Yair Movshovitz-Attias, PhD

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Research Interests

I am interested in Computer Vision and Machine Learning, specifically some of the problems I find interesting are deep learning, fine grained classification, object detection, and viewpoint estimation. My research experience includes: deep learning, fine grained visual classification of businesses in street view imagery, Computer Graphics based data generation for Computer Vision, sparse methods for joint detection and 3D viewpoint estimation of objects, fusion of speech and vision for smart shopping assistants, computer visual navigation aids for the blind, and social media analysis.

Education

Carnegie Mellon University, Computer Science Department, Pittsburgh, PA, USA

Ph.D., Computer Science, 08/2010 to 10/2015

- Advisers: Professor Yaser Ajmal Sheikh, Professor Takeo Kanade.
- Areas of Study: Computer Vision, Machine Learning, Deep Learning.
- PhD Thesis: Dataset Curation through Renders and Ontology Matching.
- Research Projects:
  - Computer Graphics Based Synthetic Data Generation for Viewpoint Estimation.
  - Fine Grained Visual Understanding of Businesses in Street Imagery.
  - Fine Grained Visual Understanding of Cars.
  - Scalable Pose-by-Detection of Vehicles in Consumer Images.
  - Wearable Computer Vision Systems for the Aid of the Visual Impaired.
  - Wearable Multi Modal Systems as Retail Assistants.

Hebrew University of Jerusalem, School of Computer Science and Engineering, Jerusalem, Israel

M.S., Computer Science, 10/2008 to 10/2009

- *Magna Cum Laude* in Computer Science
- Thesis: *Persistent Particle-Filters For Background Subtraction*
- Adviser: Professor Shmuel Peleg
- Areas of Study: Computer Science, Computer Vision, Background subtraction.
- MsC. Thesis: Persistent Particle Filters for Background Subtraction
- Research Focus: I adapted the Particle Filter algorithm for use in segmenting moving objects in endless video streams with dynamic background. In my adaptation particles can become "dormant" if they sense a large shift in the tracked state (usually as a result of a passing object). This ability reduces the number of particles needed for estimating the colors of the background.

B.S., Computer Engineering, 10/2004 to 07/2008

- Advisers: Professor Jeffrey S. Rosenschein, Professor Shmuel Peleg
- Topics: Computer Engineering, Computer Science, A.I., Robotics, Machine Learning.
- Main Research: Creating an autonomous mobile platform using off the shelf, low cost, parts.

Professional Experience

Google, Mountain View, California, USA

Software Engineer **11/2015 to present**

- I work in the Machine Perception group in Google Research. My main focus is large scale supervised learning (mostly image classification) in the face of label scarcity. (C++, Python, TensorFlow)

Google, Mountain View, California, USA

Software Engineering Intern **05/2014 to 10/2014**

- Hosts: Liron Yatziv, Qian Yu, and Martin Stumpe at Street View.
- I worked with a team in Street View, employing Computer Vision and Machine Learning algorithms, specifically Deep learning approaches (Neural Networks), to extract business store front information from StreetView images.
  My algorithms needed to be extremely efficient as they were running on huge numbers of images. (C++, Python)

Google, Mountain View, CA

Software Engineering Intern **05/2012 - 08/2012**

- Hosts: Sergey Ioffe, Alexander Toshev, Google Research
- During the summer of 2012 I worked as as Software Engineering Intern at Google Research. I worked on a system for classifying images according to their visual content. As part of this project I came up with programs that analyzed various image statistics, such as color and texture, to extract informative 'features'. I then fed these features to Machine Learning algorithms to learn a model that can classify the images according to the visual concepts they depict (dogs, cars, trees, etc'). This involved writing code that can process large amounts of data. (C++)

Optimet, Optical Metrology Ltd, Jerusalem, Israel

Software Engineer **10/2007 to 10/2008, 10/2009 to 03/2010**

- Optimet is a developer and provider of sophisticated, non-contact measurement sensors and solutions, with up to sub-micron precision. I was part of a team that developed an exciting laser scanner for Dental CAD/CAM. The scanner is now part of Nobel BioCare's Procera line of products.
- As part of my position as a Software Engineer I was involved in the development of state of the art algorithms for 3D modeling, measurement acquisition etc. I was also involved in the design and implementation of a software suite that operates a laser scanner. (C++, C#, MATLAB, OpenCV)

Exent Technologies, Petach-Tikva, Israel

QA Engineer **05/2003 to 10/2003, 07/2004 to 10/2004**

- Exent Technologies provides application-on-demand services. As part of the QA team, my job was to simulate an end-user of the system, and correct errors found in the simulation process.

Technology Center, Israeli Defense Force, Israel

Field Technician **08/1999 to 08/2002**

- I was part of a team of field technicians of a system for remote IT management. My position included the setup and maintenance of a large number of small distributed communication networks that were deployed in remote locations.
- Towards the end of my service, I designed and taught a course for the training of new technicians.

Publications

Movshovitz-Attias, Y. (2015). *Dataset Curation through Renders and Ontology Matching*. Ph.D. thesis, Carnegie Mellon University, Pittsburgh, PA.

Movshovitz-Attias, Y., Yu, Q., Stumpe, M.C., Shet, V., Arnoud, S., and Yatziv, L. (2015). Ontological Supervision for Fine Grained Classification of Street View Storefronts. In *CVPR*. Boston, USA.

Movshovitz-Attias, Y., Boddeti, V.N., Wei, Z., and Sheikh, Y. (2014). 3D Pose-by-Detection of Vehicles via Discriminatively Reduced Ensembles of Correlation Filters. In *BMVC*.

Baek, I., Stine, T., Dash, D., Xiao, F., Sheikh, Y., Movshovitz-Attias, Y., Chen, M., Hebert, M., and Kanade, T. (2014). Physical Querying with Multi-Modal Sensing. In *WACV*.

Movshovitz-Attias, D., Movshovitz-Attias, Y., Steenkiste, P., and Faloutsos, C. (2013). Analysis of the Reputation System and User Contributions on a Question Answering Website: StackOverflow. In *ASONAM*. Niagara Falls, Canada.

Movshovitz-Attias, Y. and Peleg, S. (2010). Bacteria-Filters: Persistent particle filters for background subtraction. In *Image Processing (ICIP), 2010 17th IEEE International Conference on*, pp. 677–680. IEEE.

Movshovitz-Attias, Y. (2009). *Persistent particle filters for background subtraction*. Master's thesis, Hebrew University of Jerusalem, Israel.

Movshovitz-Attias, Y. (2008). HANS - HUJI's Autonomous Navigation System. Undergraduate Thesis.

Awards and Grants

- Nvidia Hardware Donation Grant. 2014
- Amazon AWS in Education Grant Award. 2014
- Qualcomm Innovation Fellowship Finalist. 2014
- Computer Science, Tuition Scholarship for Graduate Achievements. 2009
- Intel Award, for research in Software Technologies. 2009
- Computer Engineering Best Senior Project Award . 2008
- Dean's Honors List. 2007, 2008
- Computer Engineering Freshmen Tuition Scholarship. 2005

Teaching Experience

- **Computational Photography** (15-463) Carnegie Mellon University Fall 2014. Teaching assistant for Prof. Kris Kitani.
- **Artificial Intelligence: Representation and Problem Solving** (15-381) Carnegie Mellon University, Fall 2012. Teaching assistant for Prof. Ariel Procaccia and Prof. Emma Brunskill.
- **Operating Systems** (67808) Hebrew University of Jerusalem, Spring 2009. Teaching assistant for Prof. Dror Feitelson.
- **Introduction to Computer Science** (67101) Hebrew University of Jerusalem, Fall 2008. Teaching assistant for Prof. Jeffrey S. Rosenschein.
- **Technician Training Course** Israeli Defense Force, 2002. Course Instructor.

Students Mentored

- *Zijun Wei*, Master, Robotics Institue, CMU.
  I advised Zijun on two projects. In the first we built an Android App for helping visually impaired individuals locate restroom signs using the built in video camera. In the second we built an Android App for collecting a large dataset of car images, and annotating them with the car make and model.

- *Fanyi Xiao*, Master, Robotics Institue, CMU
  I worked with Fanyi on a system for querying the Internet for consumer objects using a wearable camera. I Served on Fanyi's MSc. Committee.

- *Esha Uboweja*, Undergraduate, Computer Science Department, CMU
  Esha worked with me on a creating a large annotated dataset of car images. The images were annotated with their make and model. Her task was to build the backend part of our system. The images were captured on users' Android devices using an App built by Zijun Wei. The app communicated with the backend server and sent the image data with the annotations. Esha was also in worked on a website that updates in realtime when new data arrives.

- *Karl Hellstern*, Undergraduate, Computer Science Department, CMU
  I advised Karl on a system that helps visually impared people to recognize faces. The system used a wearable video camera, mounted on a pair of sunglasses, detected faces in the video stream, and created a unique, highly distinguishable pattern that was applied as an electrical signal to the user's tounge using the BrainPort device.

Professional Service

- Program Committee: Workshop on Egocentric Vision (CVPR2014)
- Reviewer: CVPR2016
- Reviewer: CVPR2013
- Reviewer: CVPR2012

Languages

- Hebrew: Native language
- English: Speak fluently and read/write with high proficiency