Devanshu Arya

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Education

2017 - Present **PhD. Deep Learning and Computer Vision,** *University of Amsterdam, The Netherlands*
Thesis: Representation Learning on Hypergraphs
Advisors: Prof. Marcel Worring & Dr. Stevan Rudinac

2010 - 2015 **B.Tech-M.Tech Electrical Engineering,** *Indian Institute of Technology (IIT) Kanpur, India*
Thesis: Voice Activity Detection using Deep Belief Networks
Advisor: Prof. Rajesh Hegde

Professional Experience

Nov. 2020 - Apr. 2021 **Deep Learning Intern** - *Serket-tech, Amsterdam*
Project: Behavior Tracking for Livestock Health Management
- Developing a behavior monitoring system for improving health of livestocks in animal farms.
- Built a multi-object tracking system for visually identical animals such as pigs.
- Currently developing algorithms for long term group level action localization for animals.

Jan. 2017 - Oct. 2020 **Researcher/ Machine Learning Engineer** - *ASGARD, Horizon 2020 EU project*
Project: Machine Learning for Dynamic Social Network Analysis
- Developed forensic investigation tools for Law Enforcement Agencies (LEAs) technological autonomy across EU to predict links in a major online criminal discussion forum.
- Built Hyper-Matrix, a novel graph based visual analytics technique for predicting and visualizing behavior patterns of users in social networks including a relevance feedback mechanism.

Jul. 2015 - Nov. 2016 **Analytics Specialist** *Opera Solutions, New Delhi*
Project: Intelligent Decision Support in Large Scale Auditing
- Built a risk measurement system to assess audit engagements for professional services company.
- Created machine learning pipeline that performed automated extraction of linguistic entities and relationships, classified key statements in a document indicative of risks and mitigation.

Relevant Publications

D. Gupta, D. Arya, E.Gavves. "Rotation Equivariant Siamese Networks for Tracking". IEEE conference on Computer Vision and Pattern Recognition, (CVPR) 2021. [pdf]

S. Bhattacharya, D. Arya, D. Bhowmick, R. Thomas, D. Gupta. "Improving Solar Cell Metallization Designs using Convolutional Neural Networks". Deep Learning for Simulation (SimDL) Workshop at International Conference on Learning Representations, (ICLR) 2021. [pdf]

D. Arya, D. Gupta, S. Rudinac, M. Worring. "HyperSAGE: Generalizing Inductive Representation Learning on Hypergraphs". arXiv 2020. [pdf]

M. Fischer, D. Arya, D. Streeb, D. Seebacher, D. Keim, M. Worring. "Visual Analytics for Temporal Hypergraph Model Exploration". IEEE Transactions on Visualization and Computer Graphics, (TVCG) 2020. [pdf]

D. Arya, R. Olij, D. Gupta, A. El Gazzar, G. Wingen, M. Worring, R. Thomas. "Fusing Structural and Functional MRIs using Graph Convolutional Networks for Autism Classification". International Conference on Medical Imaging with Deep Learning (MIDL) in Proceedings of Machine Learning Research, (PMLR) 2020. [pdf]

T. P. Kuipers, D. Arya, D. Gupta. "Hard Occlusions in Visual Object Tracking". RLQ Workshop at European Conference on Computer Vision, (ECCV) 2020. [pdf]

D. Arya, S. Rudinac, M. Worring. "HyperLearn: A Distributed Approach for Representation Learning in Datasets With Many Modalities". ACM International Conference on Multimedia (ACMMM) 2019. [pdf]

D. Arya, M. Worring. "Exploiting Relational Information in Social Networks using Geometric Deep Learning on Hypergraphs." Proceedings of International Conference on Multimedia Retrieval (ACM ICMR) 2018. [pdf]

D. Arya, A. Raj, R. M. Hegde. "Significance of variable height-bandwidth group delay filters in the spectral reconstruction of speech" INTERSPEECH 2013. [pdf]

Research Internships

May 2014 - Jul. 2014 **Nanyang Technological University (NTU), Singapore**
Supervisor: Prof. Chng Eng Siong, School of Computer Science
Project: Deep Neural Networks Based Voice Activity Detection (VAD)
Developed deep learning based model to build a semi-supervised VAD which can detect speech part of signal under non-stationary noise scenarios at an SNR level as low as -5dB.

May 2013 - Jul. 2013 **Phillips Research, Bangalore, India**
Research Intern at Ultrasound Division of Healthcare Department
Project: Predicting the Needle Guidance Path for 3D Ultrasound Medical Image Analysis
Devised a 3D path planning algorithm to improve needle visualization tools for cancer by predicting trajectories during biopsy procedurals.

Technical Skills

- Programming Languages: Python, C , JavaScript, Java, MATLAB
- Deep Learning Libraries: Pytorch, Tensorflow, Keras
- Other Tools: Docker, Lucene, DeepStream, Elasticsearch, Git

Miscellaneous

Reviewer: CVPR, ICPR, ACMMM, TMM, MIDL
Teaching: Information Visualization, Fundamentals of Data Science, Speech Signal Processing
Supervision: Thesis projects of 3 MSc. and 5 BSc. students in Artificial Intelligence programme