# Mohsen Ali

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## SUMMARY

A self-motivated professional having broad background in computer science and research & development. Extensive experience of developing algorithms for practical problems in the field of computer vision and machine learning. Current research focuses on deep learning, domain adaptation, object detection & urban area analysis using satellite imagery.

## Employment

**2014 - present** **Assistant Professor**
*Computer Science Department,*
*Information Technology University, Lahore.*
Co-founder of **Intelligent Machines Lab at ITU**
Advisor **Computer Vision & Machine Learning Research Group**

## Education

**2007 - 2014** **University of Florida, Gainesville**,
*PhD (Computer Science). Thesis topic: Deconstructive Learning*

**2003 - 2006** **Lahore University of Management Sciences**
*Masters Leading to PhD (Computer Science)*

**2000 - 2002** **Punjab University College of Information Technology, Lahore**
*Master of Science (Computer Science),*

**1999 - 2000** **Department of Computer Science (Punjab University)**
*Post-Graduate Diploma in Computer Science*

## Current Areas of Interest

Computer Vision, Machine Learning (especially Deep Learning).

## Technical Skills

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| Programming Languages | C/C++ |
| Tools & Libraries | Caffe, Matlab, OpenCv, Tensorflow |

## Honors and Awards

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| **2019** | Fulbright Talk on Intelligent Mapping of Pakistan |
| **2019** | Facebook Travel Grant to present work at CVPR |
| **2007-2011** | Fulbright Scholarship for PhD |
| **2006** | Dean's Honor List at LUMS |
| **2002** | Gold Medalist in MSc. at PUCIT |
| **2000** | First position in PGD at PUCIT |

## Selected Publications (Google Scholar: https://tinyurl.com/yy9tnwd6)

- "Learning from Scale-Invariant Examples for Domain Adaptation in Semantic Segmentation", N. Subhani, **M. Ali**, *European Conference on Computer Vision, 2020*

- "Destruction from sky: Weakly supervised approach for destruction detection in satellite imagery", MU Ali, W Sultani, **M Ali**, *ISPRS Journal of Photogrammetry and Remote Sensing 2020.*

- "Deep built-structure counting in satellite imagery using attention based re-weighting", A Shakeel, W Sultani, **M Ali**, *ISPRS Journal of Photogrammetry and Remote Sensing*, 2019

- "Affine-Constrained Group Sparse Coding and Its Application to Image-Based Classification", **Mohsen Ali**[1]*, Yu-Tseh Chi*, Muhammad Rushdi, Jeffrey Ho; *International Conference of Computer Vision*, 2013

- "Block and Group Regularized Sparse Modeling for Dictionary Learning", Yu-Tseh Chi, **Mohsen Ali**, Ajit Rajwade, Jeffrey Ho, *IEEE Conference on Computer Vision and Pattern Recognition*, 2013

## Academic Experience

**Assistant Professor, CS. Dept., Information Technology University (Fall 2014-present)**

I have been teaching computer vision and deep learning for past many years at ITU.

## Selected List of Projects

**SDG-Lab: Slum Mapping Using Satellite Imagery (PI, funded by UNDP with SDG-Lab)**

We are using the deep learning techniques to identify slums in cities of Pakistan from satellite imagery. Dr. Mohsen is PI for the project which is being conducted in collaboration with Dr. Izza Aftab at Economics Department, under the newly established SGD-Tech-Lab, funded by United Nations Development Program.

**Feature Extraction & Matching for 3D Point Cloud Formation (co-PI, funded by Electronics and Telecommunications Research Institute, South Korea) (2017- on-going)**

Using Deep Learning to develop a state-of-art and robust local keypoint detection and matching pipeline.

**Satellite/Aerial Imagery**

Analyzing satellite and aerial imagery to gather information that could difficult to gather on challenging train. Using Deep Learning we have been able to design a system for automatic marking population centers in Cholistan desert. We are working on segmenting "destroyed" areas in satellite imagery to help understand impact of war or natural catastrophe. We are collecting data for counting houses.

**Mapping Punjab's Human Footprint**

We have been collaborating with PITB to align vaccination activities with the urban population by detecting build structures using remote sensing and destruction estimation from satellite imagery. Combining it with administrative and crowd sourced information (like Openstreetmap), helps us characteristics of urban areas, like size of population centers are near parks/hospitals/schools.

Project Page: http://im.itu.edu.pk/satellite-imagery-web-page/

### Domain Adaptation

For deep learning to be of use to everyone, algorithms trained on one dataset ought to work on similar but different dataset too. We are designing self-supervised methods to adapt segmentation and object detection models from one domain to other.

### Intelligent Large Geo-Localized Dataset Collection for Pakistan

We are creating smart tools that will allow users to share photographs (and other multi-media content), helping us create geo-located map of Pakistan. The Machine Learning based algorithm will sit in between the loop and extract semantic and syntactic information present in the content, for example bio-diversity (types birds and animals), geographical diversity (mountain, lakes, water-falls), etc.. This will not only create a useful historical information resource for academics trying to study Pakistan, but also a large dataset trying to reduce bias prevalent in existing datasets.

## References

**Dr. Jeffrey Ho,**

Senior member of Technical Staff at MediaTek
San Jose, California, USA.
Previously: Assistant Professor, CISE, Univ. of Florida, Gainesville, FL, USA
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[1] * authors contributed equally to this work