# Mostafa **Miandari Hossein**

(+1) 437 987 8759 | mostafa.miandari@mail.utoronto.ca | miandari.dev | Miandari | miandari

## Summary

PhD candidate with production ML experience, focused on human-technology interaction. Research in computational social science, NLP, and applied LLM systems. Uncovered new patterns in 1M+ unstructured social media posts using LLM extraction and embedding analysis. Industry background in user analytics (40M users), A/B testing, and predictive modeling. Looking to build AI systems that augment human decision-making.

## Education

### University of Toronto
*Toronto, Canada*

PH.D. IN PSYCHOLOGY
*2020 - Now*

- GPA: 4 / 4
- Dissertation: "Platform effects on emotion, information content, and norm-responsiveness in social media". Studied how communication patterns differ across platforms and what drives those differences. Applied traditional NLP methods, LLM-based extraction, embedding analysis, clustering, and mixed-effects modeling to answer these questions. Advisor: Cendri Hutcherson
- Notable Courses: Human-Computer Interaction, Introduction to Advanced Statistical Methods

### University of Tehran
*Tehran, Iran*

M.SC. IN ELECTRICAL ENGINEERING - BIO-ELECTRICAL ENGINEERING
*2015 - 2017*

- GPA: 3.82 / 4, Ranked 1st
- Dissertation: "Analysis and modeling of human interactive learning in a probabilistic markov environment"Studied how social interaction affects the balance between deliberate planning and habitual decision-making in a sequential learning task. Applied reinforcement learning and statistical modeling. Advisors: Dr. Majid Nili Ahmadabadi, Dr.Bahador Bahrami
- Notable Courses: Machine Learning, Reinforcement Learning, Image Processing, Introduction to Cognitive Neuroscience

## Experiences

### Neuromatch Academy — NeuroAI Course
*Remote*

PROJECT ASSISTANT, Selected as project TA (<10% acceptance) for NeuroAI, Neuromatch's advanced course. Mentored students across 5 time zones in formulating research questions at the intersection of neuroscience and artificial intelligence.
*2025*

### Parametric Lab
*Toronto, Canada*

DATA ANALYST, DATA ANALYST, built event detection pipeline to identify significant blockchain activity (large transactions, NFT sales). Enabled users to track notable market events without monitoring raw transaction data.
*2023*

### User Insight & Advertising Teams - Cafe Bazaar
*Tehran, Iran*

DATA ANALYST & RESEARCHER, analyzed user behavior in an app marketplace with 40 million users. Built classification models for user segmentation to improve product personalization and ad targeting. Designed and ran A/B experiments to optimize conversion rates.
*2020 - 2021*

### People Analytics Team- Cafe Bazaar
*Tehran, Iran*

HUMAN RESOURCES ANALYST, built predictive models for employee performance, retention, and attrition risk. Analyzed survey, performance, and manager report data to identify risk patterns; worked with leadership to develop interventions.
*2019 - 2020*

### SRC Accelerator, SYNTECH Technology and Innovation Center
*Qazvin & Tehran, Iran*

DATA SCIENTIST, developed ML models for a shopping aggregator platform. Built recommender systems and visual retrieval models for fashion-item localization (image-to-product matching).
*2017 - 2018*

### Farabi Brokerage Co.
*Tehran, Iran*

DATA SCIENTIST, developed stock price movement prediction models. Evaluated multiple approaches including deep learning (LSTM) and regression-based methods.
*2017*

## Projects

### Personal Knowledge Base System MCP Server 🔗🔗

Built RAG infrastructure for natural-language Q&A over personal knowledge archives (papers, videos, notes). Addresses the problem of querying and synthesizing information from large volumes of consumed content. Implements hybrid retrieval, query decomposition, and MCP integration.

**Adaptive Qualitative Interviewer** 🎧

Built an LLM-powered system for behavioral research that generates adaptive follow-up questions based on participant responses. Addresses the tradeoff between questionnaire scalability and interview depth. Implements LangGraph, configurable experiment protocols, and REST API / web UI deployment.

**Gritful — Multiplayer Habit Tracking Platform** 🎧 🌐

Building a habit tracking platform that combines custom goal definition with multiplayer competition — features that don't typically coexist in existing apps. Implements configurable scoring algorithms (binary, scaled, tiered), real-time leaderboards, and streak mechanics. Uses Next.js and Supabase.

**Multi-Platform Social Media Data Pipeline**

Built infrastructure for collecting and annotating data across social media platforms. Enables cross-platform comparison using unified schemas. Implements Playwright scraping, FAISS vector storage, and LLM-based classification.

**Behavioral Modeling in Social Dilemma Games**

Developed hierarchical RL models for human social decision-making in an online multiplayer game. Combines behavioral modeling with realistic gaming environments. Decision Neuroscience Lab, U of T.

**Market Intelligence & Event-Driven Trading System**

Built two-part trading infrastructure: (1) NLP pipeline that scrapes and analyzes market-moving accounts and news sources, paired with custom volume/flow indicators (PineScript) for discretionary analysis; (2) automated execution system for scheduled economic releases (e.g., CPI, NFP) that fetches data at publication and trades on actual-vs-expected delta.

## Skills

**LLMs & NLP:** Prompt Engineering, MCP, Agentic Coding, LangChain, LangGraph, Llamaindex, Chromadb, FAISS, Embeddings

**ML & Deep Learning:** Reinforcement Learning, Clustering, PyTorch, Keras, Scikit-learn, XGBoost

**Data Analysis & Experimentation:** A/B Testing, Mixed-Effects Modeling, Bayesian Inference, Pandas, Metabase

**Programming:** Python, MATLAB, SQL, R, TypeScript

**Other:** Git, FastAPI, Pydantic, Docker, UV, Streamlit, Supabase, Playwright

## Publications

Hossein, M. M., Hutcherson C., (Submitted). Emotional Fingerprints Across Platforms: Disentangling User from Platform Effects in Political Discourse

Hossein, M. M., Ershadmanesh, S., Vahabie, A. H., & Ahmadabadi, M. N. (Submitted). The effects of directed and free self-monitoring on goal-directed and habitual decision-making.

Saeedpour, S., Hossein, M. M., Deroy, O., & Bahrami, B. (2023). Interindividual differences in Pavlovian influence on learning are consistent. Royal Society Open Science, 10(9), 230447.

Navidi, P., Saeedpour, S., Ershadmanesh, S., Hossein, M. M., & Bahrami, B. (2023). Prosocial learning: Model-based or model-free?. Plos one, 18(6), e0287563.

Ershadmanesh, S., Miandari, M., Vahabie, A.-H., & Nili Ahmadabadi, M. (2019). Higher meta-cognitive ability predicts less reliance on over confident habitual learning system. bioRxiv, 650556

## Research Interests

● Decision-making ● Human-AI Interaction ● Computational Social Science ● Applied NLP/LLMs ● Behavioral Modeling

## Honors & Awards

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| 2020 | **Burton Graduate Scholarship** as an incoming student with first class academic standing. | *University of Toronto* |
| 2020 | **Doctoral Recruitment Award** as an incoming student with first class academic standing. | *University of Toronto* |
| 2020 | **Graduate Scholarship** of University of Toronto for international doctoral students. | *University of Toronto* |
| 2019 | **Graduate Scholarship** of Dartmouth College for international students. | *Dartmouth College* |
| 2018 | **Becoming a Member** of Iran's National Elites Foundation (INEF) | *Domestic* |
| 2017 | **Ranked 1st** among all graduate students of Bio-electrical Engineering in M.Sc. program, class of 2014 | *University of Tehran* |
| 2015 | **Graduate Scholarship** from Cognitive Science and Technologies Council for my master thesis | *Domestic* |
| 2014 | **Ranked 98th** in nationwide M.Sc. enterance exam among more than 30,000 participants | *Domestic* |
| 2013 | **Ranked 13th** in international Data mining cup in Germany with Amirkabir U. of Tech. team | *International* |