



## Dr. Zubair Khan

**Work :** National Center for Physics (NCP), 44000, Islamabad, Pakistan

**Email:** [zubairkhan@sjtu.edu.cn](mailto:zubairkhan@sjtu.edu.cn) **Email:** [zubair.khan@ncp.edu.pk](mailto:zubair.khan@ncp.edu.pk)

**Phone:** (+92) 3116558078

**Website:** <https://zubairkhan001.github.io/zubairkhan.github.io/>

**WhatsApp Messenger:** +92-3220857684

**LinkedIn:** <https://www.linkedin.com/in/zubair-khan-357b2b56/>

**Gender:** Male **Date of birth:** 14/08/1992 **Nationality:** Pakistani

### ABOUT ME

I am smart, hardworking, out of the box thinker, curious, self-motivated, humble, and eager to learn and explore sort of person.

### WORK EXPERIENCE

[ 01/04/2023 – Current ]

#### Assistant Manager (Technical)

**Artificial Intelligence Technology Center (CoE AITeC), National Center for Physics**

**City:** Islamabad

**Country:** Pakistan

- Developing AI based solutions
- Provide trainings related to AI (Computer Vision and Python)
- Present the work to collaborators in industry and academia

[ 26/08/2021 – 25/08/2022 ]

#### Research Assistant

**Pak-Austria Fachhochschule (PAF-IASST): Sino-Pak center for Artificial intelligence (SPCAI)**

**City:** Haripur

**Country:** Pakistan

The development of a real-time human anomalous action recognition and deployment on Jetson Nano edge device.

### EDUCATION AND TRAINING

[ 01/09/2017 – 20/10/2022 ]

#### PhD. Control Science and Engineering

**Shanghai Jiaotong university**

**City:** Shanghai

**Country:** China

**Field(s) of study:** Information and Communication Technologies: *Software and applications development and analysis*

**Thesis:** Unsupervised image segmentation using Classical and Contemporary deep learning approaches

1. Clustering
2. Feature engineering
3. Feature learning
4. Bottom-Up image segmentation

[ 01/09/2014 – 01/07/2017 ]

#### MSc. Information and Communication Engineering

**Hohai University**

**City:** Changzhou

**Country:** China

[ 01/09/2008 – 30/12/2012 ]

**BSc. Telecommunication Engineering**

***The Islamia University of Bahawalpur***

**City:** Bahawalpur

**Country:** Pakistan

## LANGUAGE SKILLS

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**Mother tongue(s):** Urdu

**Other language(s):**

**English**

LISTENING C2 READING C2 WRITING C2

SPOKEN PRODUCTION C2 SPOKEN INTERACTION C2

**Chinese**

LISTENING B2 READING C1 WRITING C1

SPOKEN PRODUCTION B2 SPOKEN INTERACTION C1

*Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user*

## DIGITAL SKILLS

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Machine Learning | Deep Learning | Computer Vision | Python | MATLAB (Programming) | AI platform: Pytorch, Tensorflow etc. | Latex: advanced user | OS: ubuntu, Windows | Artificial Intelligence | High performance computing (HPC) | Video Surveillance

## PUBLICATIONS

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[ 2021 ]

**[Bottom-up Unsupervised Image Segmentation using FC-Dense u-net based Deep Representation Clustering and Multidimensional Feature Fusion based Region Merging](#)**

Image and Vision Computing, Elsevier (SCI)

[ 2019 ]

**[Image segmentation via multi-dimensional color transform and consensus based region merging](#)**

Multimedia Tools and Applications, Springer (SCI)

[ 2020 ] **[Clustering approach for adaptive unsupervised colour image segmentation](#)**

IET image processing (SCI)

[ 2017 ] **[An Improved K-means Clustering Algorithm for Image Segmentation](#)**

IJICIC (EI)

[ 2016 ]

**[Automatic Detection and Counting of Circular Shaped Overlapped Objects Using Circular Hough Transform and Contour Detection](#)**

WCICA'16 (EI)

[ 2019 ]

**[Feature Fusion Based Deep Spatiotemporal Model for Violence Detection in Videos](#)**

ICONIP'19 (EI)

[ 2019 ] [A Deep Unsupervised Convolutional Network for Multi-focus Image Fusion](#)

ICAISC'19 (EI)

[ 2024 ]

### **Non-parametric K-means clustering-based adaptive unsupervised color image segmentation**

**Reference:** Zubair Khan, Jie Yang

Image segmentation focuses at highlighting region of interest within the image, by accumulation of pixels based on given properties. This task resembles to clustering, yet many standard clustering methods fail to meet the basic requirement of image segmentation, that is number of segments is rarely determined automatically. The proposed non-parametric K-means clustering (EAIS) overcomes this limitation and turns out to be particularly suitable for the task of image segmentation. In this paper, we propose a non-parametric K-means clustering approach (EAIS) that automatically and adaptively determines the initialization conditions i.e. number of clusters, initial cluster centroids and subsequently segments the image into suitable regions. The proposed approach comprises of five modules that includes deep image reconstruction, intra-histogram individual peak level detection, inter-histogram peak levels association, mutual consensus-oriented cluster seeds merging, and morphological reconstruction-driven spatial post-processing. Deep reconstruction performs image smoothing by reducing the variance and outliers in the color channel distribution. The proposed approach utilizes image histograms based global distribution to determine the optimal initialization condition for pixel clustering (image segmentation). Followed by dynamic and optimally devised cluster seeds merging for redundancy reduction and determination of adequate number of cluster seeds for K-means initialization. Finally, morphological reconstruction inducts spatial awareness in the clustered space and enhances the spatial consistency of cluster member's (pixels). Diverse experimental results on the BSDS500 benchmark validate that our proposed approach is robust to various natural scenarios and comparable to state-of-the-art methods regarding segmentation quality and computational efficiency.

## RECOMMENDATIONS

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### **PHD Supervisor**

**Name:** Prof. Jie Yang

**Email:** [jieyang@sjtu.edu.cn](mailto:jieyang@sjtu.edu.cn)

Professor jie yang has been my PHD supervisor.

### **MS supervisor**

**Name:** Prof. Jianjun Ni

**Email:** [jianjun\\_ni@hhu.edu.cn](mailto:jianjun_ni@hhu.edu.cn)

Prof. jianjun Ni has been my supervisor during the master's degree at Hohai university.

### **Principal Investigator**

**Name:** Prof. Haroon Yousaf

**Email:** [haroon.yousaf@uettaxila.edu.pk](mailto:haroon.yousaf@uettaxila.edu.pk)

I worked under the supervision of prof. haroon yousaf in the human anomaly recognition project.

## PROJECTS

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[ 01/07/2023 – 01/10/2023 ] **Facial recognition based exit-entry logger system**

We developed an AI based system that employs SCRFD for face detection and ARCFace for face recognition.

[ 01/03/2023 – 30/03/2023 ] **Pothole detection**

We trained our model on Road damage detection dataset RDD2022 dataset using YOLOv8.

[ 26/08/2021 – 25/08/2022 ]

### **Spatio-temporal learning based efficient human anomalous activity understanding**

Development of AI model for real-time video-based inference of human actions/violence and model deployment on NVIDIA Jetson Nano.

**Links:** [https://paf-iast.edu.pk/spcai\\_intellisurvproject2/](https://paf-iast.edu.pk/spcai_intellisurvproject2/) | <https://github.com/Laowai01/Human-anomaly-recognition>

## **HONOURS AND AWARDS**

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[ 04/01/2016 ] **Innovative Student Award** Awarding institution: Hohai Univeristy

I achieved this prestigious award due to my excellent academic performance.

## **HOBBIES AND INTERESTS**

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### **Sports**

I love playing badminton, table tennis, running, and swimming.

## **CERTIFICATES**

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### **Artificial Intelligence Foundations: Machine Learning**

LinkedIn

**Link:** [https://www.linkedin.com/learning/certificates/17f5f1ec0a84a546f20899c17af88e4613a8f2930255a5dd07f20bd7fd92645d?trk=share\\_certificate](https://www.linkedin.com/learning/certificates/17f5f1ec0a84a546f20899c17af88e4613a8f2930255a5dd07f20bd7fd92645d?trk=share_certificate)

[ 01/02/2022 – 03/03/2022 ] **Machine Learning**

Coursera

**Link:** <https://www.coursera.org/account/accomplishments/certificate/7FQ2F2CFDN4M>

### **Image and Video Processing: From Mars to Hollywood with a Stop at the Hospital**

Coursera

**Link:** <https://www.coursera.org/account/accomplishments/certificate/3D22ZD3WX2M6>

### **Natural Language Processing**

Coursera

**Link:** <https://www.coursera.org/account/accomplishments/certificate/7FJUE83CWYGB>