

# ASHISH GOYAL

## Permanent Address

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## OBJECTIVE

A PhD position in Department of Electrical Engineering and Computer Science utilizing skills in machine learning, signal processing and statistics.

## EDUCATION

*Bachelor and Master of Technology (Integrated)* in Electrical Engineering  
Specialization in Communication and Signal Processing  
Indian Institute of Technology, Bombay, India (MH) 400076      GPA 9.08 / 10      2012 - 2017  
Thesis - Deep Networks for Analyzing Group Activity

## RESEARCH EXPERIENCE

*Samsung Research Institute, Bangalore, India*      August 2017 - Present  
Advanced Technology Labs      (Lead Research Engineer)

- Samsung EYELIKE™ - Developed multiple technologies for remote eye health care reusing old Galaxy smartphones that are no longer of use.
  - Designed screening tests for visual acuity and perimetry using a virtual reality (VR) headset.
  - Invented a mechanism for changing accommodation depth in common VR headsets without complex optical instruments and used it for measuring refractive power of adult human eye.
  - Contributed to ML algorithms for diagnosis of ophthalmic diseases using fundus images captured by smartphones and a lens attachment.
  - Paper accepted for oral presentation in the proceedings of EMBC 2018, and international patent granted both as primary author.
- Ultra-Wide Band (UWB) - Developed methods for contact free human-device interaction without invading privacy using reflected signals from UWB impulse radar.
  - Created real-time algorithms for detecting human presence and distance using wavelet analysis.
  - Trained deep learning algorithms for tracking human activity level and identifying hand gestures.
- Hyper-spectral Imaging - Managed a team of four engineers towards development of algorithms for analysing skin pigments such as haemoglobin and melanin using hyper-spectral images. Patent granted and a full paper submitted for review.
- Two international patents published, one paper accepted in conference, multiple spot awards and professional software designer certification.

*Indian Institute of Technology, Bombay, India*      July 2016 - July 2017  
Department of Electrical Engineering      (Master thesis)

- Developed deep networks trained to analyze surveillance videos and detect potentially anomalous scenarios. Paper accepted in the proceedings of ICVGIP 2018 as primary author.
- Tracked individual persons and activities - standing and walking. Discovered groups of people in crowd and their collective activities - walking, crossing a road, talking and waiting in a queue together.

National University of Singapore  
SINAPSE Laboratory

May - July 2015  
(Internship)

- Developed a real-time algorithm to track and follow moving objects using dynamic vision sensor (DVS) mounted on a hexapod in a swarm robotics scenario. Paper accepted in EMBS BioRob 2016.
- Algorithm involved cluster initialization using k-means and an on-line method for assigning subsequent sensor data to moving and static clusters using time series analysis.

## PUBLICATIONS

- "Estimation of Spherical Refractive Errors Using Virtual Reality Headset," 40<sup>th</sup> International Engineering in Medicine and Biology Conference 2018
- "Hierarchical Deep Network for Group Discovery and Multi-level Activity Recognition," 11<sup>th</sup> Indian Conference on Computer Vision, Graphics and Image Processing 2018
- "Real-Time robot tracking and following with neuromorphic vision sensor," 6<sup>th</sup> IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics - BioRob 2016

## PATENTS

- "Method For Determining Refractory Power Of Eye Using Immersive System And Electronic Device Thereof" WO2019156485 [SAMSUNG ELECTRONICS CO., LTD.] 07 February 2019
- "Method And Apparatus For Measuring Body Temperature Using A Camera" WO2020171554 [SAMSUNG ELECTRONICS CO., LTD.] 18 February 2020

## COMPUTING SKILLS

Proficient - C, C++, Python, Matlab, Java, TensorFlow, PyTorch, Keras, L<sup>A</sup>T<sub>E</sub>X  
Basic - Assembly, Verilog, Django, LTspice, Arduino, Bash

## HONORS

Regional Jury, Smart India Hackathon 2020  
Multiple Spot Awards, Samsung  
Software Professional Certification, Samsung 2018  
Department Academic Mentor, IIT Bombay 2016  
Special mention, inter-hostel technical competitions, IIT Bombay 2014

## OTHER INTERESTS

Playing music - classical, bass and electric guitar, drums and piano. Mountaineering - completed 5 day expedition to Kedarkantha (4000 meters, -20 degree Celsius). Trekking. Photography.