Elias Firisa

Personal Website
github.com/EliasSf73 eliasfirsa@kaist.ac.kr eliassfirisa@gmail.com leetcode.com/u/Abdiisf/

Education

Korea Advanced Institute of Science and Technology (KAIST) **Feb 2022 – Feb 2026 (Expected)**
B.S. in Brain and Cognitive Science, Minor in AI *Daejeon, South Korea*

Relevant Coursework

Machine Learning, Data Science,Statistical Machine Learning, Experimental Data Analysis & Modeling, Intro to Linear Algebra, Probability & Statistics, Signals and Systems, Signal Processing, Data Structures, Discrete Mathematics

Experience

Research Intern **June 2025 – Present**
MolpaxBio — 3D Surgical Simulation Team *Daejeon, South Korea*

- Develop a deep-learning pipeline that converts head CT scans and 2D images into textured 3-D face meshes for cosmetic-surgery preview.
- Deliver watertight meshes and FLAME latents ready for WebGL viewing and AI-driven shape edits.

Research Intern **Dec 2024 – June 2025**
KAIST Decision Brain Dynamics Lab *Daejeon, South Korea*

- Analyzing frontal lobe EEG patterns using power spectrum analysis and machine learning to measure stress and emotional states.
- Applied machine learning algorithms to classify Parkinson's disease datasets, yielding insights into disease patterns.
- Conducted a foundational study on the neurophysiological and clinical aspects of Parkinson's disease.

Undergraduate Researcher **Feb 2024 – Nov 2024**
KAIST Brain-Machine Intelligence Lab *Daejeon, South Korea*

- Developed and implemented Variational Autoencoders (VAEs) for facial image generation and latent space exploration using the CelebA dataset.
- Researched the integration of predictive coding concepts within deep learning frameworks to advance machine understanding of cognitive processes.

Research Intern **June 2024 – Aug 2024**
University of Leeds Worm Lab *Leeds, UK*

- Conducted research on time series forecasting of chaotic systems using Duffing oscillator dynamics and nonlinear dynamical models.
- Applied time series forecasting models (e.g., DLinear) to predict C. elegans neural activity from complex datasets.

Research Internship **Mar 2024 – May 2024**
KAIST Data Strategy Lab *Daejeon, South Korea*

- Reviewed and analyzed research papers on AI-driven metrics for text summarization, information retrieval, and sentiment analysis.

Tutor **Sep 2024 – Present**
KAIST *Daejeon, South Korea*

- Provide tutorials for foundational courses (e.g., General Biology) to freshman students.
- Coach advanced subjects including Linear Algebra, Probability, Statistics, and Neuroscience to non-freshman students.

Projects

RAG Pipeline for Financial Q&A

- Designed and implemented a Retrieval-Augmented Generation (RAG) pipeline tailored for a financial question-answering corpus, enhancing contextual accuracy.

Variational Autoencoder with CelebA *[GitHub Link]*

- Developed a VAE using PyTorch on the CelebA dataset for high-quality facial image generation and latent space analysis.

Student Grade Classification *[GitHub Link]*

- Developed a machine learning model to classify student grades by analyzing academic and demographic data, achieving high predictive accuracy.

Integrated Statistical and Survival Modeling of Glioblastoma Outcomes

- Identified significant glioblastoma treatment effects ($p \leq 0.05$, $HR \leq 0.8$) by applying ANOVA with Tukey HSD and Kaplan-Meier/Cox survival modeling to 150+ preclinical experiments and 200+ clinical patient records.

Parameter Estimation: Optimization of Lotka–Volterra Dynamics

- Optimized predator-prey Ordinary Differential Equation (ODE) parameters to fit empirical data, minimizing model-data error using grid search, Nelder-Mead, and simulated annealing algorithms.

Web3-Based Freelance Marketplace *[Project Link]*

- Led the creation of a decentralized freelance marketplace using Web3 technologies; awarded 1st place in a competition.

Skills

- **Programming Languages:** Python, Java, MATLAB, HTML, CSS
- **ML & Data Science:** PyTorch, NumPy, Pandas, Scikit-learn, VAEs, RAG, Time Series Forecasting, Statistical Modeling, Data Visualization (Matplotlib, Seaborn)
- **Tools & Platforms:** Git, GitHub, LeetCode
- **Neuroscience Methods:** EEG Analysis, Power Spectrum Analysis, Computational Neuroscience Techniques

Awards and Achievements

- Top Project: Web3 and Blockchain Competition (Spring 2023)
- KAIST Alumni Scholarship (2024)
- INSEO Scholarship (2023)