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Khalifa University

Mechanical Engr. Department

Abu Dhabi, UAE



University Profile

Research Interests

Vision-Based Tactile Sensing in Agriculture, Intelligent devices for rehabilitation, Application of AI for Healthcare, and Biomedical Image Analysis.

Positions

- 2024–Present *Research Associate*, Khalifa University
AI-driven vision-based tactile sensors for robotics in agriculture
- 2023 *Visiting Research Associate*, Khalifa University
Intelligent wearable medical devices, such as the SixthFinger
- 2021–2023 *Research Assistant*, National University of Science & Technology, NUST, Pakistan
Skin cancer segmentation on histopathology images, and Sensor failure prediction for mission-critical autonomous aerial vehicles
- 2020–2021 *Python Developer*, Freelancer.
50+ projects in Web Automation, Web Scraping, Data Analysis and Visualization, and Digital Image processing

Education

- 2020–2022 *Master's in Computer Software Engineering*, NUST, Pakistan
Focus: AI in BioMedical Engineering
Dissertation: *Radiology Report Generation for Chest X-ray Images using Transformers*.
- 2016–2020 *Bachelor's in Computer Science*, University of Agriculture, Pakistan
Thesis title: *V-Farmer: An autonomous vertical farmer*
- 2018–2019 *Bachelor's in Education*, University of Agriculture, Pakistan

Startups

- AgriRIPE *Co-Founder & CEO*,
Slogan: *"Harvest Right, Ripen Bright – Perfect Fruits in Every Hand"*,
Incubated at Khalifa Innovation Center (KIC)
Raised One million AED from Local Industry

Patents

1. **Mohsan, M. M.**, Hasanen, B., Hassan, T., Hussain, I., Werghi, N., and Seneviratne, L. (2024). *A wearable device using vision-based tactile sensors to detect object firmness*, Khalifa University. **US Patent # 18/908435**

Journal Articles

7. **Mohsan, M. M.**, Hasanen, B., Hassan, T., Uddin, M., Werghi, N., Seneviratne, L., and Hussain, I. (2024). SwishFormer for Robust Firmness and Ripeness Recognition of Fruits using Visual Tactile Imagery Based Tactile Sensing. *PostHarvest Biology and Technology* (Under Review)
6. Khan, A. M., **Mohsan, M. M.**, Akram, M. U., Hassan, T., Khawaja, S. G., and Qayyum, A. (2024). Radiology Report Generation from a Singular Perspective using Transformers with Knowledge Distillation. *Biomedical Signal Processing and Control* (Under Review)

5. Alqahtani, F. F., **Mohsan, M. M.**, Alshamrani, K., Zeb, J., Alhamami, S., and Alqarni, D. (2024). **CNX-B2: A Novel CNN-Transformer Approach For Chest X-ray Medical Report Generation**. *IEEE Access*, 1–1.
4. Imran, M., Islam Tiwana, M., **Mohsan, M. M.**, Alghamdi, N. S., and Akram, M. U. (2024). **Transformer based framework for multi-class segmentation of skin cancer from histopathology images**. *Frontiers in Medicine* 11, 1380405.
3. Ahmad, M. W., Akram, M. U., **Mohsan, M. M.**, Saghar, K., Ahmad, R., and Butt, W. H. (2024). **Transformer-based sensor failure prediction and classification framework for UAVs**. *Expert Systems with Applications*, 123415.
2. **Mohsan, M. M.**, Akram, M. U., Rasool, G., Alghamdi, N. S., Baqai, M. A. A., and Abbas, M. (2022). **Vision Transformer and Language Model Based Radiology Report Generation**. *IEEE Access* 11, 1814–1824.
1. Fatima, J., **Mohsan, M. M.**, Jameel, A., Akram, M. U., and Muzaffar Syed, A. (2022). **Vertebrae localization and spine segmentation on radiographic images for feature-based curvature classification for scoliosis**. *Concurrency and Computation: Practice and Experience* 34, e7300.

Conference Articles

2. Hasanen, B., **Mohsan, M. M.**, Alkayas, A. Y., Renda, F., and Hussain, I. **Soft Vision-Based Tactile-Enabled SixthFinger: Advancing Daily Objects Manipulation for Stroke Survivors**. *8th IEEE-RAS International Conference on Soft Robotics (RoboSoft) 2025*.
1. Fatima, J., **Mohsan, M. M.**, Qaisar, M. U., Hamza, M., Tahir, M. Z., and Zaman, G. **Handcrafted and Deep features based Classification of Scoliosis**. *2nd International Conference on Digital Futures and Transformative Technologies (ICoDT2) 2022*

Short Papers

2. **Mohsan, M. M.**, Xu, B., Hasanen, B., Hassan, T., and Hussain, I. **Cross-Modal Knowledge Distillation for Efficient Material Recognition: Aligning Language Descriptions with Tactile Image Models** *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2024*.
1. **Mohsan, M. M.**, Hasanen, B., Hassan, T., Hussain, I., Werghi, N., and Seneviratne, L. **Avocado Firmness Assessment Using Vision-Based Tactile Sensing: A Non-Destructive Approach**. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2023*.

Presentations & Workshops

2. **Mohsan, M. M.** (2023). Transformers in Biomedical field. *College of Electrical & Mechanical Engineering, NUST*. (Workshop) 04 January 2023
1. **Mohsan, M. M.** (2022). Transformer based Medical Report Generation (TrMRG). *5th annual resident research conference 2022*. (Presentation) 16 December 2022

Media

2. **Mohsan, M. M.** (2023). Transformers in Biomedical field. *College of Electrical & Mechanical Engineering, NUST*. (Workshop) 04 January 2023
1. **Mohsan, M. M.** (2022). Transformer based Medical Report Generation (TrMRG). *5th annual resident research conference 2022*. (Presentation) 16 December 2022

Professional Service, Awards, Development, Certificates

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| Awards | - Best Innovative Idea Award in BioMedical Field, 5th annual resident research conference 2022. |
| Reviewer | - Biomedical Signal Processing and Control Journal. Elsevier.
- International Conference on Medical Image Computing and Computer Assisted Intervention, MICCAI 2023. |
| Extracurricular | - Stanford University - Khalifa University Collaboration, Khalifa University
- Asia Pacific ICT Alliance (APICTA) Awards 2022, Lead Organizer, Pakistan
- Pakistan Software House Association (P@SHA) Awards 2022, Lead Organizer, Pakistan |
| Certificates | - Deep Learning Specialization (5 courses), Deeplearning.AI.
- Write in Sciences, Stanford.
- Python for Data Science, AI & Development.
- Web Development, Young Development Corps. |
| Referee | -  Prof. Dr. Muhammad Usman Akram , <i>Master's degree supervisor</i> , NUST
-  Asst. Prof. Dr. Irfan Hussain , <i>Line Manager</i> , Khalifa University
-  Assoc. Prof. Dr. Sajid Gul Khawaja , <i>Co-PI of BIOMISA lab</i> , NUST
-  Asst. Prof. Dr. Taimur Hassan , <i>Collaborator</i> , Abu Dhabi University |