Ahmad Humayun

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Awards & Achievements

Microsoft Research Project Prize for best MSc. Computer Graphics, Vision and Imaging thesis at UCL (2010).

BBC Best Overall Student Prize in MSc. Computer Graphics, Vision and Imaging at UCL (2010).

Software Design Finalist for **Microsoft Imagine Cup 2007 Korea**. The project on Automated Video Recording of Lectures (AVRiL) was selected to represent Pakistan for the first time in this prestigious invitational.

Mentor Graphics Project Award for AVRiL - best BSc. senior year project (2007).

Education

Georgia Institute of Technology	Aug. '11 - April '18
Ph.D. Computer Science, School of Interactive Computing	
University College London (UCL)	Sept. '09 - Sept. '10
MSc. Computer Graphics, Vision and Imaging - *Distinction*	
Lahore University of Management Sciences (LUMS)	Aug. '03 - July '07
BSc. (Hons.). Computer Engineering (Major) - *High Merit*	

Professional Experience

Google DeepMind *Research Scientist*, AI for Health team	May '22 - to date
Vicarious FPC, Inc. *Team Lead, and Researcher*, Neural Network Vision	Sept. '18 - May '22
Georgia Institute of Technology *Graduate Research Assistant*, Computational Perception Lab.	Aug. '11 - April '18
Facebook AI Research, Menlo Park *Research Intern* with Manohar Paluri and Piotr Dollár	May '15 - July '15
Microsoft Research, Redmond *Research Intern*, Multimedia, Interaction, & Communication group	May '14 - July '14
The University of Warwick *Research Associate*, Dept. of Computer Science	Sept. '10 - Dec. '10
Lahore University of Management Sciences *Research Associate*, Dept. of Computer Science	Jan. '07 - July '09
MobileWeaver ApS *Junior Software Developer*, Technical Department	March '08 - Jan. '09

Publications

Low-shot Object Learning with Mutual Exclusivity Bias. (2nd author)
Advances in Neural Info. Processing Systems (NeurIPS) - Datasets and Benchmarks - Dec. '23. ngailapdi.github.io/projects/lsme

Incremental Object Learning from Contiguous Views. (5th author)
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) , Oral Presentation - June '19. iolfcv.github.io

Iterative Machine Teaching. (3rd author)
International Conference on Machine Learning (ICML) - Aug. '17. ahumayun.com/pubs/itermteach17

Multiple-Instance Video Segmentation with Sequence-Specific Object Proposals. (3rd author)
The 2017 DAVIS Challenge on Video Object Segmentation - CVPR Workshops - July '17. ahumayun.com/pubs/davisvid17

The Middle Child Problem: Revisiting Parametric Min-cut and Seeds for Object Proposals . (1st author)
International Conference on Computer Vision (ICCV) - Dec. '15. tinyurl.com/y5svhk4z

Finding Temporally Consistent Occlusion Boundaries in Videos using Geometric Context. (2nd author)
IEEE Winter Conference on Applications of Computer Vision (WACV) - Jan. '15. cpl.cc.gatech.edu/projects/temporaloccl/

RIGOR: Recycling Inference in Graph Cuts for generating Object Regions. (1st author)
IEEE Conference on Computer Vision and Pattern Recognition (CVPR) - June '14. cpl.cc.gatech.edu/projects/RIGOR/

Video Segmentation by Tracking Many Figure-Ground Segments. (3rd author)
International Conference on Computer Vision (ICCV) - Dec. '13. web.engr.oregonstate.edu/~lif/SegTrack2/

Learning a Confidence Measure for Optical Flow. (2nd author)
IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI) - May '13. visual.cs.ucl.ac.uk/pubs/flowConfidence

**A Novel Paradigm for Mining Cell Phenotypes in Multi-Tag Bioimages
using a Locality Preserving Nonlinear Embedding**. (2nd author)
International Conference on Neural Information Processing (ICONIP) - Nov. '12. ahumayun.com/pubs/cellembed12

Publications (*Contd.*)

RAMTaB: Robust Alignment of Multi-Tag Bioimages. (2nd author)
PLoS ONE - Feb. '12. journals.plos.org/plosone/article?id=10.1371/journal.pone.0030894

**A Framework for Molecular Co-Expression Pattern Analysis
in Multi-Channel Toponome Fluorescence Images**. (1st author)
Microscopy Image Analysis with Apps. in Biology (MIAAB) - Sept. '11. ahumayun.com/pubs/coexprstis11

Towards Protein Network Analysis Using TIS Imaging and Exploratory Data Analysis. (3rd author)
Workshop on Computational Systems Biology (WCSB) - June '11. ahumayun.com/pubs/tisdata11

Learning to Find Occlusion Regions. (1st author)
IEEE Conference on Computer Vision and Pattern Recognition (CVPR) - June '11. visual.cs.ucl.ac.uk/pubs/learningOcclusion/

Myosin Motors Drive Long Range Alignment of Actin Filaments. (3rd author)
Journal of Biological Chemistry - Feb. '10. www.jbc.org/content/285/7/4964.abstract

Research Projects

Video Object Detection at Georgia Institute of Technology (*Ph.D. thesis*)
Currently researching on combining motion and appearance cues for localization in video. The goal is to develop deep architectures for generating proposals amenable for detecting and tracking objects. Tools: Lua Torch, Python, C++

Incremental Learning Inspired by Developmental Psychology at Georgia Institute of Technology (*Ph.D. thesis*)
Introduced an incremental learning paradigm where the learner sees a streaming set of concepts without any labeling. This is supported by a novel data-generator which can produce any number of synthetic videos of objects. Tools: PyTorch

Optimization for Object Segmentation at Georgia Institute of Technology (as *Ph.D. student*)
Research on combinatoric optimization techniques for object segmentation in videos and images. Tools: Matlab, C++

Video Supervision for Generating Video Proposals at Facebook AI Research
Research on unsupervised discovery of objects in large scale video datasets. Tools: Matlab, Python, C++

Object Proposals for CT Images at Georgia Institute of Technology (as *Ph.D. student*)
Supervising a project for generating segmentation proposals in 3D CT scans, leading to detection of organs.

Crowd Tracking with Multiple Depth Sensors at Microsoft Research
Developed a large area, crowd tracking system by fusing data from multiple depth sensors. Tools: Kinect SDK, C++

Detecting Occluded Regions at UCL (*MSc. thesis*)
Worked on a supervised learning method to detect regions of occlusion in a two frame sequence. Tools: Matlab

Tracking Techniques using Object's Shape Cues at LUMS
Researched tracking techniques for accurate generation of trajectories using object's non-rigid shape descriptors, resilient to occlusion. This was partly funded by NSF. (ahumayun.com/crspd) Tools: Matlab

Molecular Pattern Analysis of Cancerous Colon Cells at The University of Warwick
A multi-disciplinary project for the detection of cancerous tissue. We developed registration and non-linear embedding techniques for analysis of tissues from a multidimensional imaging process. Tools: Matlab

Automated Video Recording of Lectures - AVRiL at LUMS (*senior year project*)
Developed an automated *director* that captures a multi-camera lecture environment. Tools: OpenCV

Improvements in Google's MapReduce Architecture at LUMS
Research enabling MapReduce to run speculatively on skewed input data. (tinyurl.com/q3detyg) Tools: Python, Hadoop

Surveillance Video Compression through Foveation as a *research initiative*
Researched the development of a novel H.264 encoder which assigns more bits to areas where the human visual system is more likely to foveate in surveillance footage. (http://suraj.lums.edu.pk/~foveation) Tools: Java Media Framework

Skills & Interests

Proficient in Python, Jax, TensorFlow, PyTorch, C++, Matlab | Cycling, solving puzzles, and rock climbing.

References

Michael Stark

Senior Engineering Manager, Visual Perception,
Intrinsic
✉ starkmichael@google.com

Gabriel J. Brostow

Professor of Machine Vision, Dept. of Computer Science,
University College London
✉ brostow@cs.ucl.ac.uk