

SYED ALI ASGHER

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I am a recent graduate with a Master's degree in Electronics Engineering, specializing in Artificial Intelligence and Computer Vision at the Core Research Institute of Intelligent Robots, Jeonbuk National University, South Korea. I have expertise in fundamental and practical problems of computer vision and artificial intelligence. My main research interests include Deep Learning, Machine Learning, & Computer Vision. I am passionate about developing algorithms to extract useful information from data with applications in agriculture, medicine and beyond.

Education

Master's Degree in Electronic & Information Engineering

Jeonbuk National University, South Korea

09/2022 - 08/2024

Field of Study: Computer Vision

Masters's Thesis: Deep Learning-Based Spatiotemporal Plant Health Assessment with Time Series Image Data

Master's Degree in Software Engineering (Interrupted)

Wuhan University, Wuhan, China

09/2021 - 09/2022

Field of Study: Artificial Intelligence

Completed one year of coursework (Interruption due to COVID-19)

Bachelor of Technology (B.Tech.)

Islamic University of Science and Technology, India

01/08/2016 – 05/10/2020

Field of Study: Computer Science Engineering with Specialization in Machine Learning and Deep Learning

Bachelor's Thesis: Intelligent Face Recognition System using Deep Learning

Advisor: Dr. Assif Assad

List of Present and Past Projects

- **Deep Learning-Based Spatiotemporal Plant Health Assessment with Time Series Image Data (Present)**
 - Data Collection : Collected a comprehensive dataset spanning the entire life cycle of tomato plants to gain a thorough understanding of plant development and health over time. Data were collected for three varieties of tomato plants: Nonari, Dafnis, and Big Tomato.
 - Data Annotation : Collaborated with domain experts to annotate the dataset on a scale of 1 to 5 (poor health to optimal health), considering factors such as early flowering, stem thickness, leaf coloration, and presence of stress or disease.
 - Plant Health Monitoring Framework : Developed two deep learning-based strategies for monitoring plant health: a) *Image-Based Plant Health Monitoring* b) *Region-Based Plant Health Monitoring*. During the implementation of these frameworks, we employed state-of-the-art deep learning-based feature extractors, including Vision Transformers, Swin Transformers, ConvNeXts, ResNet, and YOLO.
 - Practical Applicability : The findings of this research have significant implications for the agricultural industry. It helps to determine the exact health status of plants, allowing farmers to implement interventions tailored to the specific health status of their plants.
- **Plant Disease Classification using a lightweight Attention Enhanced DS-ResNet:**
 - Designed and implemented an enhanced lightweight ResNet model for Tomato disease classification: Bacterial Wilt, Early Blight, Late Blight, Septoria Leaf Spot, and Leaf Mold.
 - Stem Layer Modification: Removed the stem layer in ResNet and replaced it with a simpler 4×4 convolution with a stride of 4, enhancing model simplicity and efficiency.
 - Added channel-wise attention to further enhance the model's ability to focus on important features.
 - Applied depthwise convolution to certain layers to further optimize the model's computational efficiency without compromising performance.
 - Implemented cutting-edge augmentation techniques CutMix and Cutout to enhance model robustness and improve generalization capabilities.
 - Applied Stochastic Depth and label smoothing as a regularization technique to prevent overfitting and enhance the model's ability to generalize effectively.

- Utilized the AdamW optimizer to enhance training efficiency and stability.
- Replaced ReLU activation function with GELU (Gaussian Error Linear Unit) to introduce non-linearity and improve the model's learning capabilities.
- Conducted thorough ablation studies to analyze and understand the impact of different components, ensuring a comprehensive evaluation of the model's architecture.
- **Smart Attendance System using Image Processing**
 - Developed a team project for automating attendance tracking using image processing techniques.
 - Incorporated advanced techniques, including data augmentation, deep face embeddings, and few-shot learning, to enhance accuracy and performance.
 - Implemented data augmentation methods to augment the dataset and improve model generalization.
 - Utilized deep face embeddings to extract discriminative facial features for accurate identification.
 - Employed few-shot learning techniques to recognize individuals with minimal training data.
 - Collaborated closely with team members to distribute tasks, ensuring efficient project execution and timely completion.

Research Papers

- Ali Asgher Syed, Alvaro Fuentes, Sook Yoon, Dong Sun Park, "**Deep Learning-Based Plant Health State Classification Using Image Data**", *Journal of Internet of Things Convergence*, Status: Revision Submitted.
- Ali Asgher Syed, Alvaro Fuentes, Sook Yoon, Dong Sun Park, "**Image and Region-Based Deep Learning Strategies in Plant Growth Health Assessment with Expert Annotations**", *Frontiers in Plant Science*, Status: Submitted.
- Jiuqing Dong, Alvaro Fuentes, Wei Jin, Ali Asgher Syed, Sook Yoon, Dong Sun Park, "**Enhancing Anomaly Detection in Plant Disease Recognition with Knowledge Ensemble**", *Applied Intelligence*, Status: Under Review.

Research Experience

- **Research Assistant – CSE Department, Islamic University of Science and Technology** 03/2020 – 07/2020
 - Conducted literature reviews and analyzed relevant research to deepen understanding of machine learning concepts.
 - Integrated and analyzed datasets to gain insights and identify patterns for machine learning applications.
 - Assisted in designing and executing experiments to explore practical machine learning techniques.
 - Applied machine learning and deep learning models to address real-world problems.
 - Collaborated with team members to optimize model performance through experimentation.
 - Developed research writing skills to effectively communicate findings and insights.
- **Deep Learning and Machine Learning Intern – Indian Institute of Technology Guwahati** 12/2019 – 02/2020
 - Conducted extensive experimentation and analysis with advanced computer vision algorithms: VGG, ResNet, SENets UNet, and Double UNet.
 - Applied these algorithms to diverse datasets, conducting ablation studies to understand their performance and behavior under different conditions.
 - Explored the impact of changing hyperparameters on model performance and fine-tuned them for optimal results.
 - Investigated the effects of various architectural modifications and hyperparameter adjustments on algorithm performance and accuracy.
 - Generated valuable insights through thorough analysis and comparison of different algorithm configurations.

MOOCs & Online Courses Certifications

- **Incremental Learning offered by ContinualAI** 07/2023 – 09/2023
 - Focused on addressing catastrophic forgetting and data storage challenges in Incremental Learning.

- **Methods Learned:**
 - Elastic Weight Consolidation (EWC) and Learning Without Forgetting (LwF) for mitigating catastrophic forgetting.
 - iCaRL for exemplar-based incremental learning.
 - Generative Adversarial Networks (GANs) for generative replay.
 - Encoding Episodes as Concepts (EEC) for strict class-incremental learning. Utilized convolutional autoencoders and Neural Style Transfer to avoid blurry image generation.
- **Deep Learning Specialization offered by DeepLearning.AI on Coursera** 06/2020 – 09/2020
 - Completed an extensive online specialization in Deep Learning, offered by DeepLearning.AI.
 - Mastered essential concepts such as Neural Networks, Hyperparameter Tuning, Regularization, Optimization, and Convolutional Neural Networks.
 - Gained hands-on experience in designing and implementing deep learning models for practical applications.
- **Machine Learning for Science and Engineering Applications** 03/2020 – 04/2020
 - Successfully completed an online course on Machine Learning for Science and Engineering Applications from the prestigious Indian Institutes of Technology Madras.
 - Explored foundational Machine Learning algorithms, Neural Networks, Convolutional Neural Networks, and Recurrent Neural Networks.
 - Developed practical skills in applying machine learning techniques to solve real-world problems in science and engineering domains.

Academic Achievements

- **Gold Medalist, International Mathematics Competition 5th Scientific League of PAYA, Tehran, Iran:**
 - Demonstrated exceptional mathematical skills and problem-solving abilities.
 - Achieved top honors in an international competition with participants from various countries.
- **Brain Korea 21 Fellowship, Jeonbuk National University:**
 - Awarded the Brain Korea 21 Fellowship for my master's program at Jeonbuk National University.
 - Chosen for this fellowship based on academic merit and potential for research excellence.
- **Internship Award, Indian Institutes of Technology, Guwahati:**
 - Recognized for outstanding performance and potential during the internship.
 - Gained valuable practical experience and worked on real-world projects.
- **Merit-cum-Means Scholarships, Indian Government:**
 - Received scholarships for four consecutive years in recognition of academic excellence and financial need.
- **Chinese Government Scholarship, Master's Degree in Computer Science, Wuhan University:**
 - Selected for a highly competitive scholarship to pursue an Masters degree at a renowned Chinese university.
 - Completed the first year of the degree; studies disrupted due to COVID-19.

Additional Skills and Competences

- **Languages:**
 - Kashmiri: Native proficiency
 - English: Full professional proficiency
 - Chinese: Elementary proficiency
 - Hindi: Intermediate proficiency
 - Urdu: Full professional proficiency
- **Social Skills and Competences:**
 - Self-motivated

- Ability to work well in teams
- Adaptability to diverse multicultural environments gained through studying and working abroad
- Good communication skills gained through work experience as a researcher
- Fluent in multiple languages
- **Organization Skills and Competences:**
 - Academic tutor at Winter Coaching Center, teaching Mathematics to underprivileged students for 11th and 12th grade (Nov-Mar, 2020-2021)
 - President of the Computer Science Student Council at Islamic University of Science and Technology (2018-2020)
 - Class representative for the entire B.Tech course (2016-2020)
 - Former member and founder of different groups (Frontier Club, Sustainable Development) at JBNU
 - Project and team leadership experience by coordinating my B.Tech final year project on the development of an Intelligent Face Recognition System
- **Technical Skills and Competences:**
 - Ability to conduct research and work autonomously
 - Proficiency in working with machines and high-computing devices
 - Knowledge of statistical analysis and information management
- **Computer Skills and Competences:**
 - Microsoft Office: Word, Excel, PowerPoint
 - Software: Jupyter, PyCharm, Anaconda, IntelliJ IDEA, Visual Studio (proficient in their respective environments for efficient development and coding)
 - Programming Languages: C, C++, Java, Python, MATLAB, HTML, CSS (strong command for versatile programming and development tasks)
 - Libraries and Frameworks: NumPy, Pandas, Keras, TensorFlow, Scikit-learn, OpenCV, PyTorch (extensive experience and expertise in utilizing these essential tools for efficient implementation of machine learning, deep learning, and computer vision algorithms)
 - Platforms: Windows, Linux

References

1. **Dr. Aga Shahee**
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2. **Dr. Adil Bashir**
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