Suleman Qamar

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Summary

I am a Research Scholar with a background in machine learning, autonomous navigation, reinforcement learning for target tracking, computer vision, and medical image analysis. I have contributed to the field with several scientific articles published in prestigious journals and conference proceedings. As a research scientist, I aim to leverage my expertise in machine learning and autonomous navigation, as well as my strong leadership and communication skills.

Education

Pakistan Institute of Engineering and Applied Sciences (PIEAS), Pakistan Nov. 2019 – Nov 2021
Master of Science in Computer Science with distinction (Gold Medal) and a certificate of merit *CGPA: 3.96*

- Thesis: Autonomous UAVs and Deep Reinforcement Learning
- Supervisor: Professor Asifullah Khan

University of Kotli Azad Jammu & Kashmir (UoKAJK), Pakistan Sept. 2014 – Dec. 2018
Bachelor of Science in Computer Science with distinction (Gold Medal) *CGPA: 3.87*

- Senior year project: Image Classification using Deep Learning
- Supervisor: Asst. Professor Zaheed Ahmed

Research Publications

Journal Publications

- Qamar, M., **Qamar, S.**, Muneeb, M., Bae, S. H., & Rahman, A. (2023). Saliency Prediction in Uncategorized Videos Based on Audio-Visual Correlation. IEEE Access, 11, 15460-15470 [Link]
- Arshad, M. A., Khan, S. H., **Qamar, S.**, Khan, M. W., Murtza, I., Gwak, J., & Khan, A. (2022). Drone Navigation Using Region and Edge Exploitation-Based Deep CNN. IEEE Access, 10, 95441-95450 [Link]
- **Qamar, S.**, Khan, S. H., Arshad, M. A., Qamar, M., Gwak, J., & Khan, A. (2022). Autonomous Drone Swarm Navigation and Multitarget Tracking with Island Policy-Based Optimization Framework. IEEE Access, 10, 91073-91091 [Link]
- **Qamar, S.**, Durad, M. H., Islam, F. U., Saleha, S. R., Hamza, M., Urooj, A. H., & Akber, S. M. A. (2023). AI Credit: Machine Learning Based Credit Score Analysis. Journal of Computing & Biomedical Informatics, 5(01), 217-229 [Link]
- **Qamar, S.** (2023). Smart OMVI: Obfuscated Malware Variant Identification using a novel dataset, *arXiv:2305.08396* [Link]

Conference Publications

- **Qamar, S.**, Qamar, M., Shahbaz, M., Arshad, M. A., Shah, N. S., & Khan, A. (2022, August). Autonomous Drone Swarm Navigation in Complex Environments. In 2022 19th International Bhurban Conference on Applied Sciences and Technology (IBCAST) (pp. 290-295). IEEE [Link]
- Arshad, M., Khan, S. H., Khan, M. W., **Qamar, S.**, & Khan, A. (2021, December). Autonomous Drone Navigation using Deep Convolutional Neural Network, Seventh International Conference on Aerospace Science and Engineering (ICASE 2021) [Link]

Research Experience

Drone Swarm Intelligence | *Python, Unity, Mlagents, Pytorch* Feb. 2021 – Nov. 2021

- A general-purpose drone swarm was developed using C#, Unity with Python Framework, mlagents, that can locate dynamic targets in a complex environment while avoiding obstacles and keeping the swarm formation.
- Novel reward functions were implemented and different algorithms like Soft-Actor Critic, Proximal Policy Optimization and Truly Proximal Policy Optimization were employed to train the simulation model.
- Concept of multiple swarms was added that allowed swarms to combine and divide according to environment and number of targets.

Malware Analysis and Classification | *Python, Scikit-learn, Opencv* March 2022 – June 2023

- Created the Tiny OMD (Tiny Obfuscated Malware Dataset) to address the challenge of dealing with obfuscated or polymorphic malwares.
- The combination of TinyOMD with two pre-existing datasets, MalImg and Kaggle Malware dataset, resulted in a merged dataset. Subsequently, the merged dataset underwent various obfuscation techniques, leading to the creation of a newly obfuscated dataset called OMD (Obfuscated Malware Dataset).

Credit Analysis and Prediction | *Python, Scikit-learn, Opencv, Flask* March 2022 – June 2023

- The "Give me some credit" Dataset underwent multiple pre-processing phases to improve its quality. Various traditional machine learning and deep learning methods were then applied to the dataset.
- A web application was developed using flask for easier user interaction.

Agriculture Crop Classification | *Python, Scikit-learn, Opencv* Sept. 2022 – Present

* Multiple cleaning techniques were applied to the PlantDoc dataset in order to eliminate samples that lacked a proper view of leaves.
* Subsequently, a range of deep learning methods, including vision transformers, were employed for classification purpose.

Glaucoma detection | *Python, Scikit-learn, Opencv* Aug. 2022 – Present

* DNA protein sequences responsible for major glaucoma types were extracted from Uniprot
* The dataset underwent redundancy removal using CD-HIT.
* Tradional machine learning models such as XGBoost and SVM were utilized for predicting glaucoma.

Breast Cancer Survey | *Python, Scikit-learn, Opencv* March. 2021 – Present

* An extensive review paper titled "A Comprehensive Review of Mitosis Detection Techniques in H&E Stained Breast Cancer Pathological Images" is currently being written, focusing on breast cancer.
* The paper specifically explores deep learning techniques, the variations observed among datasets, and the impact of pre-processing methods.

Professional Services

Reviewer

- IEEEAccess journal in Artificial Intelligence and Autonomous Systems
- Selected areas related to deep neural networks in Applied Soft Computing

Experience

Visiting Faculty Nov. 2023 – Current

University of Kotli Azad Jammu & Kashmir *Pakistan*

Teaching the following courses:

- Artificial Neural Networks
- Artificial Intelligence
- Data Structures

Machine Learning Research Assistant Mar 2022 – June 2023

CIPMA Lab, Pakistan Institute of Engineering and Applied Sciences *Pakistan*

- Smart OMVI: Obfuscated Malware Variant Identification using a novel dataset
- Malware detection using Windows Audit Logs
- AICredit: Credit Score Analysis using Machine Learning
- Agriculture Crop Classification using Plantdoc dataset
- Glaucoma disease detection using DNA Sequences

Visiting Faculty Nov. 2021 – Feb. 2022

University of Kotli Azad Jammu & Kashmir *Pakistan*

Taught the following courses:

- Automata and Theory of Formal Languages
- Introduction to Programming
- Artificial Intelligence and Machine Learning

Projects

Image Classification using Deep Learning | *C#.NET, Matlab, Telerik* Feb. 2021 – Nov. 2021

- Image classification application using transfer learning with ResNet as the base model.
- Frontend was developed in C# .NET for easier user interaction while Backend was developed in MATLAB 2018b.

Drone Follow | *Python, TensorFlow, Spyder* Oct. 2020 – Jan. 2020

- Developed a drone follow detector that follows a person
- Mantains a safe predefined distance from the person and all obstacles
- Drone has the ability to capture video

Tic-tac-toe AI | *C# .NET, Visual Studio* May 2017 – Oct. 2017

- Developed a simple tic-tae-toe game having Artificial Intelligence
- Implemented a achivement leatherboard that keeps the highest score, longest win streak, games played etc.
- Ability for users to play against each other.

FaceRecog | *Python, Jupyter Notebook* May 2017 – Aug. 2017

- Developed a simple face recognition application using python.

Other Projects | *C# .NET, Python, TensorFlow, Laravel* Oct. 2016 – May 2022

- Image Manipulator (I-man) using TensorFlow, Colab
- Drone Follow using TensorFlow, Spyder
- Collaboration: Traffic prediction using LSTM, GRU (Spyder)
- Chess Game developed in Java using Eclipse IDE
- Automatic Medicine System (AMS) using Laravel Framework
- Tetris in Java using Netbeans IDE

Technical Skills

- **Programming**: Python, C/C++, SQL, JavaScript, HTML/CSS
- **Frameworks**: Pytorch, Tensorflow, ML-Agents, Laravel, Flask, WordPress
- **Developer Tools**: Git, Docker, VS Code, Visual Studio, Spyder, PyCharm, Google Colab, Jupyter Notebook, Unity 3D
- **Libraries**: OpenCV, Scikit-learn, Pandas, Keras, NumPy, Matplotlib, Seaborn
- **Typesetting Drawing**: LaTeX, Microsoft Office, Draw.io
- Strong understanding of deep learning, deep reinforcement learning and computer vision
- The ability to effectively collaborate with team members while also demonstrating independent problem-solving skills to tackle complex challenges.
- Familiarity with autonomous navigation in unmanned aerial vehicles, breast cancer detection using deep learning
- Proficiency in software development technologies, including Agile development, Scrum methodologies, and Version Control, with a strong understanding of their principles and practices.

Volunteer Services

- Microsoft Office Specialist Trainer for MS Word, PowerPoint and Excel
- SocTech member at UoKAJK
- Network Workshop Organizer

Awards and Honors

- **Gold Medal** and Excellence Certificate in MS for Outstanding Academic Performance
- Certificate of appreciation for Outstanding Performance in thesis work
- Certificate of Merit for CGPA higher than 3.75
- **Fully funded scholarship** in MS
- **Gold Medal** in BS for obtaining the first position
- **Fully funded scholarship** in BS

Certifications

Name	**Issuing Authority**
Machine Learning with Python	Cognitive Class IBM DSN
Deep Learning Fundamentals	Cognitive Class IBM DSN
Data Analysis with Python	Cognitive Class IBM DSN
Introduction to Cloud	Cognitive Class IBM DSN
SQL and Relational Databases	Cognitive Class IBM DSN
Build your own Chatbot	Cognitive Class IBM DSN
Visual Perception for Self-Driving Cars	Coursera
AI in Healthcare (IT) & Bioinformatics: Learn to build CNNs	Udemy
Exploratory Data Analysis (EDA) for Machine Learning	Udemy
Android App Development	AJK Tevta 2018
Microsoft Office Certifications	Certiport Microsoft
Convolutional Neural Networks in Python: CNN Computer Vision	Udemy
Generative Adversarial Networks for Data Augmentation (AI)	Udemy
Graph Neural Networks: Basics, Codes and Simulations for AI	Udemy
Git & GitHub A Practical Course: Beginner To Advanced Level	Udemy

References

- Name: Prof. Dr. Asifullah Khan
  Position: Professor
  Head of Pattern Recognition Lab, PIEAS
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- Name: Prof. Dr. Abdul Majid
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  Head of Biomedical Informatics Lab, PIEAS
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