

Sara Ibrahim

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Education

University of Debrecen

Sep 2019 – Jul 2023

BSc in Physics

- **Thesis:** Analysis of Cluster Shapes in the AFP Detector
- **ECTS Credits:** 192
- **Coursework:** Focused on computational physics, mathematics, data analysis, and research methods.

Training & Experience

Carerha - Tech Her Up Program

Sep 2024 – Present

Data Science Track

- Engaged in an intensive training program covering data science fundamentals and machine learning.
- Analyzed real-world datasets to extract insights, clean data, and build predictive models.
- Implemented machine learning algorithms using Pandas, Numpy, and Scikit-learn to solve practical problems.

Projects

House Prices Prediction

- **Institution:** Carerha - Tech Her Up Program
- **Tools:** Python, Pandas, Numpy, Scikit-learn, Matplotlib, Seaborn
- **Description:**
 - Applied Exploratory Data Analysis to identify key relationships and outliers in the data
 - Built and evaluated multiple regression models, including SGDRegressor and Polynomial Regression across various degrees.
 - Applied Ridge regularization technique to prevent overfitting and improve model generalization.
 - Evaluated model performance with MSE, RMSE, and R^2 , achieving robust predictive results.

Energy Consumption and Power Demand Analysis

- **Institution:** Carerha - Tech Her Up Program
- **Tools:** Python, Pandas, Matplotlib, Seaborn, Plotly
- **Description:**
 - Analyzed 2013 energy records to identify regional and temporal consumption patterns.
 - Conducted statistical tests to validate regional and temporal consumption differences.
 - Developed interactive dashboards to visualize energy consumption trends and cost-saving insights.
 - Implemented optimization strategies, reducing energy consumption and costs by 6.7% and 6.5%, respectively.

Analysis of Cluster Shapes in the ATLAS AFP Detector

- **Institution:** Nuclear Physics Polish Academy of Sciences
- **Tools:** C++, ROOT, gnuplot
- **Description:**
 - Studied cluster formation in the ATLAS AFP detector using 2017 low pile-up run data.
 - Analyzed cluster shape distributions to understand proton interactions in the silicon tracker.
 - Verified 99% accuracy in cluster reconstruction algorithms.
 - Investigated the impact of beam conditions (BCID and pile-up effects) to optimize detector performance.

Analysis and Interactive Visualization of Neutrino Event Topologies

- **Institution:** Joint Institute for Nuclear Research (JINR)
- **Tools:** C++, ROOT, JavaScript, HTML, CSS
- **Description:**
 - Analyzed OPERA experiment emulsion data from CERN Open Data to study tau neutrino appearance.
 - Processed 50 muon neutrino interactions from 2,925 charged-current events to track charm decays.
 - Verified results against published OPERA papers, confirming consistency.
 - Developed an interactive 3D event display for visualizing neutrino interactions.

Search for New Physics with Computers: The Ising Spin Model

- **Institution:** Jülich Supercomputing Centre (JSC)
- **Tools:** C++, Python
- **Description:**
 - Simulated magnetization in ferromagnetic materials using the Ising spin model.
 - Analyzed phase transitions and validated theoretical predictions with large-scale computations.

Digital Skills

Programming Languages: Python, C++, C, SQL, PHP

Data Science Tools: ROOT, Pandas, Numpy, Matplotlib, Seaborn, Scikit-learn

Web Development: Laravel, HTML, CSS, JavaScript

Other Tools: LaTeX, Microsoft Office Suite, Linux Environment

Basic Knowledge: Geant4, Parallel Programming, Scilab, Octave

Languages

Arabic: Native

English: Proficient (C2)

German: Intermediate (B1 Reading, A2 Writing/Speaking)

Honors and Awards

Accomplished Competitor – The University Physics Competition

Bronze Honour – International Youth Math Challenge

Pre-Finalist Certificate – International Youth Math Challenge

Participation Certificate, International Youth Math Challenge (2021)

Certificate of Merit, Purple Comet Math Meet (2018)

Certifications

Data Literacy Professional Track, DataCamp

Elements of AI, Introduction to AI, University of Helsinki

Certificate of Participation, The Talent Council of the University of Debrecen

Certificate of Participation, VII. International Interdisciplinary Conference

Certificate of Participation, 20th János Szentágothai Multidisciplinary Conference