

# Khalil Khan

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## Profile Summary

I received my BSc in Electrical Engineering (2007) and MS in Computer Engineering (2012) from the University of Engineering and Technology (UET), Peshawar, Pakistan. I completed my Ph.D. at the Department of Informatics, University of Brescia, Italy (2016). My research interests mainly focus on Artificial Intelligence, Deep & Machine Learning, and Computer Vision. I like to solve problems using data and science. My main tools are statistics and machine learning. I also practice data exploration and visualization. I like simple solutions, but I enjoy going complex whenever it's needed. I like quality. I'm also very interested in things "more AI", such as reinforcement learning, autonomous driving, or AI-assisted medicine. My current position is Assistant Professor in the Department of Computer Software Engineering and Computer Science, Pak-Austria Institute of Applied Sciences and Technology, Haripur, Pakistan.

## Personal Information

Date of Birth February 02, 1984  
Place of Birth Dir lower, KPK, Pakistan  
Nationality Pakistani  
PEC No. ELECT/25632

## Research Interests

- Artificial Intellegence  
- Machine Learning  
- Deep Learning  
- Data Science

## Education

- 2013–2016** PhD Artificial Intellegence and Machine Learning, University of Brescia - Italy  
**Title:** A Multi-Task Framework for Face Analysis through Semantic Face Segmentation  
**Supervisor:** Prof. Pierangelo Migliorati ([pierangelo.migliorati@unibs.it](mailto:pierangelo.migliorati@unibs.it))
- 2010–2012** MS Computer Engineering, UET Peshawar  
**Title:** An Efficient Method for Urdu Language Text Search in Image Based Urdu Text  
**Supervisors:** Dr. Rehan Ullah Khan & Dr. Nasir Ahmad ([re.khan@qu.edu.sa](mailto:re.khan@qu.edu.sa), [n.ahmad@nwfpuet.edu.pk](mailto:n.ahmad@nwfpuet.edu.pk) )
- 2003–2007** BSc Communication Engineering, UET Peshawar  
**Title:** Performance Comparison of Various Face Recognition Techniques  
**Supervisor:** Prof. Javaid Akhtar (late)

## Research and Teaching Experience

**Assistant Professor (November, 2020 — till date).**

**Department of Computer Software Engineering and Computer Science, Pak-Austria Institute of Applied Sciences and Technology, Haripur, Pakistan.**

**Responsibilities:** Conducting research and academic activities under the Software Engineering programs. Have developed and implemented Outcome Based Education framework for the department in the year 2019.

**Associate Professor (Head of Department) (January, 2020 — November 2020).**

**Department of Electrical and Software Engineering, University of Azad Jammu and Kashmir, Pakistan.**

**Responsibilities:** Conducting research and academic activities under the Electrical and Software Engineering programs. Leading a team of highly motivated academicians and researchers. Have developed and implemented Outcome Based Education framework for the department in the year 2019.

**Assistant Professor (December, 2017 — January, 2020).**

**Department of Software Engineering, University of Azad Jammu and Kashmir, Pakistan.**

**Responsibilities:** Conducting research and academic activities under the Electrical and Software Engineering programs. Leading a team of highly motivated academicians and researchers.

**Assistant Professor (February, 2016 — December, 2017).**

**Department of Electrical Engineering, The University of Poonch, Rawlakot, Pakistan.**

**Responsibilities:** Conducting research and academic activities under the Electrical Engineering program. As a team head, conducted successful Pakistan Engineering Council visits for the sessions 2016 -17 and 2017 -18.

**Research and Teaching Assistant (February, 2013 — February, 2016).**

**Signal Processing and Digital Communications Research Group, University of Brescia, Italy.**

**Responsibilities:** Interaction with fellow researchers by executing several individual and group projects in Signal, Image Processing and Machine Learning areas.

**Lecturer (November, 2010 – December, 2012).**

**Department of Electrical Engineering, University of Lahore, Islamabad Campus.**

**Responsibilities:** Instructing subjects such as signals and system, digital image processing, digital signal processing, and programming languages to undergrad Electrical Engineering students.

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## Industrial Experience

**Field Engineer – Fixed lines, GSM and CDMA (October, 2007 – November, 2010).**

**Zhongxing Telecom Pvt. Ltd., China.**

GSM BSS Experience: Installation, commissioning and integration of BTS & BSC.

Power & EASS Experience: Power & external alarms troubleshooting expertise.

OFAN Experience: Installation, integration and troubleshooting of Optical Network Unit and Optical Link Terminal.

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## Research Projects

**Consultant (1.8 Million SAR):** Intelligent Real-time Crowd Monitoring System Using Unmanned Aerial Vehicle video and Global Positioning Systems Data – funded by Ministry of Science and Technology, KSA (in progress).

**Co. PI (5 Million Euros):** Targeted advertisement on display centers in Metropolitana di Brescia, billboards and public places – funded by Telecom Italia (completed) .

**PI (Rs. 480, 000 PKR):** Pashto Language Resource Development for Natural Language Processing and Text Processing Research, Higher Education Commission, Pakistan (completed).

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## Computer skills

**Programming Languages:** C/C++, Python, Matlab.

**Tools & Libraries:** OPENCV, L<sup>A</sup>T<sub>E</sub>X, Sckiti-Learn, Numpy, Scipy, Matplotlib, Photo-shop and MS Office

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## Admin Work

**Chairman**, *Department of Electrical Engineering, Jan 2017 to present.*

**Chairman**, *Board of Under Graduate Studies, Department of Electrical Engineering, The University of Azad Jammu and Kashmir, Muzafarabbad.*

**Member**, *Academic Council, The University of Azad Jammu and Kashmir, Muzafarabbad.*

**Member**, *Departmental Selection Committee, The University of Azad Jammu and Kashmir, Muzafarabbad.*

**Director**, *Digital Signal Processing lab, Department of Electrical Engineering, The University of Azad Jammu and Kashmir, Muzafarabbad.*

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## Publications

### SCI/SCIE Indexed Selected Journal Papers

- 2020 1 – **Khalil Khan**, Rehan Ullah Khan, Sergio Benini, Riccardo Leonardi "Head Pose Estimation: A Comprehensive Review", IEEE Transaction on Pattern Analysis and Machine Intelligence – revision submitted(**IF: 9.45**).
- 2020 2 – **Khalil Khan**, Ala Alfuqaha "Survey on the key challenges of utilizing ML in smart city applications: Explainability, Ethics and Adversarial Attacks", IEEE Communication Surveys and Tutorials – revision submitted(**IF: 23.230**).
- 2020 3 – **Khalil Khan**, Waleed Albattah, Rehan Ullah Khan, Ali Mustafa Qamar, Durr-e-Nayab "Advances and Trends in Real Time Visual Crowd Analysis", Applied Sciences (**IF: 2.474**).
- 2020 4 – Sahib Khan, **Khalil Khan**, "A Varying Distance Based Robust Variable Data Hiding Technique Using DCT", Applied Sciences (**IF: 2.474**).
- 2020 5 – **Khalil Khan** Asma Gul, Ghulam Sarwar, Tae-Sun Chung , and Muhammad Attique "3D Head Pose Estimation through Face Features and Deep Convolutional Neural Networks", Computers, Materials & Continua (**IF: 4.89**).
- 2020 6 – Waleed Albattah, **Khalil Khan**, Rehan Ullah Khan "Attributes Reduction in Big Data", Applied Sciences (**IF: 2.474**).
- 2020 7 – Farhan Ullah, Bofeng Zhang, Rehan Ullah Khan , **Khalil Khan**, Tae-Sun Chung, Muhammad Attique, Salim El Khediri, Sadeeq Jan "Deep Edu: A Deep Neural Collaborative Filtering for Educational Services Recommendation", IEEE Access (**IF: 4.640**).
- 2020 8 – Sana Shokat, Rabia Riaz, **Khalil Khan**, Sanam Shahla Rizvi, Farina Riaz, Se Jin Kwon "Analysis and Evaluation of Braille to Text conversion Methods", Mobile Information Systems (**IF: 1.635**).
- 2020 9 – Khalil Ullah, **Khalil Khan**, Muhammad Amin, Muhammad Attique, Tae-Sun Chung"Multi-channel Surface EMG Spatio-temporal Image Enhancement using Multi-scale Hessian based Filters", Applied Sciences (**IF: 2.474**).
- 2020 10 – **Khalil Khan**, Rehan Ullah Khan, Kashif Ahmad, Farman Ali "Face Segmentation: A Journey from Classical to Deep Learning Paradigm, Approaches, Trends, and Directions" IEEE Access (**IF: 4.640**).
- 2020 11 – Kashif Ahmad, **Khalil Khan**, Ala Alfuqaha "Intelligent Fusion of Deep Features for Improved Waste Classification" IEEE Access (**IF: 4.640**).
- 2020 12 – **Khalil Khan**, Nasir Ahmad, Farooq Khan, " A Framework for Head Pose Estimation and Face Segmentation through Conditional Random Fields", Signal, Image and Video Processing: (**IF: 1.894**).
- 2020 13 – Sahib Khan, **Khalil Khan**, Mushtaq Khan, Tawab Khan, Rehan Ullah Khan, Muhammad Fazal Ijaz "ACO based Variable Least Significant Bits Data Hiding in Edges using IDIBS Algorithm", Symmetry (**IF: 2.645**).
- 2020 14 – **Khalil Khan**, Byeong-hee Roh, Jehad Ali, Irfan Uddin, Nasir Ahmad. "Pashtu Handwritten Numerals Database and Deep Learning Benchmark", PloS One journal (**IF: 2.870**).
- 2020 15 – Sahib Khan, **Khalil Khan**, Farman Ali, Kyung-Sup Kwak " Forgery Detection and Localization of Modifications at Pixel Level", Symmetry (**IF: 2.645**).
- 2020 16 – **Khalil Khan**, Rehan Ullah Khan, Farman Ali, Kyung-Sup Kwak "Facial Attributes Classification through End-to-End Face Parsing and Deep Convolutional Networks", Sensors (**IF: 3.275**).

- 2019 17 – **Khalil Khan**, Muhammad Abeer Irfan, Ghulam Sarwar, " A Unified Framework for Head Pose, Age and Gender Classification through End-to-End Face Segmentation", *Entropy* (IF: 2.700).
- 2019 18 – **Khalil Khan**, Sergio Benini, Massimo Mauro, Riccardo Leonardi, Pierangelo Migliorati, " Face Analysis through Semantic Face Segmentation", *Signal Processing: Image Communication* (IF: 2.814).
- 2019 19 – **Khalil Khan**, Muhammad Attique, Ikram Syed, " Automatic Gender Classification Through Face Segmentation", *Symmetry*: (IF: 2.645).
- 2019 20 – Farooq Khan, HM Noor ul Huda Khan, **Khalil Khan**, " Transmissivity of Opt-omechanical System Containing a two-level System", *International Journal of Modern Physics* (IF: 0.769).
- 2019 21 – Muhammad Abeer Irfan, **Khalil Khan**, Sahib Khan, Arslan Arif, Aleem Khaliq, Zain Anwer Memon, Muhammad Ismail " Single Image Super Resolution Technique: An Extension to True Color Images", *Symmetry* (IF: 2.645).
- 2019 22 – Sergio Benini, **Khalil Khan**, Riccardo Leonardi, Massimo Mauro, Pierangelo Migliorati " FASSEG: a FAcE Semantic SEGmentation repository for face image analysis", *Data in Brief* (IF: 0.7).
- 2019 23 – M Ehsan Mazhar, M Nauman Usmani, **Khalil Khan**, Sajjad Ahmad, and Javed Ahmad " Impact of Dopant on Electrical and Dielectric Properties of Nano particles", in *Journal Material Express Research* (IF: 1.449).
- 2018 24 – **Khalil Khan**, Nasir Ahmad, Khalil Ullah " Multi-class semantic segmentation of faces using CRFs", *Turkish Journal of Electrical Engineering and Computer Sciences*: 10.3906/elk-1607-332 (IF: 0.697).

#### HEC Recognized and Scopus Indexed Journals

- 2018 25 – **Khalil Khan**, Muhammad Waheed, Adeel shams "Pashtu Numerals Recognition through Convolutional Neural Networks", in *Journal of Applied and Emerging Sciences*.
- 2018 26 – **Khalil Khan**, Nasir Ahmad, Muhammad Ehsan Mazhar, Rehan Ullah Khan "FaceParser – A New Face Segmentation Approach and Labeled Database", in *International Journal of Engineering and Technology*.
- 2017 27 – Jihad Ali, **Khalil Khan** and Nair Ahmad "Robust Multimodal Face Recognition with Pre-processed Kinect RGB-D Images", in *Journal of Engineering and Applied Sciences*:
- 2017 28 – **Khalil Khan**, Massimo Mauro and Riccardo Leonardi "Gender and Expression Analysis Based on Semantic Face Segmentation", in *Springer Lecture Notes in Computer Science series*:
- 2017 29 – Usman Ali, Arslan Shaukat, Masroor Hussain, Jihad Ali and **Khalil Khan** "Automatic Cancerous Tissue Classification using Discrete Wavelet Transformation and Support Vector Machine", in *Journal of Basic and Applied Scientific Research*:
- 2016 30 – Muhammad Sidique, **Khalil Khan**, Rehanullah Khan and Nasir Ahmad ,"Performance Evaluation of Super-resolution Reconstruction Algorithm based on Linear Magnification", *International Journal of Computer Science Issues*:
- 2012 31 – Muhammad Sidique, **Khalil Khan**, Rehanullah Khan and Nasir Ahmad ,"Performance Evaluation of Super-resolution Reconstruction Algorithm based on Linear Magnification", in *International Journal of Computer Science Issues*:
- 2012 32 – **Khalil Khan**, Muhammad Sidique, Muhammad Aamir and Rehanullah Khan, "An Efficient Method for Urdu Language Text Search in Image Based Text", in *International Journal of Computer Science Issues*:
- 2012 33 – **Khalil Khan**, Rehanullah Khan, Nasir Ahmad and Khwaja Naveed "Urdu Text Recognition using Principal Component Analysis", in *International Journal of Computer Applications*:

#### International Conferences

- 2019 34 – Ikram Syed, **Khalil Khan**, Irfan Uddin "Analysis of Group Based Contention in IEEE 802.11ah Networks", *The 5th International Conference on Next Generation Computing*, Chiang Mai, Thailand, 2019.
- 2019 35 – Khwaja Naveed, Khalil Khan, **Khalil Khan**, Nasir Ahmad and Muhammad Fayaz "A Machine Learned Approach to Identify the Anomalies in Load Pattern of Pakistan", *5th International Conference on Power Generation Systems and Renewable Energy Technologies*, Istanbul Technical University, Turkey, 2019.
- 2018 36 – **Khalil Khan**, Khalil Khan Ikram Syed, M Sarwar Khan, Muhammad Ehsan Mazhar, Irfanud Din, Nasir Ahmad "FPL – An End-to-End Face Parts Labeling Framework", *Proceedings of the 24th International Conference on Automation & Computing*, Newcastle University, UK:
- 2017 37 – **Khalil Khan**, Nasir Ahmad, ME Mazhar, RU Khan "FaceParser – A New Face Segmentation Approach and Labeled Database", *3rd International Conference on Engineering Technology and Applied Sciences*, Malaysia:

- 2017 38 – **Khalil Khan**, Massimo Mauro and Riccardo Leonardi "Gender and Expression Analysis Based on Semantic Face Segmentation", International Conference on Image Analysis and Processing, September 11-15 2017, Italy:
- 2017 39 – **Khalil Khan**, Massimo Mauro and Riccardo Leonardi "Head Pose Estimation through Multi-class Face Segmentation", International Conference of Multimedia & Expo, Hong Kong, July 10-14:
- 2015 40 – **Khalil Khan**, Massimo Mauro and Riccardo Leonardi "Multi-class semantic segmentation of faces", IEEE International Conference on Image Processing, September 27-30, QUBEC, Canada:
- 2015 41 – **Khalil Khan**, Nasir Ahmad, Rehan Ullah khan and Ali Alkhalifa, "Urdu Text Classification: Decision Tree Approach", IEEE International Conference on High Capacity Optical Networks and Enabling Technologies , NUST Islamabad: