Brendan P. Murphy

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Education

- **Stanford University** — Stanford, CA
  Artificial Intelligence Graduate Certificate (GPA: 3.71) — *April 2023 - present*
- **Boston University** — Boston, MA
  B.A., Computer Science — *Sep 1996 - Dec 2001*

Work Experience

- **Identifai** — San Francisco, CA
  ML Research — *Jul. 2024 - Present*
  - Developed an advanced Transformer-based deepfake detection model utilizing Spatiotemporal Inconsistency Learning (STIL) to enhance both spatial and temporal anomaly detection. Integrated adversarial training with techniques like Projected Gradient Descent (PGD) to improve robustness against a wide range of attacks. Leveraged synthetic data and augmentations to refining the model's resilience. Incorporated robust optimization techniques to address the cyclical "cat-and-mouse game" between deepfake creation and detection, making the model more adaptable to evolving adversarial tactics.
  - Performed a comprehensive audit of the Know Your Employee (KYE) detection system, including the creation of facial profiles, live detection processes, and the integration flow for connecting to meetings and retrieving video feeds. In addition to identifying strengths, weaknesses, and areas for improvement, I built an AI-driven system to automate the code review process. Inspired by Nvidia's Agent Morpheus, this system leverages LLM-based analysis and (RAG) for CVE and vulnerability analysis. It orchestrates multiple AI agents via CrewAI, each responsible for different aspects of code review—security, performance, and quality. By integrating with the CI/CD pipeline, the system conducts comprehensive code audits after build and test steps, and generates actionable reports. This approach enhances the security posture, catches potential issues early, and continuously improves code quality.

Poliquicks — Remote
AI Advisor/ML Engineer — *Jul. 2024 - Present*

- Designed a profile-based matching and recommendation system to align voters with candidates by developing feature vectors that encapsulate political stances on various topics.
- Integrated Retrieval-Augmented Generation (RAG) methods using Llama Index and LangChain to enhance the accuracy of political information retrieval within the app.
- Developed and maintained backend services using Express.js, incorporating authentication mechanisms with Firebase and JWT, while establishing CI/CD workflows via GitHub Actions for streamlined deployment.
- Employed an agentic framework (AgentOps) to automatically generate TypeScript unit tests, achieving comprehensive code coverage and enhancing the reliability of the codebase.
- Configured and managed Kubernetes clusters on Azure AKS to facilitate the deployment of a forthcoming mobile application, ensuring robust performance and scalability.
- Helped design and implement a hybrid data storage approach utilizing Azure CosmosDB and MongoDB, optimizing for complex query handling and cost-effective data access.

Bank of America New York, NY

VP Development Lead *Jun. 2016 - Oct. 2023*

- Designed, developed, and deployed a conversational AI framework, enabling 10+ teams to implement custom chatbot instances without individual AI model development, resulting in a Global Recognition Silver award for innovation among 400 Risk and Finance Technology professionals.
- Successfully navigated the Bank's AI Tollgate and Model Risk Management process, bringing an AI/ML model from concept to production in a highly regulated environment.
- Lead development of a core infrastructure project for the Quartz platform. Built tools including a chatbot framework, incident resolution recommendation engine, email analysis report (topic modeling, classification, sentiment analysis), application capacity prediction and management, code review, compliance and validation tools, violation reports, and custom application KPI/metrics reporting.
- Provide training to developers and quantitative professionals on the various components of the Quartz platform including its distributed object store database, distributed grid computing service, and integrated development environment.
- Responsible for the oversight and administration of the production environment and Quartz platform centric project management activities for the Risk and Finance lines of business throughout the SDLC. This is accomplished by annual code reviews, building tools and reports to enforce compliance, technical standards, developer best practices, and enterprise policy.
- Build risk application and Quartz Core capability, including troubleshooting code, incidents and failures, identifying root cause, workarounds, and corrective actions to prevent future failures while teaching and enforcing Quartz development best practices which aim to maintain interoperability throughout the Quartz Financial Stack.
- Develop subject matter expertise on the technical and functional aspects of Global Risk Analytics applications; Wholesale Loss Forecasting, Mortgage Models, Back Testing, Default Risk Charge, Fair Value Options. Understand the regulatory context, use and impacts of the applications and develop business relationships with various related teams within the bank.

- **State Street** New York, NY

  Technical Lead *May 2014 - June 2016*

  - Developed and maintained business functional and technical specifications for internal users and prime brokers, while managing code, change requests, and functional improvements across all phases of the SDLC.
  - Configured application instances to accommodate client on-boarding and feature requests, promoting new features through process to production while minimizing risk and improving applications' robustness and efficiency.
  - Demonstrated technical ownership of urgent incidents and issues, including debugging, troubleshooting, and resolving trade processing issues for exchange-traded securities and OTC derivatives, while acting as a liaison between development, clients, and prime brokers.

- **Rockit Solutions / Rockefeller & Co.** New York, NY

  Developer and Technical Business Analyst *March 2008 - April 2014*

  - Served as a liaison between Rockit's software development team and its business users in Trading, Accounting, and Client Service groups (front and middle office), gathering detailed requirements, analyzing business needs, proposing, specifying, and coding solutions. Authored functional specifications, modeled new functions, and performed testing of new functionality, communicating, instructing, and training relevant stakeholders on new functionality/releases to the platform.

- Wrote scripts to correct data throughout the system as a result of user or system error, and sourced data from FactSet, Bloomberg, and IDC, building tools to import security data and ensure data integrity.
- Provided support for trades, orders, corporate actions, remittances, dividends, coupons and interest, performance, transfers, security pricing, feeds, imports, statements, and Portfolio View (the application's web interface), solving user problems through instruction, queries/scripts, and journal entries.
- Automated a monthly branch/account access/locking procedure, handing off responsibility to the client service team, and developed a front-end interface for formatting and importing journal entries in bulk. Monitored and reported on the health of the system and clients/accounts by reviewing daily exception reports for account value, holdings, shares, costs, and currency variances, researching and solving issues.
- Collaborated with auditors and compliance to develop reports and tools to audit user access and system permissions, and worked with traders and developers to debug errors, design solutions, and correct data resulting from system/user errors, documenting issues in the case management system.

- **RiskMetrics Group** New York, NY
  Developer *Dec 2002 - May 2006*
  - **Hedge Platform**
    Served as primary contact and developed modules to load, process, and maintain client data feeds, on-boarding new funds and fund of funds into the system. Ran risk reports and fixed any bugs that came up during the report generating process, developing technical specifications based on analysts' functional requirements and use cases. Maintained and modified/rewrote code to improve the quality and efficiency of the platform, and developed technical specs for the second generation HedgePlatform.
  - **WealthBench**
    Designed, coded, maintained, and extended APIs written in Java and SQL, maintaining, bug fixing, and extending functionality within an object-oriented and service-oriented framework to process portfolio data and generate reports.
  - Implemented and integrated the reporting subsystem designed to deliver high-quality PDF reports to clients quickly using Java Report Generator, customizing the resulting PDF reports by writing new EJBs and JSP templates, and developing Java servlets in Eclipse on Win XP and deploying to Tomcat on Linux.
  - Implemented and integrated the charting subsystem, designed charting methodology and integration plan for XML-based third-party charting software, allowing clients to configure most aspects of the report, including deciding which pages to include and adding custom dynamic charts and text.
  - Attended client meetings with major banks to explain the customization capabilities of the reporting system, becoming familiar with Monte Carlo Simulations, VaR, and many other financial and risk metrics.

Machine Learning Projects

- **Efficient Alignment of Medical Language Models using Direct Preference Optimization**
  I used LoRA parameter-efficient fine-tuning and quantization with Direct Preference Optimization (DPO) to align BioMistral to specific medical tasks.
  https://github.com/csbrendan/CS224N

- **Optimizing Bias Mitigation in LLMs: A Study of Fine-Tuning Techniques and Augmented Data**
  I explored innovative approaches to debiasing language models, particularly focusing on fine-tuning GPT-2 with augmented data. By employing finetuning with anti-stereotype and neutral masking augmented data, and comparing the results to in-context learning using similar strategies.
  https://github.com/csbrendan/CS330

- **Leveraging BYOL for Image Classification in Limited Labeled Medical Domains**
  I evaluated the effectiveness of a self-supervised learning method, Bootstrap Your Own Latent (BYOL), across different medical imaging modalities. I enhanced BYOL with additional augmentation techniques, creating a "BYOL+" model that demonstrated resilience to distribution shifts within the same modality and proficiency in few-shot learning scenarios on the PneumoniaMNIST dataset.
  https://github.com/csbrendan/CS230

- **Med-Idefics: A Two-Stage Fine-Tuning Approach for Enhanced Medical Visual Question Answering**
  I explored fine-tuning techniques for the IDEFICS 8B open-source multimodal large language model for medical visual question answering (Med-VQA). Adapted IDEFICS 8B to the medical domain using a two-stage fine-tuning approach utilizing the VQA-RAD and ROCO datasets.
  https://github.com/csbrendan/CS231N

- More on my github: https://github.com/csbrendan

Certificates (DeepLearning.AI)

Generative Adversarial Networks (GANs) Specialization
Generative AI with Large Language Models
Deep Learning Specialization
Machine Learning Specialization
Machine Learning Engineering for Production (MLOps)
DeepLearning.AI TensorFlow Developer
Natural Language Processing in TensorFlow
Convolutional Neural Networks in TensorFlow
Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning
Sequence Models
Neural Networks and Deep Learning
Structuring Machine Learning Projects
Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization
Machine Learning
Convolutional Neural Networks

Additional Coursework

Stanford University
CS230 Deep Learning
CS330 Deep Multi-Task and Meta Learning
CS224N Natural Language Processing with Deep Learning
CS231N Deep Learning for Computer Vision

Stony Brook University
Financial Accounting
Investment Analyses
Corporate Finance
Money, Banking and Monetary Policy

Skills

Programming Languages & OS: Python, PyTorch, TensorFlow, GNU Octave, NumPy, Java (Sun Certification), SQL, C++, Perl, PHP. Visual Studio Code, PyCharm, Eclipse, Excel, Jupyter Notebook, DB Artisan, Jira, SOA, Emacs, Teams, Slack, and Office. Operating Systems I have experience with include macOS, Linux, Sun OS, and Windows 11.

Cloud Computing: Developed and deployed machine learning projects utilizing GPU instances on AWS, Azure, and Google Cloud Platform. Experience with cloud services and infrastructure management, including: containerization and orchestration with Docker and Kubernetes, AWS SageMaker, WandB, and monitoring with Grafana.

Natural Languages: English, fourth semester proficiency in Japanese.

Interests

Academic: Machine Learning, NLP, Computer Vision.

Sports: running, triathlons, surfing.