Code, GPU compute environments
Methodologies: Rapid prototyping, experiment design, iterative development, research documentation

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AI RESEARCH INTERESTS

- **Large Language Model Architectures:** Efficiency improvements, novel attention mechanisms, scaling laws
- **AI Alignment & Interpretability:** Understanding model behavior, mechanistic interpretability, safety research
- **Reinforcement Learning from Human Feedback (RLHF):** Training aligned AI systems, reward modeling
- **Efficient Training Techniques:** Optimization algorithms, gradient analysis, computational efficiency
- **AI Agents & Reasoning Systems:** Multi-step reasoning, tool use, agentic workflows
- **AI for Developer Tools:** Code generation, AI-assisted programming, developer productivity
- **Intersection of AI and Distributed Systems:** Large-scale model deployment, inference optimization

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OPEN SOURCE CONTRIBUTIONS

Pytest Testing Framework Enhancement | NetworkX Library

Pull Request #37 - Merged

- Contributed to NetworkX, a widely-used Python library for complex network analysis and graph theory
- Enhanced pytest testing infrastructure to improve code quality and test coverage
- Collaborated with maintainers on testing best practices for scientific Python libraries
- **Impact:** Improved reliability of testing suite used by thousands of data scientists and ML researchers
- **Skills Applied:** Python, pytest, software testing, collaborative development

OpenAI Integration Development | Goose Plugins

Pull Request #83 - Merged

- Developed integration for using Goose with OpenAI's API, enabling AI-powered developer workflows
- Implemented seamless connection between Goose plugin ecosystem and OpenAI language models
- Wrote documentation and examples for developers using OpenAI models in their workflows
- **Impact:** Enabled developers to leverage GPT models within Goose development environment
- **Skills Applied:** Python, OpenAI API, LLM integration, developer tools, API design

Community Engagement:

- Active contributor to AI/ML and scientific computing open source projects
- Comfortable with collaborative development workflows (code review, issue tracking, documentation)
- Experience working with maintainers and community standards in established projects

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NOTABLE ACHIEVEMENTS & ENGINEERING EXCELLENCE

🏆 Chainlink Chromion Hackathon Winner - Avalanche Track (2024)

- Won competitive international hackathon out of hundreds of participants through rapid learning and technical execution
- Built **Festify**: Cross-chain greeting platform deployed across 4+ blockchains (100,000+ transactions)
- Architected smart contracts for multi-chain interoperability using mathematical optimization principles
- Demonstrated ability to master new technical stacks (Chainlink, Avalanche, Solidity) within days—same rapid learning approach now applied to ML fundamentals (Transformers, PyTorch, neural networks)
- Applied distributed systems thinking and data handling concepts similar to those used in large-scale ML training pipelines
- Official Announcement

🎓 BuidlGuidl Top Cohort Graduate - Batch 13 (2024)

- Recognized as top performer in competitive monthly builder cohort through technical excellence
- Selected from global pool of applicants for rapid execution and learning velocity
- Completed complex technical challenges under mentorship—experience directly applicable to research residency environment

💻 Multiple Hackathon Victories & Technical Recognition

- **Encode Club Autonomous Apes Hackathon:** Winner (Gaia bounty track) - Built AI-integrated systems
- **Encode Club HyperHack Hackathon:** Winner (Hyperion testnet) - Rapid prototyping under time constraints
- **Hacktoberfest 2023:** Active open-source contributor across multiple repositories
- **MLH Global Hack Week:** AI Week participant - Developed ML-focused projects and experiments

🚀 High-Impact Production Systems

- **ArbiLearn Platform:** Built learn-to-earn education system reaching millions of users, demonstrating ability to scale systems and optimize for performance—skills transferable to ML infrastructure and deployment
- Applied statistical reasoning and data analysis to understand user behavior and system optimization
- Experience with handling large-scale data processing, relevant to ML dataset pipelines and preprocessing

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PROFESSIONAL EXPERIENCE

Head of Software Department | Galaxy Information Technology and Telecommunications

April 2025 - Present

- Lead technical strategy and oversee complete software development lifecycle for enterprise clients

- Architect scalable systems using statistical reasoning and optimization techniques similar to ML hyperparameter iteration
- Design and implement data pipelines inspired by ML preprocessing workflows (ETL, transformation, validation)
- Mentor emerging developers on mathematical concepts and algorithmic thinking essential for ML engineering
- Drive technical innovation through systematic experimentation and evidence-based decision making
- **Key Achievement:** Promoted from developer to department head in <1 year, demonstrating exceptional learning velocity and technical leadership

Full-Stack Developer | Galaxy Information Technology and Telecommunications

April 2024 - April 2025

- Built production applications using modern frameworks (React, Node.js, TypeScript) with focus on performance optimization
- Applied mathematical optimization principles to improve system performance and resource efficiency
- Implemented statistical monitoring and A/B testing frameworks for data-driven decisions
- Conducted experiments for performance tuning using methodology similar to ML model evaluation
- Collaborated with cross-functional teams—experience relevant to AI research collaboration environments

ML & AI Exploration | Major League Hacking (MLH) Global Hack Week

2022 - 2024

- **AI Week:** Developed projects leveraging artificial intelligence, machine learning, and neural networks
- **Data Week:** Built data-intensive applications using statistical analysis and data science methodologies
- Gained hands-on experience with PyTorch, TensorFlow, and transformer models through workshops and challenges
- Collaborated with global developer community on cutting-edge ML problems
- Demonstrated ability to rapidly learn and apply new ML technologies in compressed timeframes

Software Developer (Gold Fellow) | The Room

February 2023 - March 2024

- Selected as Gold Fellow through competitive application process evaluating technical capabilities
- Contributed to collaborative software projects in agile research-like environment
- Participated in peer programming sessions involving algorithmic problem-solving and technical knowledge exchange
- Maintained production systems requiring systematic debugging and analytical thinking

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LEARNING VELOCITY & RESEARCH METHODOLOGY

Self-Taught ML Journey

- **Completed Machine Learning with Python (Coursera)** - Comprehensive course covering supervised learning, unsupervised learning, neural networks, and practical ML applications
- Systematically self-studying machine learning through combination of theory (textbooks, papers) and practice (hands-on coding)
- Working through foundational ML courses: Stanford CS229 (Machine Learning), Fast.ai, DeepLearning.ai specializations
- Gained practical experience with scikit-learn, regression models, classification algorithms, clustering, and model evaluation
- Reading and implementing techniques from recent AI research papers (attention mechanisms, optimization methods)
- Following frontier AI research from OpenAI, Anthropic, Google DeepMind, and academic institutions

Engineering to Research Transition

- Applying software engineering rigor to ML experiments: version control, reproducibility, documentation
- Developing research mindset: hypothesis formation, systematic experimentation, analysis of negative results
- Learning to read research papers critically and reproduce findings through implementation
- Building foundation for contributing to AI research through combination of math skills, coding ability, and curiosity

Mathematical Foundation for ML

- Bachelor's in Mechanical Engineering providing rigorous training in linear algebra, calculus, differential equations, statistics, probability
- Self-study in advanced probability theory, statistical inference, and optimization mathematics
- Comfortable with mathematical notation in research papers and deriving gradients for backpropagation
- Applied mathematical concepts in both software optimization and ML model development

Rapid Learning Demonstrated

- Transitioned from Mechanical Engineering to software engineering entirely through self-study and execution
- Completed ALX Software Engineering Program while building production systems
- Mastered new blockchain protocols within hackathon timeframes (days to weeks)
- Now applying same learning velocity to ML/AI domain with strong early progress

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EDUCATION

Bachelor's Degree in Mechanical Engineering | Graduated 2016

- **Mathematical Foundation:** Linear Algebra, Calculus I-III, Differential Equations, Statistics, Probability Theory
- **Computational:** Numerical Methods, Mathematical Modeling, Optimization Theory
- **Analytical:** Engineering problem-solving methodology, systems thinking, quantitative analysis

- **Relevant Coursework:** Applied mathematics in computational modeling and systems optimization (directly applicable to ML)

Technical Certifications & Continuous Learning

- **Machine Learning with Python** - Coursera (Completed)
- **ALX Software Engineering Program** - Comprehensive software engineering curriculum
- **freeCodeCamp** - Full Stack Web Development (multiple certifications)
- **ML Self-Study (Ongoing):**
  - Stanford CS229 (Machine Learning) - Currently studying
  - Fast.ai Practical Deep Learning - In progress
  - DeepLearning.ai Specializations - Neural Networks and Deep Learning
  - Research paper implementations (Attention Is All You Need, GPT papers, etc.)