Faris Hamdi Rizk

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LinkedIn GitHub Website Google Scholar

Education

Delta Higher Institute of Engineering and Technology **Sep. 2021 – Jul. 2026**

Bachelor's degree, Engineering - ***GPA: 3.2/4.0*** *Mansoura 35111, Egypt*

- **Department**: Electronics and Communication Engineering with a concentration in Machine Learning and Computer Vision
- **Relevant Coursework**: Python Programming, Computer Science I,II, Statistics & Probability Theory, Linear Algebra, Calculus I, II, Discrete Mathematics, Computer Organization and Structure, Technical Writing

Research Experience

Research Staff **Sep. 2024 – Present**

Applied Machine Learning (AML) Lab, Zewail City Computing Society (ZCCS) *Zewail City of Science, Egypt*

- **Collaborating** with a multidisciplinary team to conduct research in Computer Vision, Natural Language Processing (NLP), and Machine Learning, advancing innovative solutions across various domains.

Undergraduate Research Assistant **Sep. 2023 – Present**

Applied Machine Learning Lab - Supervisor: ***Prof. El-Sayed M. El-kenawy, (h-index: 69)***

Department of Communications and Electronics, Delta Higher Institute of Engineering and Technology, Mansoura, Egypt

In Collaboration with Computer Science and Intelligent Systems Research Center, Blacksburg 24060, Virginia, USA

- **Computer Vision for Pothole Detection**: Developed a computer vision model using the **AlexNet** architecture for pothole detection in asphalt roads, achieving **92.15% accuracy**. Presented the research at the International Telecommunications Conference (ITC-Egypt).
- **Deep Learning for Traffic Detection and Patterns**: Enhanced traffic detection systems by integrating **CNN** models with optimization algorithms, getting a **97.28% detection accuracy** in real-world datasets. Additionally, it evaluated deep learning architectures for predicting traffic patterns, contributing to smart city development. Published research findings in 2 journal articles.
- **Image Classification for Oil Spill Detection**: Collaborated on a project utilizing **satellite imagery** for oil spill detection, employing advanced image segmentation techniques, achieved an **accuracy of 96.88%**. The research was presented at the 2024 International Telecommunications Conference (ITC-Egypt).
- **Optimization Algorithms for Student Performance Prediction**: Applied the Greylag Goose Optimization Algorithm and Binary Waterwheel Plant Algorithm to improve student performance prediction models. After GGO optimization **The performance error decreased by 41.75%**. Published research findings in 2 papers.

Publications

Conference Articles:

- Abdelmalak M. E. S., Khodadadi N., Zaki A. M., Eid M. M., Rizk F. H., et al. (2024). ***Pothole Detection in Asphalt Roads: A Comprehensive Approach for Enhanced Road Maintenance and Safety with AlexNet Model***. ITC-Egypt, 269–274. doi:10.1109/ITC-Egypt61547.2024.10620566.
- Rizk F. H., Mohamed M. E., Sameh B., Zaki A. M., Eid M. M., et al. (2024). ***Enhancing Student Performance Prediction with Greylag Goose Optimization Algorithm***. ITC-Egypt, 32–37. doi:10.1109/ITC-Egypt61547.2024.10620568.
- Sherif K., Rizk F. H., Zaki A. M., Eid M. M., et al. (2024). ***Revolutionizing Oil Spill Detection: A Machine Learning Approach for Satellite Image Classification***. ITC-Egypt, 245–250. doi:10.1109/ITC-Egypt61547.2024.10620599.

Journal Articles:

- Rizk F. H., Arkhstan S., Zaki A. M., Kandel M. A., & Towfek S. K. (2023). ***Integrated CNN and Waterwheel Plant Algorithm for Enhanced Global Traffic Detection***. Journal of Advanced Intelligent Systems, Volume 6 (Issue 2), 36–45. doi:10.54216/JAIM.060204.
- Kandel M. A., Rizk F. H., Hongou L., Zaki A. M., Khan H., et al. (2023). ***Evaluating the Efficacy of Deep Learning Architectures in Predicting Traffic Patterns for Smart City Development***. Journal of Advanced Intelligent Systems, Volume 6 (Issue 2), 26–35. doi:10.54216/JAIM.060203.
- Rizk F. H., Elshabrawy M., Sameh B., Mohamed K., & Zaki A. M. (2024). ***Optimizing Student Performance Prediction Using Binary Waterwheel Plant Algorithm for Feature Selection and Machine Learning***. Journal of Advanced Intelligent Systems, Volume 7 (Issue 1), 19–37. doi:10.54216/JAIM.070102.

Selected Projects

Pothole Detection in Asphalt Roads Using AlexNet Model **Jan. 2024 – May. 2024**

- Developed a computer vision system using **AlexNet** for real-time pothole detection in asphalt roads, designed for smart city infrastructure applications.
- Deployed the model on a mobile car platform, achieving **92.15% accuracy** in identifying potholes, significantly enhancing road maintenance efficiency.
- Optimized the model to process real-time data, enabling on-the-fly detection in challenging road environments.
- **Published findings at The International Telecommunications Conference (ITC-Egypt)**, contributing to road safety research and smart city innovations.
- **Skills**: Computer Vision, AlexNet, Real-Time Detection, Mobile Car Deployment, Machine Learning Pipeline, Research Publication

Face Mask Detection Using MobileNetV2 **Apr. 2024**

- Built a deep learning model using **MobileNetV2** to detect face masks, addressing public safety during the COVID-19 pandemic.
- Achieved **97.71% accuracy** on the test dataset, demonstrating the model's robustness and efficiency in detecting various mask-wearing conditions.
- **Skills**: MobileNetV2, TensorFlow, OpenCV, CNN, Real-Time Data Processing, Model Deployment, Deep Learning

Exploratory Data Analysis for Retail Sales Optimization **Mar. 2024**

- Conducted **Exploratory Data Analysis (EDA)** on a large retail dataset using **Python** to identify sales patterns, trends, and product performance.
- Utilized **Pandas, NumPy, Matplotlib, and Seaborn** for comprehensive data cleaning, transformation, and visualization, generating actionable insights for sales strategy optimization.
- Discovered key customer purchasing trends and seasonal sales spikes, leading to improved inventory and marketing strategies for the retail chain.
- **Skills**: Data Analysis, Python, Pandas, NumPy, Data Visualization, Insight Extraction, Retail Optimization

Technical Skills

Programming Languages: Python (proficient), C (intermediate), MATLAB (basic)

Machine Learning Frameworks: TensorFlow, Keras, PyTorch, Scikit-learn

Computer Vision Tools: OpenCV, dlib, YOLO, Faster R-CNN

Deep Learning Techniques: CNNs for image classification, transfer learning, object detection, segmentation, and fine-tuning pre-trained models (e.g., ResNet, VGG)

Data Handling & Visualization: NumPy, Pandas, Matplotlib, Seaborn

Tools & Version Control: LaTeX, Git/GitHub

Research Interests

- **Primary:** Computer Vision, Applied Machine Learning, Deep Learning.
- **Secondary:** AI in Education, Role of AI in Social and Economic Development, AI for Sustainability and Ethical AI Practices.

Extracurricular and Competitions

2nd Place (out of 25 teams) **Dec. 2023**

GDG DevFest Mansoura Hackathon, Mansoura University, Egypt

- Awarded 2nd place for innovative project solutions in a competitive hackathon environment.
- Developed a web-based project demonstrating the Potential of the freelance market for skilled workers in the Egyptian Market such as plumbers, carpenters, electricians, etc.

Graphic Design Head **Oct. 2023 – Present**

Google Developer Student Club (GDSC), Delta Higher Institute of Engineering and Technology

- Leading the graphic design team to create visually engaging materials for events and workshops.
- Overseeing the design and branding of club projects and promotional content.

HR **Sep. 2023 – Dec. 2023**

IHOW, Delta Higher Institute of Engineering and Technology

- Managed recruitment, onboarding, and team-building activities for the organization.
- Facilitated communication between members and addressed HR-related issues.

Graphic Designer **Jun. 2023 – Oct. 2023**

Google Developer Student Club (GDSC), Delta Higher Institute of Engineering and Technology

- Designed graphics and promotional materials for various club activities and events.
- Collaborated with team members to develop creative solutions for design challenges.

Related Training and Courses

Deep Learning for Computer Vision **Michigan Online - University of Michigan**

Prof. Justin Johnson *Online*

Completed an in-depth course on cutting-edge deep learning techniques for computer vision. Covered convolutional neural networks (CNNs), object detection, image classification, and the latest trends such as transformers and 3D vision.

Skills Gained: CNNs, object detection (YOLO, SSD), image classification, transfer learning, 3D vision, transformers, RNN, advanced neural network architectures, and real-world computer vision applications.

Machine Learning Diploma **Live Course**

Dr. Mostafa Saad Ibrahim, PhD - Senior Computer Vision Engineer at NVIDIA *Online*

Focused on applying advanced machine learning and deep learning techniques to real-world computer vision problems, including model optimization and algorithmic strategies for handling complex datasets.

Skills Gained: Advanced machine learning algorithms, deep learning foundations, model optimization, hyperparameter tuning, and solving real-world computer vision challenges.

Machine Learning Specialization **Stanford University, DeepLearning.ai**

Andrew Ng *Online*

Acquired a solid understanding of machine learning concepts, focusing on model development, evaluation, and deployment. Explored techniques for supervised and unsupervised learning, reinforcement learning, and practical best practices for working with AI systems.

Skills Gained: Supervised learning algorithms, unsupervised learning techniques, reinforcement learning, model validation and tuning, recommendation systems, and practical AI deployment.

Data Analysis Course **freeCodeCamp**

Various Instructors *Online*

Completed a comprehensive data analysis course using Python, with an emphasis on data cleaning, preprocessing, and generating insights from data through visualization techniques.

Skills Gained: Data cleaning and preprocessing, exploratory data analysis (EDA), data visualization (Matplotlib, Seaborn), statistical analysis, and Python-based data manipulation (Pandas, NumPy).

Data Structure & Algorithms **freeCodeCamp**

Various Instructors *Online*

Studied essential data structures and algorithms, focusing on efficient problem-solving techniques. Learned about algorithmic complexities and implemented key algorithms such as sorting and searching using Python.

Skills Gained: Algorithm design, sorting and searching algorithms, data structure implementation (linked lists, trees, graphs), complexity analysis, and Python programming.

Python and OOP **freeCodeCamp**

Various Instructors *Online*

Gained proficiency in Python programming with a focus on object-oriented programming (OOP) principles. Developed projects applying OOP concepts such as inheritance, polymorphism, and encapsulation.

Skills Gained: Python programming, object-oriented design (OOP), class and object management, inheritance, polymorphism, and software development practices.

Languages

English: C1 Level (Advanced)

Arabic: Native Proficiency