

# Nazar Khan

✉ nazarkhan@pucit.edu.pk • 📄 faculty.pucit.edu.pk/nazarkhan/

## Education

---

<b>University of Central Florida</b> <i>Ph.D. Computer Science</i>	<b>Orlando, FL, USA</b> 2007–2013
<b>University of Saarland</b> <i>M.Sc. Computer Science</i>	<b>Saarbruecken, Germany</b> 2004–2007
<b>Lahore University of Management Sciences</b> <i>B.Sc. Computer Science, High Merit</i> Math minor	<b>Lahore, Pakistan</b> 1999–2003
<b>Aitchison College</b> <i>A-Levels</i>	<b>Lahore, Pakistan</b> 1998

## Doctoral Dissertation

---

**Title:** *Discriminative Dictionary Learning with Spatial Constraints*

**Supervisors:** Dr. Marshall Tappen, Dr. Hassan Foroosh, Dr. Kenneth Stanley, Dr. Xin Li

**Description:** Incorporation of spatial priors for discriminative dictionary learning in natural image analysis tasks.

## Master thesis

---

**Title:** *Silhouette-Based 2D-3D Pose Estimation Using Implicit Algebraic Surfaces*

**Supervisors:** Dr. Bodo Rosenhahn, Dr. Joachim Weickert

**Description:** Estimation of 3D pose via 2D image outlines.

## Bachelor thesis

---

**Title:** *3D Hand Tracking Using A Single Camera*

**Supervisors:** Dr. Sohaib Khan

**Description:** Estimation of 3D finger-tip location using a single camera.

## Experience

---

<b>Punjab University College of Information Technology</b> <i>Assistant Professor</i>	<i>Since Feb 2014</i>
<b>Collaboration with Viaesys (Ltd.) Canada</b> <i>Principal Investigator</i> Automated Road Condition Monitoring.	<i>Sep 2013 – Sep 2014</i>
<b>LUMS School of Science &amp; Engineering</b> <i>Post-Doc</i> Automated Map Digitization for Rural Pakistan.	<b>Lahore, Pakistan</b> <i>Jul–Dec 2013</i>
<b>LUMS Computer Vision Lab</b> <i>Research Associate</i>	<b>Lahore, Pakistan</b> <i>Feb–Jul 2007</i>

Man-made structure detection in aerial images.

**MPI Informatik & University of Saarland**

**Saarbruecken, Germany**

*Student Programmer*

*2004–2006*

Markerless Human Motion Capture (Feb–Dec 2006)

Matlab scripts for figure generation for Image Proc. & Comp. Vision lectures (Sep 2005–March 2006).

Image Based BRDF Measurement and Rendering (Nov 2004–June 2005)

**LUMS Computer Vision Lab**

**Lahore, Pakistan**

*Research Assistant*

*Feb–Dec 2004*

Face recognition for video content retrieval.

**InterActive Communications (Pvt.) Ltd.**

**Islamabad, Pakistan**

*Research Developer*

*June 2003–Feb 2004*

Eye detection and face recognition for video surveillance.

## Grants

---

- 2019-2022, HEC NRPU Grant 8329/Punjab/NRPU/R&D/HEC/2017 for Digitization of Cadastral Maps (DoCMap) – 4.4m
- 2020, Punjab University Travel Grant – 39k
- 2019-2020, Punjab University Research Grant – 0.15m
- 2017-2018, Punjab University Research Grant – 0.15m
- 2017, Punjab Higher Education Commission Travel Grant – 0.19m

## Awards

---

- Fulbright/HEC/USAID Scholarship for Ph.D. studies (2007–2012).
- Placed on Dean's Honour List during undergraduate study at LUMS (2002).
- Awarded Ministry of Science & Technology (MoST) Scholarship during undergraduate study at LUMS (2001–2003).

## References

---

- Prof. Dr. Mansoor Sarwar (vc@uet.edu.pk)
- Dr. Marshall Tappen (mtappen@eecs.ucf.edu)
- Dr. Sohaib Khan (sohaib@lums.edu.pk)
- Prof. Dr. Kazim Khan (kazim@math.kent.edu)
- Prof. Dr. Arif Mahmood (arif.mahmood@itu.edu.pk)
- Dr. Faraz Hussain (fhussain@clarkson.edu)

## Publications

---

### Journal Articles

- [HN16] Naila Hamid and Nazar Khan. "LSM: perceptually accurate line segment merging". In: ***Journal of Electronic Imaging*** 25.6 (2016). **IF: 0.780**, page 061620. ISSN: 1017-9909. DOI: 10.1117/1.JEI.25.6.061620. URL: <http://dx.doi.org/10.1117/1.JEI.25.6.061620>.

- [Sha+18] Saadia Shahzad, Nazar Khan, Zubair Nawaz, and Claudio Ferrero. "Automatic Debye-Scherrer elliptical ring extraction *via* a computer vision approach". In: ***Journal of Synchrotron Radiation*** 25.2 (Mar. 2018). **IF: 2.452**, pages 439–450. ISSN: 0909-0495. DOI: 10.1107/S1600577518000425. URL: <https://doi.org/10.1107/S1600577518000425>.
- [Bil+20] Bilal Iqbal, Waheed Iqbal, Nazar Khan, Arif Mahmood, and Abdelkarim Erradi. "Canny edge detection and Hough transform for high resolution video streams using Hadoop and Spark". In: ***Cluster Computing*** 23.1 (2020). **IF: 3.458**, pages 397–408. ISSN: 1573-7543. DOI: <https://doi.org/10.1007/s10586-019-02929-x>. URL: <https://doi.org/10.1007/s10586-019-02929-x>.
- [Naz+20] Nazar Khan, Arbish Akram, Arif Mahmood, Sania Ashraf, and Kashif Murtaza. "Masked Linear Regression for Learning Local Receptive Fields for Facial Expression Synthesis". In: ***International Journal of Computer Vision (IJCV)*** 128.5 (2020). **IF: 5.698**, pages 1433–1454. ISSN: 0920-5691. DOI: 10.1007/s11263-019-01256-3. URL: <https://doi.org/10.1007/s11263-019-01256-3>.
- [MG +21a] M.G. Sarwar Murshed, Christopher Murphy, Daqing Hou, Nazar Khan, Ganesh Ananthanarayanan, and Faraz Hussain. "Machine Learning at the Network Edge: A Survey". In: ***ACM Computing Surveys*** 54.8 (2021). **IF: 10.282**. DOI: <http://dx.doi.org/10.1145/3469029>.

#### Conference and Workshop Proceedings.....

- [NTT09] Nazar Khan, Lam Tran, and M. Tappen. "Training many-parameter shape-from-shading models using a surface database". In: *Computer Vision Workshops (ICCV Workshops), 2009 IEEE 12th International Conference on*. 2009, pages 1433–1440. DOI: 10.1109/ICCVW.2009.5457444.
- [Mas+11] S.Z. Masood, A. Nagaraja, Nazar Khan, Jiejie Zhu, and M.F. Tappen. "Correcting cuboid corruption for action recognition in complex environment". In: *Computer Vision Workshops (ICCV Workshops), 2011 IEEE International Conference on*. 2011, pages 1540–1547. DOI: 10.1109/ICCVW.2011.6130433.
- [NT12] Nazar Khan and M. Tappen. "Stable discriminative dictionary learning via discriminative deviation". In: *Pattern Recognition (ICPR), 2012 21st International Conference on*. 2012, pages 3224–3227.
- [NT13] Nazar Khan and M. Tappen. "Discriminative dictionary learning with spatial priors". In: *Image Processing (ICIP), 2013 20th International Conference on*. **Top 10% paper**. 2013.
- [SN17] Asma Shaukat and Nazar Khan. "New word pair embeddings for word pair similarity". In: *Proceedings of International Conference on Document Analysis and Recognition, Workshop on Machine Learning (ICDAR-WML 2017), Kyoto, Japan*. 2017, pages 57–62. DOI: 10.1109/ICDAR.2017.329. URL: <https://doi.org/10.1109/ICDAR.2017.329>.
- [TN17] Waqas Tariq and Nazar Khan. "Click-Free, Video-Based Document Capture – Methodology and Evaluation". In: *Proceedings of Seventh International Workshop on Camera-Based Document Analysis and Recognition, Kyoto, Japan*. 2017, pages 21–26. DOI: 10.1109/ICDAR.2017.344. URL: <https://doi.org/10.1109/ICDAR.2017.344>.

- [RIN19] Ayesha Rafique, Tauseef Iftikhar, and Nazar Khan. “Adversarial Placement Vector Learning”. In: *2nd International Conference on Advancements in Computational Sciences (ICACS)*. IEEE. Feb. 2019, pages 1–7. DOI: 10.23919/ICACS.2019.8689004. URL: <https://doi.org/10.23919/ICACS.2019.8689004>.
- [AN20] Tayaba Anjum and Nazar Khan. “An attention based method for offline handwritten Urdu text recognition”. In: *2020 17th International Conference on Frontiers in Handwriting Recognition (ICFHR)*. IAPR. Sept. 2020, pages 169–174. DOI: <https://doi.org/10.1109/ICFHR2020.2020.00040>.
- [Edw+20] Edward Verenich, Alvaro Velasquez, Nazar Khan, and Faraz Hussain. “Improving Explainability of Image Classification in Scenarios with Class Overlap: Application to COVID-19 and Pneumonia”. In: *19th IEEE International Conference on Machine Learning and Applications (ICMLA) Special Session*. IEEE. Dec. 2020, pages 1402–1409. DOI: 10.1109/ICMLA51294.2020.00218. URL: <https://arxiv.org/abs/2008.02866>.
- [M G+20] M. G. Sarwar Murshed, James J. Carroll, Nazar Khan, and Faraz Hussain. “Resource-aware On-device Deep Learning for Supermarket Hazard Detection”. In: *19th IEEE International Conference on Machine Learning and Applications (ICMLA)*. IEEE. Dec. 2020, pages 871–876. DOI: 10.1109/ICMLA51294.2020.00142.
- [AN21] Arbish Akram and Nazar Khan. “Pixel-based Facial Expression Synthesis”. In: *2020 25th International Conference on Pattern Recognition (ICPR)*. Los Alamitos, CA, USA: IEEE Computer Society, Jan. 2021, pages 9733–9739. DOI: 10.1109/ICPR48806.2021.9413065. URL: <https://doi.ieeecomputersociety.org/10.1109/ICPR48806.2021.9413065>.

### Book Chapters.....

- [Edw+21] Edward Verenich, M.G. Sarwar Murshed, Nazar Khan, Alvaro Velasquez, and Faraz Hussain. “Mitigating the Class Overlap Problem in Discriminative Localization: COVID-19 and Pneumonia Case Study”. In: *Explainable Artificial Intelligence within the context of Digital Transformation and Cyber Physical Systems*. Springer, 2021.
- [MG +21b] M.G. Sarwar Murshed, James Carroll, Nazar Khan, and Faraz Hussain. “Efficient deployment of deep learning models on autonomous robots in the ROS environment”. In: *Deep Learning Applications, Volume 3*. Springer, 2021.

## Thesis Supervised

---

### Bachelors.....

#	Title	Year
1	Bank Cheque Parsing	2015
2	Smart Presentation Builder	2015
3	Face Recognition Attendance System	2015
4	Automated Group Attention Analyser in Closed Environment using Computer Vision	2015
5	System for Automated Design, Conduction and Evaluation of Entrance Examinations	2017
6	Exam Management System	2018
7	Automated Test Creation and Conduction System	2018
8	DocScanner	2019

## MPhil.

---

#	Title	Student	Semester
1	Road Condition Monitoring in Winter Conditions	Naila Hamid	Spring 2014
2	Click-free Document Capture for Digitization	Waqas Tariq	Fall 2016
3	A Fast and Improved Hough Transform based Ellipse Detector using 1D Parametric Space	Umar Farooq	Fall 2016
4	Expression Synthesis via Machine Learning	Sania Ashraf	Spring 2017
5	Supervised and Adversarial Learning Algorithms for Facial Expression Synthesis	Arbish Akram	Summer 2018
6	Generating Patterns by Adversarial Learning	Ayesha Rafique	Spring 2019
7	Handwritten Offline Mathematical Expression Recognition	Husnain Haider	Summer 2019
8	Scalable Machine learning Service using Automated Crowd Sourcing	Aroosa Shakeel Khan	Spring 2020
9	Automated Grading of Short Textual Answers	Sehrush Seemab	Spring 2020
10	Learning to Solve Jigsaw Puzzles	Adeela Islam	Fall 2020
11	Detection and Recognition of Tabular Structures in Historical Documents	Asmat Batool	Fall 2020
12	Handwriting Recognition for Indexing Historical Maps using Deep Learning	M. Umar Kamal	Fall 2020
13	Solving Jigsaw Puzzles with Unknown Exterior Boundary	Tauseef Iftikhar	Fall 2020
14	Detection, Recognition, and Spotting of Hand-drawn Meta-data in Historical Maps	Abubakar Siddique	In progress

## PhD.

---

#	Title	Student	Semester
1	Automatic Detection of Debye-Scherrer Rings	Saadia Shehzad	Submitted
2	Perceptually Accurate Line Segment Merging	Naila Hamid	Under progress
3	Region Clustering for Detection of Debye-Scherrer Rings	Rabia Sirhindi	Under progress
4	Offline Handwritten Urdu Text Recognition	Tayaba Anjum	Under progress
5	Digitization and Stitching of Cadastral Maps	Tauseef Iftikhar	Under progress
6	Expression Synthesis and Analysis of Facial Images	Arbish Akram	Under progress

## Reviewing Duties

---

- Reviewer for IEEE Transactions in Image Processing
- Reviewer for 3D Research journal
- Reviewer for Pattern Recognition journal
- Reviewer for International Conference on Frontiers of IT (FIT)

## Courses Taught

---

- **Deep Learning**  
<http://faculty.pucit.edu.pk/nazarkhan/teaching/Fall2020/CS568/CS568.html>  
<https://www.youtube.com/playlist?list=PLjUnRJIutnLLpDwjWv8yTVd390dYQp1Cw>
- **Machine Learning**  
<http://faculty.pucit.edu.pk/nazarkhan/teaching/Fall2018/CS567/CS567.html>

- **Advanced Machine Learning**  
<http://faculty.pucit.edu.pk/nazarkhan/teaching/Spring2019/CS667/CS667.html>
- **Computer Vision**  
<http://faculty.pucit.edu.pk/nazarkhan/teaching/Spring2021/CS565/CS565.html>  
<https://www.youtube.com/playlist?list=PLjUnRJIutnlJTppqxIPJGBEvsq7bti3PI>
- **Probability & Statistics**  
<http://faculty.pucit.edu.pk/nazarkhan/teaching/Fall2019/MA120/MA120.html>  
<https://www.youtube.com/playlist?list=PLjUnRJIutnlKepSBI2OSXyAU7DHA0wAnP>
- **Linear Algebra**  
<http://faculty.pucit.edu.pk/nazarkhan/teaching/Spring2020/MA110/MA110.html>  
[https://www.youtube.com/playlist?list=PLjUnRJIutnlI\\_2Zox21ep7TY19tZCk5cB](https://www.youtube.com/playlist?list=PLjUnRJIutnlI_2Zox21ep7TY19tZCk5cB)