Amir Arsalan Soltani

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SKILLS

AI and ML: Deep Learning, Graphical Models, Bayesian Optimization, Reinforcement Learning*

Technical: PyTorch, Blender, NVIDIA's FleX, TensorFlow*, Pybullet*, MuJoCo* *some exposure

EDUCATION

State University of New York at Buffalo, *Buffalo, New York* **December 2015**

Master of Science, Computer Science | *Concentration: Machine Learning*

Islamic Azad University, *Najafabab, Iran* **May 2012**

Bachelor of Science, Computer Software Engineering

Awards: Ranked 19th in the nationwide entrance exam for B.Sc, Distinguished Student Award

WORK EXPERIENCE

Research Assistant, Massachusetts Institute of Technology, *Cambridge, MA* **April 2016 - March 2019**

PI: Dr. Joshua Tenenbaum, Computational Cognitive Science Lab

- Physics-aware systems for perception and reasoning to endow AI agents with more human-like visual intelligence
  - Built a generative model for 3D shapes (github.com/Amir-Arsalan/Synthesize3DviaDepthOrSil)
    - **First-author paper accepted to CVPR 2017**
  - Composing 3D shape priors with physics priors to recover 3D shapes draped under cloth
  - Giving the ability to imagine new physical scenes for physical commonsense reasoning given a text description
- Endowing robots with the ability to build accurate models of the environment and perform delicate interactions

Research Assistant, State University of New York at Buffalo, *Buffalo, NY* **September - December 2015**

PI: Dr. Venu Govindaraju, Center for Unified Biometrics and Sensors

- Built an LDA-based model to do author name disambiguation for many departments at SUNY at Buffalo
- Modeled battery charging patterns for hundreds of mobile phone users with HMMs to predict optimal recharge time

Webpage Designer and Programmer, Saee Co, *Esfahan, Iran* **July - October 2011**

- Worked on Esfahan WebGIS using JavaScript, C#, AJAX, HTML and OpenLayers

MANUSCRIPTS IN PREPARATION

Yildirim, I.*, Siegel, M.*, **Soltani, A**.*, Chaudhuri, S. & Tenenbaum, J. "Perceiving Fully Occluded Objects via Physical Simulation"

* indicate equal contribution

PUBLICATIONS

Ullman T., Kosoy E., Yildirim I., **Soltani AA**., Siegel M., Tenenbaum J. & Spelke E. "Draping an Elephant: Uncovering Children's Reasoning About Cloth-Covered Objects", CogSci 2019.

Soltani, AA., Huang, H., Wu, J., Kulkarni, T. & Tenenbaum, J. "Synthesizing 3D Shapes via Modeling Multi-View Depth Maps and Silhouettes with Deep Generative Networks", CVPR 2017.

INVITED TALKS

Vision Meets Cognition Workshop, CVPR, *Honolulu, HI* **July 2017**
MIT Vision Seminar, Massachusetts Institute of Technology, *Cambridge, MA* **October 2017**

REVIEWER EXPERIENCE

Reviewer, Asian Conference on Computer Vision (ACCV) **2018**
Reviewer, IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Workshops **2019**
Reviewer, Neural Information Processing Systems (NeurIPS) **2019**

PROJECTS

Ongoing **- Commonsense Reasoning via Imagining New Physical Scenes (Python, PyTorch, Blender) 2018**
- Generate sequences of actions that give rise to a physical scene that explains the text description of a visual scene

Ongoing **- Building Touch Sensor in Simulation for Shape Perception (Python, PyTorch, Blender) 2018**
- Build a touch sensor in simulation to obtain physical properties of soft and rigid objects for delicate interaction

Compositional Perception System to Recover 3D Shapes (Python, Torch, PyTorch, Blender, FleX) 2017-2018
- Built a model-based, compositional perception system for recovering 3D shapes covered by cloth with low sample complexity

Modeling Multi-view Images to Build a Generative Model for 3D Shapes (Torch) 2016-2017
- Built a generative model for generic 3D shapes to obtain abstract description of objects to be used for model-building

Author Name Disambiguation using Latent Dirichlet Allocation (Python) 2015
- Downloaded Wikipedia corpus, processed it and used it to trained an LDA with online inference to assign scientific documents to their authors automatically

Simulation of Discharge/Recharge Patterns for Mobile Device Users using HMMs (MATLAB) 2015
- Built HMMs with a Gaussian mixture model state transition to model recharge/discharge patterns for hundreds of mobile phone users and predict the optimal time for recharge

Improving Accuracy of Indoor Localization with Kalman Filter (R) 2014
- Implemented Kalman filters for localization
- Improved results described in the paper "Mapping organizational dynamics with body sensor networks" by 5-10%

Learning Bayesian Networks Structure using Decomposable Scoring Functions (MATLAB) 2014
- Developed a greedy method to learn Bayesian network structures using decomposable scoring functions(AIC, BIC)

Modeling and Inference Children Handwritings with Bayesian Networks (MATLAB) 2014
- Modeled a data set containing cursive and hand-printed hand writings of children attending elementary school, collected over two consecutive years with Bayesian networks
- Implemented exact and approximate (MCMC) methods for inference

DNA Nucleobase Sequence Modeling/Prediction using HMMs (MATLAB) 2014
- Implemented forward-backward, Viterbi and Baum-Welch algorithms to train a Hidden Markov Model (HMM)
- Modeled DNA nucleobase sequences to capture DNA regularities

Hand-Written Digit Recognition with Neural Networks (MATLAB) 2013
- Experimented with neural network on MNIST digits data set. Obtained accuracy of ~98.5%

Regression on Page Relevancy (MATLAB) 2013
- Experimented with regression models on LETOR 4.0 dataset using Gaussian basis functions

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COMMUNITY SERVICE

Co-Founder, I Am Better, *Esfahan, Iran* **July 2008 - July 2011**

- Founded an association in Iran to propagate good manners in driving among Iranian people

Science Teacher, Science is Elementary, *Buffalo, NY* **July - December 2015**

- Taught science lessons and visualized abstract concepts to students at a local elementary school