

# Mostafa Miandari Hossein

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## Summary

PhD candidate with production ML experience. Research and engineering focused on how people interact with technology and with each other. Computational social science, NLP, and LLM applications on the research side; user analytics (40M users), A/B testing, and predictive modeling on the industry side.

## 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, mentored student research projects at the intersection of neuroscience and artificial intelligence. Guided groups in formulating research questions and applying computational methods to open science datasets.

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

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**LLMs & NLP:** Prompt Engineering, MCP, 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, C#

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

## Publications

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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

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

## Honors & Awards

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