Michael **Sakevych**

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Education

Taras Shevchenko National University — *Kyiv, Ukraine*

COMPUTER SCIENCE AND CYBERNETICS DEPARTMENT — *Sep. 2019 - 2022*

Bachelor of Science in Applied Mathematics

Johannes Kepler University — *Linz, Austria*

ARTIFICIAL INTELLIGENCE DEPARTMENT — *Mar. 2022 - Aug. 2023*

Bachelor of Science in Artificial Intelligence

Texas State University — *San Marcos, Texas*

COMPUTER SCIENCE DEPARTMENT — *Aug. 2023 - Present*

PhD in Computer Science

Skills

Expertise Machine Learning, Deep Learning, Transformers, Diffusion Models, GANs, GATs, Reinforcement Learning, Data Visualization

Languages Python, R, C++, C, SQL, C#, Maple, Golang, HTML/CSS, LaTeX

Tools Conda, Jupyter Notebook, Slurm, Vim, Matlab, Docker, Docker Compose, PyCharm, PostgreSQL, Git, Bash

Libraries PyTorch, TensorFlow, Scikit-learn, Gym, Pandas, NumPy, Matplotlib, CUDA, , OpenMP, pthreads, TeleBot, NetworkX, MPI, PyGame

Experience

Software Engineer Intern @ Distributed Lab — *Kyiv, Ukraine*

GO, SWAGGER, POSTGRESQL, REDIS, VIPER, TRAEFIK, SENTRY, HORIZON, ETHEREUM, BLOCKCHAIN — *Dec. 2021 - Feb. 2022*

- Worked on TokenD project for constructing ready-to-use blockchain-oriented services deployable on different blockchains.
- Created a multi-purpose blob storage service written in Go, bootstrapped by OpenAPI, backed by PostgreSQL and Redis
- Set up micro-service deployment containerized by Docker, orchestrated by Docker Compose and monitored by Cop and Sentry

Doctoral Instructor Assistant — *San Marcos, Texas*

TEACHING, C++, DATA STRUCTURES, CS BASICS, SYNTAX, HUMAN FACTORS — *Aug. 2023 - Present*

- Graded assignments and presentations for a undergraduate Human Factors class.
- Teaching introductory course of programming covering concepts in C++ for freshmen and grading assignments and presentations for a Human Factors class.

Projects

Monkey Interpreter

GO, COMPILER DESIGN, PROGRAMMING LANGUAGES

- Created a robust lexer, recursive-descend Pratt parser, AST-walking interpreter and REPL for the Monkey programming language.
- Implemented first-class support for the higher-order functions, recursion, tail call optimization, closures, namespaces, etc.
- Extended built-in functions to work with heterogeneous lists and closed-addressing hash tables as well as strings.
- Designed a standard library with wide variety of modules covering: buffered I/O, containers, mathematical functions, logging, etc.

Measuring embedding distortion using K-Nearest Neighbors Graphs

PYTHON, NETWORKX, PCA, SVD, PLOTLY, DIMENSIONALITY REDUCTION ALGORITHMS

- Suggested a method for evaluating the distortion in embeddings using distances in K-nn graph.
- Built distortion ”heatmap” bi-linearly interpolating in the 2D space.
- Implemented interactive visualization of distortion factors (paths in graph).
- Authored a paper describing the method and comparing it to the state-of-art approaches. Publication pending.
- Preprocessing of highly distorted edges between nodes has shown to increase the accuracy of models ±18%

Programming Assignment Bot

PYTHON, TELEGRAM API, ALGORITHMS, PLAGIARISM DETECTION

- Created chat bot that serves as a bridge between teachers and students, allowing teachers to set up a programming assignment.
- Students can send their solutions and check them against a teacher-defined test suit(including a check for plagiarism).
- Implemented state-of-the-art plagiarism detection algorithm: “MOSS, A System for Detecting Software Plagiarism. Aiken, Alex. (2002).”
- Added support for solutions targeting many different languages/compilers/toolchains.

Publications

BioDiffusion: A Versatile Diffusion Model for Biomedical Signal Synthesis

San Marcos, Texas

Coauthor — *March 2024*

- Introduced BioDiffusion, a diffusion-based probabilistic model optimized for synthesizing multivariate biomedical signals.
- Addressed critical data scarcity in small datasets by generating diverse, high-fidelity synthetic time-series samples.

The Impact of Data Augmentation on Time Series Classification Models

San Marcos, Texas

Coauthor — *May 2024*

- Conducted a comparative analysis of augmentation techniques for time-series data, including time-warping, space-warping, GANs, and Diffusion Models.
- Evaluated downstream classification performance improvements resulting from various generative augmentation strategies.

Analysis of Differences Between Time Tracking APIs

Linz, Austria

Author — *March 2023*

- Benchmarked high-performance computing processes utilizing tools such as `/usr/bin/time`, `fish time`, `bash time`, and BenchExec.
- Analyzed discrepancies in CPU time reporting across different API implementations. (Bachelor Thesis)

Extracurricular Activity

STEP IT Academy

Seattle, WA

LECTURER, VOLUNTEER — *Aug. 2020 - Jun. 2021*

- Lectured 2 semester-long Computer Science classes for senior high-school kids focusing on Algorithms and Data Structures in C++.
- Taught graph algorithms, computational complexity, multithreading, x86 assembly, encoding, compression, BMP and AVI formats.

Austrian-Ukrainian Student Support Group

Linz, Austria

ORGANIZER — *Mar. 2022 - Sep. 2022*

- Helped dislocated Ukrainian students to continue their studies at the JKU in Linz, curated a list of resources/guides. It became a news website.

3d Modeling/Printing

San Marcos, TX

ENTHUSIAST — *Sep. 2023 - Present*

- Design (FreeCAD/Blender) and printing of own models for home improvements or projects.