Kiarash Kianidehkordi

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Education:

University of Toronto Sep 2022 – Dec 2026

- HBSc. Double Major: Statistics and Cognitive Science (Computational Stream); Minor: Mathematics

Honours and Awards :

- **Gold Medal** — Iranian National Mathematics Competition & Selected to represent Iran at the 2019 South Africa International Mathematics Competition (SAIMC).

Professional Experience:

Undergraduate Researcher | UofT iSchool | COoKIE Lab | Supervisor: Prof Anastasia Kuzminykh Sep 2025 – present

- Leading a study to develop a validation rubric for benchmarks measuring **Theory of Mind (ToM) in LLMs**, addressing gaps in how cognitive abilities are evaluated in human-like AI systems.
- Synthesizing psychometric literature to produce a framework that can be used to assess LLM benchmark tasks.

Applied ML Research Assistant | UofT Department of Computer Science | IAI Lab May 2026 – present

- Supporting the development and deployment of a hybrid recommender system that combines **contextual multi-armed bandits (Reinforcement Learning)** with **LLMs** for adaptive mental health interventions in collaboration with researchers at Stanford University.
- Contributing to a systematic literature review for a **response-adaptive biostatistical research initiative** by serving as a double-blind reviewer, independently screening studies and synthesizing qualitative findings that shaped study design decisions.

Research Assistant | Ontario Institute of Studies in Education | Wisdom & Identity Lab May – Sep 2025

- Contributed to a qualitative research project by translating identified moral injury subcomponents into **a predictive processing framework** within cognitive science.
- Produced structured, publication-quality literature reviews under tight academic deadlines and synthesized clinically coded interview data to identify moral injury subcomponents distinct from PTSD.

Projects (Selected) :

Predict Human Reading Time Using GPT-2 & BERT embeddings | Course: Seminar in Computational Cognition | link

- Preprocessed **Natural Stories Dataset (+1M size)**; engineered features for reading time (RT) prediction.
- Built sliding-window batching pipeline to chunk text into overlapping segments and parallelize forward-pass scoring of **GPT-2 & BERT (~110M params) on CUDA**. Analyzed surprisal scores. Fitted **linear mixed-effects models** to predict RT.
- Contributed quantitative evidence on GPT-2 outperforming BERT (**AIC improvement of 571** points with p-value < 1e-100).

Parkinson Classification & Symptoms Profiling with Accelerometer Data | Inter-University Health Data and AI Inquiry Program | link

- Engineered **tremor-specific features** using a literature-driven approach — bandpass filtering (3–12 Hz) and power spectral density metrics — to improve cluster separation and symptom profiles applicable to remote health monitoring.
- Applied **Gaussian Mixture Model clustering** to **wrist-worn accelerometer data from 400+ participants** to classify Parkinson's disease symptom profiles achieving a **silhouette score of 0.7** without labeled training data.
- Applied **t-SNE dimensionality reduction** to validate clusters, confirming alignment with diagnostic labels and a clear progression gradient across disease duration.

Recall - Local Journal with Semantic Search and Weekly AI analysis | link

- Built local desktop journal app in Python (Tkinter UI) where every saved entry is embedded into ChromaDB vector database, enabling semantic search across past entries.
- Implemented a **RAG pipeline with CrewAI agent** (OpenAI API) that uses ChromaDB as a search_journal tool, producing weekly reflections and answering freeform questions — designed to mitigate model hallucinations.

CityScope - Weather Aware Urban Exploration App | Course: Software Design | link

- Designed and built a Java desktop app integrating the OpenWeather API to deliver weather-aware location recommendations, applying SOLID principles and clean architecture across presentation, domain, and data layers.

Skills & Tools:

- **Languages:** Python · R · Java · SQL · LaTeX. **Tools and Libraries:** Git · Jupyter · REST · Pandas · NumPy · SciPy · HuggingFace Transformers · Scikit-learn · PyTorch · TensorFlow · Statsmodels · Matplotlib · Seaborn · Azure · CUDA · CrewAI · ChromaDB. **Coursework:** Statistical Machine Learning, Convex Optimization, Regression Analysis, Time Series Analysis and Forecasting, Data Visualization, Software Design, Artificial Intelligence, Linear Algebra II.