Aigerim Keutayeva

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EDUCATION

Nazarbayev University — Astana, Kazakhstan
M.Sc. Robotics, Graduated with Honors (top 10%) — August 2021 – June 2023
Advised by Prof. Berdakh Abibullaev
Thesis topic: *Robust Subject-Independent BCIs using Attention Mechanism based Deep Learning models*
Key courses: Robot Manipulation and Mobility, Software Principles and Practice, Acquisition and Analysis of Biomedical Data, Robot Perception & Vision, Brain-Machine Interfaces, Deep Learning

Nazarbayev University — Astana, Kazakhstan
B.Sc. Robotics and Mechatronics — August 2017 – June 2021
Advised by Prof. Aibek Niyetkaliyev
Graduate project: *Shoulder Rehabilitation Exoskeleton: Biomechanics, Design and Control*
Key courses: Programming for Engineers, Performance and Data Structures, Linear Algebra, Probability, System Dynamics and Modeling, Human-Robot Interaction, Machine Learning

RESEARCH & TEACHING EXPERIENCE

Research

Graduate Research Assistant — August 2023 – Present
Brain-Machine Interfaces Lab, Nazarbayev University
- Implemented and tested deep learning models for BCI using programming languages such as Python and relevant libraries such as MNE, TensorFlow, Scikit-learn, and Pytorch
- Conducted literature reviews and synthesized findings related to BCI

Graduate Research Assistant — June 2022 – June 2023
Digital Manufacturing Lab, Nazarbayev University
- Implemented and tested machine learning models using Python and relevant libraries such as TensorFlow, Scikit-learn, and Pytorch
- Implemented and tested deep learning models for digital twin in additive manufacturing
- Conducted data preprocessing and feature engineering for deep learning tasks

Research Assistant — January 2021 – January 2022
Brain-Machine Interfaces Lab, Nazarbayev University
- Implemented and tested deep learning models for BCI
- Conducted literature reviews and analyzed findings related to BCI

Research Assistant — May 2019 – November 2020
Power Conversion and Motion Control Lab, Nazarbayev University
- Assisted with the design and execution of research projects related to power conversion and motion control
- Implemented and tested control algorithms using programming languages such as C++ and MATLAB

Teaching

Teaching Assistant — Fall 2022
Nazarbayev University, Department of Robotics
Course: Robotics II: Control, Modeling and Learning with Laboratory
- Assisted students with carrying out experiments in class size of 20
- Marked weekly assignments from students

Teaching Assistant — Spring 2022
Nazarbayev University, Department of Robotics
Course: Microcontrollers with Laboratory
- Assisted students with carrying out experiments in class size of 50
- Prepared lab equipment before each lab and proof-read lab scripts
- Marked weekly assignments from students

Industrial

Hardware Engineer Intern June 2019 – August 2019
Kazakhstan Aselsan Engineering (KAE) Astana, Kazakhstan

- Produced and tested of military and commercial components and systems.
- Assisted in product specifications design and creation.
- Assisted in performing routine product design and supporting fabrication of new mechanical or electromechanical components, subsystems, and systems.

HONORS & AWARDS

- **Hackathon on AI** by «National Information Technologies» JSC, **1st place winner** (~ $5000) July 2023
- **Dean's List**, Nazarbayev University, Kazakhstan Fall 2022, Fall 2018
- **Shell Eco-marathon Asia 2020** (team SunQar), **success in Phase 3** Spring 2020 - Spring 2021
- **Fostering Research and Innovation Potential (FRIP) program winner** Fall 2019

PUBLICATIONS

(∗) equal contribution

In Submission

[P1] A. Keutayeva, B. Abibullaev, "*Exploring the Potential of Attention Mechanism-Based Deep Learning for Robust Subject-Independent Motor-Imagery based BCIs,*" in IEEE Access, 2023. 2023

[P2] A. Keutayeva, B. Abibullaev, "*Subject-Independent Brain-Computer Interfaces: A Comparative Study of Attention Mechanism-Driven Deep Learning Models*," in IHCI Conference, 2023. 2023

Journal Articles (peer-reviewed, archival)

[J1] N. Jyeniskhan*, **A. Keutayeva***, G. Kazbek, M. H. Ali and E. Shehab, "*Integrating Machine Learning Model and Digital Twin System for Additive Manufacturing*," in IEEE Access, vol. 11, pp. 71113-71126, 2023, doi: 10.1109/ACCESS.2023.3294486. 2023

Masters' Thesis

[T1] A. Keutayeva, "*Robust Subject-Independent BCIs using Attention Mechanism based Deep Learning models*." M.Sc. Thesis. School of Engineering and Digital Sciences, Nazarbayev University, May 2023. 2023

ACADEMIC SERVICE

Peer Review — Institute of Electrical and Electronics Engineers (IEEE)

Professional membership — Young Researchers Association (NU YRA)

TECHNICAL SKILLS & LANGUAGES

- **Programming languages:** Python, C++, Java, ROS
- **ML and DL frameworks:** TensorFlow, Keras, PyTorch, Scikit-learn, Transformers
- **Signal processing and data analysis tools:** MNE, BBCI, NumPy, Pandas, Matplotlib, Seaborn
- **Tools and technologies:** Git, GitHub, OpenCV, MATLAB, SolidWorks, CUDA, Jupyter Notebook, Anaconda, CoppeliaSim, Django, MySQL

- Kazakh - *Native*
- Russian - *Native*
- English – *Fluent*
- German - *Beginner*