

# 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:** "Pseudo-Label Generation and Refinement for Minimally Supervised 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

- "A Coarse-to-Fine Pseudo-Labeling (C2FPL) Framework for Unsupervised Video Anomaly Detection". *WACV* (**Under Review**).
- 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 (Anomaly Detection), Signal and image processing, Renewable Energy.**

## PROJECTS

### Anomaly detection using federated learning

Sep. 2023 - Present

- We propose a novel integration of Federated learning in video anomaly detection
- We exercise the concept of federated learning in our anomaly detection model to detect the anomalies where the data is attained from different clients

### Minimally Supervised Video Anomaly Detection

Aug. 2022 - Present

- 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 (**Under review**)
- The proposed architecture is aimed to be transferable to different applications mainly **Automated Monitoring of Photovoltaic Plants**.

## 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).

## 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 algorithms for forecasting the 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

Jul. 2023 - Present

UAE

Projects: 1) Automated Monitoring of Photovoltaic Plants using Aerial Videos 2) Minimally Supervised Video Anomaly Detection

### 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