

# ANAS AL-LAHHAM

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## EDUCATION

### Mohamed Bin Zayed University of Artificial Intelligence (MBZUAI)

Aug. 2021 - May 2023

MASTERS OF SCIENCE IN COMPUTER VISION (FULL RIDE SCHOLARSHIP)

UAE

- **GPA:** 3.68/4.0
- **Major courses:** Human and Computer Vision, Visual Object Recognition and Detection, Geometry for Computer Vision, Digital Twins.
- **Thesis:** "A Coarse-to-Fine Pseudo-Labeling (C2FPL) Framework for Unsupervised Video Anomaly Detection"

### King Saud University (KSU)

Sept. 2015 - May 2020

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING (FULL RIDE SCHOLARSHIP)

Saudi Arabia

- **GPA:** 4.79/5.0
- **Ranked 1<sup>st</sup> among students graduated in my major**
- **Thesis:** "Sky-Imager Based Forecast of Solar Irradiance Using Machine Learning"

## PUBLICATIONS

- **Al-lahham, A.**, Tastan, N., Zaheer, M. Z., & Nandakumar, K. (2024). A Coarse-to-Fine Pseudo-Labeling (C2FPL) Framework for Unsupervised Video Anomaly Detection. In Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (pp. 6793-6802).
- K. Abutalip\*, **A. Al-lahham\***, and A. E. Saddik, "Digital Twin of Atmospheric Environment: Sensory Data Fusion for High-Resolution PM2.5 Estimation and Action Policies Recommendation". *IEEE Access*, (2023).
- **A. Al-lahham**, O. Theeb, K. Elalem, T. Alshawi, and S. Alshebeili, "Sky imager-based forecast of solar irradiance using machine learning". *Electronics*, 9(10), (2020).

## RESEARCH INTERESTS

**Computer Vision, Video Anomaly Detection, Action Anticipation, Renewable Energy**

## PROJECTS

### Collaborative Learning of Anomalies with Privacy (CLAP) for Unsupervised Video Anomaly Detection: A New Baseline

Sep. 2023 - Present

- We propose a new baseline for anomaly detection capable of localizing anomalous events in complex surveillance scenarios in a fully unsupervised fashion without any labels on a privacy-retaining distributed participant-based training configuration. To the best of our knowledge, is the first rigorous attempt to tackle video anomaly detection in the federated learning setting.
- We propose three new evaluation protocols to extensively evaluate CLAP on various scenarios of collaborations and data availability. Moreover, to carry out these evaluations, we modify the existing VAD datasets to create new splits. **(Accepted for publication at CVPR 2024)**

### Automated Monitoring of Photovoltaic Plants using Aerial Videos

Dec. 2021 - Present

- The overall goal is to develop algorithms that enable automated monitoring or inspection of solar photovoltaic (PV) plants based on aerial videos captured using drones/unmanned aerial vehicles (UAV).
- The initial use case will focus on quantifying the amount of soiling deposited on the PV panels and estimate the corresponding PV power loss (PVPL).

## A Coarse-to-Fine Pseudo-Labeling (C2FPL) Framework for Unsupervised Video Anomaly Detection

Aug. 2022 - Oct 2023

- We propose a novel anomaly detection framework that is independent of the video length
- We propose a new technique for creating and refining feature-level pseudo-labels using weak supervision
- We extend the pseudo-labeling method to completely eradicate the need of having training labels (**Published at WACV 2024**)

## Sensory Data Fusion for High-Resolution PM<sub>2.5</sub> Estimation and Action Policies Recommendation\*

Feb. 2022 - Sep. 2022

- The project aims to build a digital twin (DT) of an atmospheric environment by fusing remote sensing and observational data
- Estimated values of PM<sub>2.5</sub> obtained from an ensemble model are used to provide recommendations for decreasing the agglomeration levels.
- Published an academic journal paper regarding the proposed project (**Published: 12 January 2023**).

## Sky-Imager Based Forecast of Solar Irradiance Using Machine Learning

Sept. 2019 - Oct. 2020

- This project presents a new computationally efficient machine learning algorithm for forecasting solar irradiance for durations from 1 hour up to 4 hours using sky images.
- Compared to state-of-the-art computationally heavy algorithms, our approach achieves competitive results with much less computational complexity for both nowcasting and forecasting up to 4 hours ahead of time.
- Published an academic journal paper regarding the proposed approach (**Published: 16 October 2020**).

## EXPERIENCE

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### MBZUAI

RESEARCH ASSISTANT

Projects: 1) Automated Monitoring of Photovoltaic Plants using Aerial Videos 2) **C2FPL** 3) **CLAP**

Jul. 2023 - Present

UAE

### MBZUAI

TEACHING ASSISTANT FOR MATHEMATICAL FOUNDATIONS OF ARTIFICIAL INTELLIGENCE

Aug. 2022 - Dec 2022

UAE

### YOUSSEF MARROUN CONT.CO (YMCO)

ELECTRICAL PROJECT ENGINEER

Jun. 2019 - Aug. 2019

Saudi Arabia

- **Internship** at YMCO on DALLAH hospital west expansion project. Worked with the electrical engineering team on reviewing and verifying different electrical systems layouts using AutoCAD, such as power, lighting, structure cable.

## TECHNICAL STRENGTHS

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**Software & Tools** MATLAB, AutoCAD  
**Languages** Python (Intermediate), C++ (Basic)  
**Frameworks** PyTorch, OPENCV, Tensorflow

## ACADEMIC ACHIEVEMENTS

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**\*Top 3 Teams in NASA Airathon competition: Predict Air Quality** 2022

**King Saud University Distinguished and Talented Students Program Student Member** 2015

## REFERENCES

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**Karthik Nandakumar** Associate Professor of Computer Vision [karthik.nandakumar@mbzuai.ac.ae](mailto:karthik.nandakumar@mbzuai.ac.ae)  
**Fahad Shahbaz Khan** Professor of Computer Vision [fahad.khan@mbzuai.ac.ae](mailto:fahad.khan@mbzuai.ac.ae)  
**Abdulmotaleb El Saddik** Professor of Computer Vision [a.elsaddik@mbzuai.ac.ae](mailto:a.elsaddik@mbzuai.ac.ae)