Spandan Madan

CONTACT INFORMATION

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RESEARCH INTERESTS

Computer Vision, Reinforcement Learning

CURRENT APPOINTMENTS AND SCHOLARSHIPS

Snap Research Scholar'17
Awarded the Snap Research Scholarship (https://goo.gl/yyqi6V)

Harvard SEAS Fellow   June 2017 - Present
Advisor : Hanspeter Pfister, Harvard University.

Research Assistant, MIT   Dec 2016 - Present
Advisors : Frédo Durand and Aude Oliva, MIT.

EDUCATION

Master of Engineering, Harvard University, USA   Aug 2016 - present
Computational Science and Engineering
GPA : 3.835/4

Master and Bachelor of Technology, IIT Delhi, INDIA   Aug 2010 - Dec 2015
Biochemical Engineering and Biotechnology
Master's GPA : 9.0/10, Bachelor's GPA: 8.265/10

RESEARCH EXPERIENCE

COMPUTER VISION EXPERIENCE
Computer vision for multi-modal images   Dec 2016 - Present
MASTER'S THESIS (co-advised by Frédo Durand, Aude Oliva, Hanspeter Pfister)

- Worked on parsing and jointly reasoning over visual and textual elements in infographics, leading to three research papers this year.
- Extracted text from infographics using scene text recognition pipelines, and used topic modeling on the extracted text for category and tag prediction.
- Constructed a synthetic dataset, and trained supervised models to detect and classify icons in infographics.
- Currently working on unsupervised joint embedding models for text and icons extracted from within infographics.

Anomaly detection in videos for ATM security cameras   Jan 2016 - Apr 2016
Research Engineer, Uncanny Vision (INDIA) for a project with Qualcomm

- Designed a fully convolutional autoencoder model based on the SegNet architecture for detecting suspicious human behavior in ATM security cameras in real time.

PAST RESEARCH
Ensembled neural networks for predicting DNA-protein interactions Jan 2015 - Dec 2015
Research Engineer, IIT Delhi

- Worked on a project to predict DNA-protein binding sites for targeted gene editing, which led to two publications.

Metrics for unsupervised clustering algorithms   July 2014 - Dec 2015
MASTER'S THESIS (Co-advised by University of Pennsylvania and IIT Delhi)

- Full time research engineer at University of Pennsylvania for six months, and continued project as thesis on returning to IIT.

- Designed metrics for comparing unsupervised protein clustering algorithms in the absence of gold standard data.

PUBLICATIONS AND ABSTRACTS

COMPUTER VISION

1. **Madan, S.**[*], Bylinskii, Z.[*], Tancik, M.[*], Recasens, A., Zhong, K., Alsheikh, S., Pfister, H., Durand, F. (2017) "Iconness: an Icon Proposal Mechanism for Annotating and Summarizing Infographics".[in submission] (* implies equal contribution)
2. Bylinskii, Z.[*], Alsheikh, S.[*], **Madan, S.**[*], Recasens, A.[*], Zhong, K., Pfister, H., Durand, F. , Oliva, A. (2017) "Understanding Infographics Through Textual and Visual Tag Prediction". arXiv preprint arXiv:1709.09215. (* implies equal contribution)
3. Bylinskii, Z., Kim, N.W., O'Donovan, P., Alsheikh, S., **Madan, S.**, Pfister, H., Durand, F., Russell, B., Hertzmann, A. (2017) "Learning Visual Importance for Graphic Designs and Data Visualizations", ACM User Interface Software and Technology Symposium (UIST)
4. Newman, A.P., Bylinskii, Z., Haroz, S., **Madan, S.**, Durand, F., Oliva, A. (2017) "Effects of title wording on memory of trends in line graphs" [abstract, in submission]

PAST RESEARCH

5. Dutta, S., **Madan, S.**, Parikh, H., Sundar, D., 2016. "An ensemble micro neural network approach for elucidating interactions between zinc finger proteins and their target DNA". BMC genomics, 17(13), p.1033.
6. Dutta, S., **Madan, S.**, Sundar, D., 2016. "Exploiting the recognition code for elucidating the mechanism of zinc finger protein-DNA interactions". BMC genomics, 17(13), p.1037.

INVITED LECTURES AND TALKS

Berkeley Artificial Intelligence Research lab (BAIR)   Nov 2017
Computer vision seminar series

MIT Graphics Group   Nov 2017
Computer graphics seminar series

Harvard Business School   Oct 2017
Some solved and unsolved problems in machine learning (https://goo.gl/C8ZoDV)

REVIEWING EXPERIENCE

1. One paper for TPAMI, 2017.
2. Three papers for CVPR, 2018.

TEACHING AND MENTORSHIP

Advanced Topics in Data Science (Graduate Class)   Harvard University
Teaching Fellow   Jan 2017 - May 2017
Single handedly designed the final project for the class. Taught sessions on Deep Learning.
Bioinformatics   IIT Delhi
Teaching Assistant   January 2015 - June 2015
Taught lab sessions, taught extra lecture sessions to teach relevant computer science concepts to students in bioengineering, designed and graded assignments.

Undergraduate student researchers mentored:

1. Anelise Newman, MIT (September 2017 - Present)
2. Anirudh Suresh, Harvard University (September 2017 - Present)
3. Harsh Parikh, IIT Delhi (Janurary 2015 - July 2015)

OTHER TECHNICAL PROJECTS

1. **HINGLISH**: Android app with over 50,000 downloads on google play store
2. **Online Tutorials**
   - An end to end implementation of a machine learning pipeline. (2750 stars on Github)
   - PyTorch tutorials