Deepak Pathak

Contact Information

Carnegie Mellon University
Robotics Institute
Pittsburgh, PA

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Google Scholar

Education

University of California, Berkeley — Aug 2014 – Aug 2019

PhD Candidate in Computer Science
Advised by Prof. Alexei A. Efros and Prof. Trevor Darrell
CGPA : 4.0/4.0

Indian Institute of Technology, Kanpur — Aug 2010 – June 2014

BTech. in Computer Science and Engineering
Gold Medal in Computer Science
CGPA : 9.9/10

Appointments

Carnegie Mellon University Pittsburgh, PA — Sept 2020 – Present
Assistant Professor

Facebook AI Research Menlo Park, CA — Sept 2019 – Aug 2020
Researcher

University of California, Berkeley Berkeley, CA — Sept 2019 – Aug 2020
Visiting Researcher with Prof. Pieter Abbeel

Facebook AI Research Pittsburgh, PA — May 2018 – Jan 2019
Research Intern

Facebook AI Research Seattle, WA — May 2016 – Nov 2016
Research Intern

Microsoft Research New York City, NY — May 2013 – Aug 2013
Research Intern

Indian Institute of Technology, Kanpur Kanpur, India — Aug 2013 – May 2014
Undergraduate Researcher

Industry Experience

Co-Founder of VisageMap Inc. — Founded 2014
Later acquired by FaceFirst Inc., Los Angeles, CA
VisageMap (now, FaceFirst) offers person identification solution that outperform alternative identification methods, including fingerprints, iris scans, and other biometric recognition systems.

Honors And Awards

Sony Faculty Research Award — 2020-21

Best Paper Award Finalist in Cognitive Robotics at ICRA'21 — 2021

GoodAI Faculty Research Award — 2020-21

Google Faculty Research Award — 2019-20

Winner of **Virtual Creatures Competition at GECCO** — 2019

Facebook Graduate Fellowship — 2018-20

Nvidia Graduate Fellowship — 2017-18

Snapchat Inc. Graduate Fellowship — 2017

ICCV Outstanding Reviewer Award — 2017

Gold Medal for the highest academic performance in the department. — 2014

Best Undergraduate Thesis Award, IIT Kanpur. — 2014

TCS Best Software Award in the graduating year. 2014

Binay Kumar Sinha Award for best industrially applicable thesis in the graduating year. 2014

Academic Excellence Award, IIT Kanpur. 2011-14

CBSE Merit Scholarship for undergraduate studies. 2010-14

Invited Talks

"Robots that Rapidly Adapt to Diverse Tasks and Environments"
UCL: Centre for Artificial Intelligence Aug 2021
UBC: CAIDA Seminar Series July 2021

"Rapid Adaptation in Robot Learning"
MIT CSAIL: Embodied Intelligence Seminar July 2021

"Unifying Perception and Control through Video"
CVPR 2021: Invited talk at Unlabeled Video Workshop June 2021

"Learning to Generalize beyond Training"
Microsoft Research, New York City Apr 2021

"Robots that Learn to Generalize Beyond Training"
MonREAL/MILA Robot Learning Seminar Mar 2021

"Ontogeny and Phylogeny of Embodied Robots"
EPFL Neuro Symp: Surprise, Curiosity, Reward Feb 2021
RTG Computational Cognition: DeepRL Workshop Jan 2021

"Learning to Generalize beyond Training"
CMU Robotics Institute Seminar Nov 2020

"Compositional Control: Intelligence without a brain"
GoodAI Workshop on Meta-Learning & Multi-Agent Learning Aug 2020

"Self-Supervision & Modularity: Cornerstones for Generalization in Embodied Agents"
ECCV 2020: Invited talk at Workshop on Self-Supervised Learning Aug 2020

"Intelligence without a brain"
CogSci 2020: Invited talk at Workshop on the Origins of Commonsense July 2020

"Curious and Compositional Robots"
Invited talk at Stanford July 2020

"What does pretraining mean for robots?"
CVPR 2020: Invited talk at Embodied-AI Workshop June 2020

"Generalization via Self-Directed Learning"
CMU Mar 2019
MIT EECS Mar 2019
MIT BCS Mar 2019
USC Feb 2019
UC Berkeley AI Seminar Feb 2019
Google Brain May 2019
Facebook AI Research June 2019
Nvidia Research July 2019
Meetup on State of AI and ML by ValleyML.ai Aug 2019

"Curiosity-driven Exploration in Artificial Agents and Robots"
Workshop on Curiosity, Explanation, & Exploration at Princeton University June 2019

"Self-Supervised Exploration via Disagreement"
International Conference on Machine Learning (ICML) June 2019

"Large Scale Study of Curiosity-Driven Learning"

NeurIPS 2018: Deep Reinforcement Learning Workshop	Dec 2018
"Building Generalizable Agents via Curiosity and Self-supervision"	
GRASP Seminar: University of Pennsylvania	Sept 2018
Microsoft Research, NYC	Sept 2018
VASC Seminar: Robotics Institute, CMU	May 2018
"Learning Instance Segmentation by Interaction"	
Deep Robotics Vision Workshop (CVPR)	June 2018
"Zero-Shot Visual Imitation"	
International Conference on Representation Learning (ICLR)	Apr 2018
"Lifelong Learning via Curiosity and Self-supervision"	
Vision Seminar: CSAIL, MIT	Mar 2018
Research Meeting: Google Brain	Mar 2018
Invited Talk: Redwood Center for Theoretical Neuroscience, Berkeley	Sept 2017
Invited Seminar Talk: IIT Kanpur	Jan 2018
Invited talk: Uber AI Labs	Sept 2017
"Learning to Perceive and Act via Self-supervision"	
Invited talk: Frontiers of Video Technology Workshop, Adobe	July 2017
"Learning Features by Watching Objects Move"	
CVPR 2017: Large-Scale Video Understanding Workshop	June 2017
"Curiosity-driven Exploration using Self-Supervised Prediction"	
International Conference on Machine Learning (ICML)	May 2017
Invited talk: OpenAI, San Francisco	June 2017
"Exploring Four Axes of Self-Supervision"	
Talk at Berkeley AI Research Seminar	Apr 2017
"Unsupervised Learning of Visual Representations"	
Mysore Park Workshop on Vision, Language and AI	Dec 2016

PrePrints

[1] **FLAVR: Flow-Agnostic Video Representations for Fast Frame Interpolation**
ArXiv Preprint, 2021
Tarun Kalluri, ***Deepak Pathak***, Manmohan Chandraker, Du Tran

Peer Reviewed Publications

[2] **Worldsheet: Wrapping the World in a 3D Sheet for View Synthesis from a Single Image**
International Conference on Computer Vision (ICCV) 2021 **(Oral)**
Ronghang Hu, Nikhila Ravi, Alex Berg, ***Deepak Pathak***

[3] **Hierarchical Neural Dynamic Policies**
Robotics: Science and Systems (RSS) 2021
Shikhar Bahl, Abhinav Gupta, ***Deepak Pathak***

[4] **RMA: Rapid Motor Adaptation for Legged Robots**
Robotics: Science and Systems (RSS) 2021
Ashish Kumar, Zipeng Fu, ***Deepak Pathak***, Jitendra Malik

[5] **Unsupervised Learning of Visual 3D Keypoints for Control**
International Conference on Machine Learning (ICML) 2021
Boyuan Chen, Pieter Abbeel, ***Deepak Pathak***

[6] **Differentiable Spatial Planning using Transformers**
International Conference on Machine Learning (ICML) 2021
Devendra Chaplot, ***Deepak Pathak***, Jitendra Malik

[7] **Auto-Tuned Sim-to-Real Transfer**
International Conference on Robotics and Automation (ICRA) 2021 **(Award Finalist)**
Yuqing Du, Olivia Watkins, Trevor Darrell, Pieter Abbeel, ***Deepak Pathak***

[8] **Planning in Learned Latent Action Spaces for Generalizable Legged Locomotion**
IEEE Robotics and Automation Letters (RA-L) 2021
Tianyu Li, Roberto Calandra, ***Deepak Pathak***, Yuandong Tian, Franziska Meier, Akshara Rai

[9] **Learning Long-term Visual Dynamics with Region Proposal Interaction Networks**
International Conference on Representation Learning (ICLR) 2021
Haozhi Qi, Xiaolong Wang, ***Deepak Pathak***, Yi Ma, Jitendra Malik

[10] **Neural Dynamic Policies for End-to-End Sensorimotor Learning**
Neural Information Processing Systems (NeurIPS) 2020 **(Spotlight)**
Shikhar Bahl, Mustafa Mukadam, Abhinav Gupta, ***Deepak Pathak***

[11] **Sparse Graphical Memory for Robust Planning**
Neural Information Processing Systems (NeurIPS) 2020
Michael Laskin, Scott Emmons, Ajay Jain, Thanard Kurutach, Pieter Abbeel, ***Deepak Pathak***

[12] **One Policy to Control Them All:**
Shared Modular Policies for Agent-Agnostic Control
International Conference on Machine Learning (ICML) 2020
Wenlong Huang, Igor Mordatch, ***Deepak Pathak***

[13] **Planning to Explore via Self-Supervised World Models**
International Conference on Machine Learning (ICML) 2020
Ramanan Sekar, Oleh Rybkin, Kostas Daniilidis, Pieter Abbeel, Danijar Hafner, ***Deepak Pathak***

[14] **Locally Masked Convolution for Autoregressive Models**
Uncertainty in Artificial Intelligence (UAI) 2020
Ajay Jain, Pieter Abbeel, ***Deepak Pathak***

[15] **Compositional GAN: Learning Conditional Image Composition**
International Journal of Computer Vision (IJCV) 2020
Samaneh Azadi, ***Deepak Pathak***, Sayna Ebrahimi, Trevor Darrell

[16] **Learning to Control Self-assembling Morphologies: A Study of Generalization via Modularity**
Neural Information Processing Systems (NeurIPS) 2019 **(Spotlight)**
Deepak Pathak*, Chris Lu*, Trevor Darrell, Phillip Isola, Alexei A. Efros
Also, The winner of Virtual Creatures Competition at GECCO 2019

[17] **Third-Person Visual Imitation Learning via Decoupled Hierarchical Control**
Neural Information Processing Systems (NeurIPS) 2019
Pratyusha Sharma, ***Deepak Pathak***, Abhinav Gupta

[18] **Self-Supervised Exploration via Disagreement**
International Conference on Machine Learning (ICML) 2019
Deepak Pathak*, Dhiraj Gandhi*, Abhinav Gupta

[19] **Large-Scale Study of Curiosity-Driven Learning**
International Conference on Representation Learning (ICLR) 2019
Yuri Burda*, Harri Edwards*, ***Deepak Pathak****, Amos Storkey, Trevor Darrell, Alexei A. Efros
Also at *Deep RL Workshop, NeurIPS 2018* **(Oral)**

[20] **Zero-Shot Visual Imitation**
International Conference on Representation Learning (ICLR) 2018 **(Oral)**
Deepak Pathak*, Parsa Mahmoudieh*, Guanghao Luo*, Pulkit Agrawal*, Dian Chen, Fred Shentu, Evan Shelhamer, Jitendra Malik, Alexei A. Efros, Trevor Darrell

[21] **Investigating Human Priors for Playing Video Games**
International Conference on Machine Learning (ICML) 2018 **(Long Oral)**
Rachit Dubey, Pulkit Agarwal, ***Deepak Pathak***, Thomas L. Griffiths, Alexei A. Efros

[22] **Learning Instance Segmentation by Interaction**
Deep Learning in Robotics Vision Workshop (CVPR) 2018 **(Oral)**
Deepak Pathak*, Yide Shentu*, Dian Chen*, Pulkit Agrawal*, Trevor Darrell, Sergey Levine, Jitendra Malik

[23] **Curiosity-driven Exploration using Self-Supervised Prediction**
International Conference on Machine Learning (ICML) 2017
Deepak Pathak, Pulkit Agrawal, Alexei A. Efros, Trevor Darrell

[24] **Learning Features by Watching Objects Move**
Computer Vision and Pattern Recognition (CVPR) 2017
Deepak Pathak, Ross Girshick, Piotr Dollár, Trevor Darrell, Bharath Hariharan
Also at *Large-Scale Video Understanding Workshop (CVPR) 2017* **(Oral)**

[25] **Toward Multimodal Image-to-Image Translation**
Neural Information Processing Systems (NIPS) 2017
Jun-Yan Zhu, Richard Zhang, ***Deepak Pathak***, T. Darrell, A. A. Efros, O. Wang, Eli Shechtman

[26] **Context Encoders: Feature Learning by Inpainting**
Computer Vision and Pattern Recognition (CVPR) 2016
Deepak Pathak, Philipp Krähenbühl, Jeff Donahue, Trevor Darrell, Alexei A. Efros

[27] **Large Scale Visual Recognition through Adaptation using Joint Representation and Multiple Instance Learning**
Journal of Machine Learning Research (JMLR) 2016
Judy Hoffman, ***Deepak Pathak***, Eric Tzeng, J. Long, S. Guadarrama, T. Darrell, Kate Saenko

[28] **Constrained Convolutional Neural Networks for Weakly Supervised Segmentation**
International Conference on Computer Vision (ICCV) 2015
Deepak Pathak, Philipp Krähenbühl, Trevor Darrell

[29] **Fully Convolutional Multi-Class Multiple Instance Learning**
Workshop Track in International Conference on Representation Learning (ICLR) 2015
Deepak Pathak, Evan Shelhamer, Jonathon Long, Trevor Darrell

[30] **Detector Discovery in the Wild: Joint Multiple Instance and Representation Learning**
Computer Vision and Pattern Recognition (CVPR) 2015
Judy Hoffman, ***Deepak Pathak***, Trevor Darrell, Kate Saenko

[31] **A Comparison of Forecasting Methods: fundamentals, polling, prediction markets, and experts**
Journal of Prediction Markets (JPM) 2015
Deepak Pathak, David Rothschild, Miro Dudík

[32] **Anomaly Localization in Topic-based Analysis of Surveillance Videos**
Winter Conference on Applications of Computer Vision (WACV) 2015
Deepak Pathak, Abhijit Sharang, Amitabha Mukerjee

[33] **Where is my Friend? - Person identification in Social Networks**
Automatic Face and Gesture Recognition (FG) 2015
Deepak Pathak, Sai Nitish Satyavolu, Vinay P. Namboodiri

Other Publications

[34] **Constrained Structured Regression with Convolutional Neural Networks**
arXiv:1511.07497 2015
Deepak Pathak, Philipp Krähenbühl, Stella X. Yu, Trevor Darrell

Service And Leadership

Area Chair 2020 - Present
NeurIPS 2020/2021, CVPR 2021, ICLR 2021, ICML 2021, ICCV 2021

Session Chair 2020 - Present
NeurIPS 2020, ICRA 2021, ICML 2021

CogSci Workshop Co-organizer July 2020
The Origins of Commonsense in Humans and Machines

CVPR Workshop Co-organizer June 2019
Computer Vision After 5 Years

ICLR Workshop Co-organizer May 2019
Task Agnostic Reinforcement Learning

ECCV Workshop Co-organizer Sept 2018
11th POCV Workshop: Action, Perception and Organization

Reviewer 2015-19
CVPR, NeurIPS, ICML, ICLR, CoRL, ECCV, ICCV, RSS, AAAI, IJCV, PAMI, JMLR

Graduate Admissions: UC Berkeley 2015, 2018
Reviewed applications for AI research area

BAIR Undergraduate Mentor 2018
Undergrads from underrepresented groups who are considering a career in research

Media Coverage

RMA: Rapid Motor Adaptation for Legged Robots Summer 2021
Washington Post, *CBS TV*, *Wall Street Journal*, *TechCrunch*, *Forbes*, *CNET*, *TechXplore*, *L'ADN (France)*, *Digitech News (Italy)*, *CNBeta (China)*, *Observador (Portugal)*, *Beratakini (Malaysia)*, *3DNews (Russia)*, *15Min (Lithuania)*, *GeekTime (Israel)*

Auto-Tuned Sim-to-Real Transfer Spring 2021
Synced Review

Planning to Explore via Self-Supervised World Models Fall 2020
VentureBeat, Synced Review

Large-Scale Curiosity-driven Learning Fall 2018
The Economist, The Verge, Quartz

Investigating Human Priors for Playing Video Games Spring 2018
MIT Tech Review, Hitech News Daily

Curiosity-driven Exploration using Self-Supervised Prediction Summer 2017
The Wall Street Journal, MIT Tech Review, New Scientist, Quanta Magazine, Wired, Engadget, NYPost, California Magazine, Digital Trends, Caixin, Publico, India Times

A Comparison of Forecasting Methods: Predicting Oscar Awards Spring 2015
Daily Mail, Business Insider, Engadget, Huffington Post

Teaching Experience

16-824: Visual Learning and Recognition — Spring 2021
Carnegie Mellon University
Instructor

CS 280: Computer Vision — Spring 2016
University of California Berkeley
Graduate Student Instructor with Prof. Alexei A. Efros and Prof. Trevor Darrell

CS 189/289: Introduction to Machine Learning — Fall 2015
University of California, Berkeley
Graduate Student Instructor with Prof. Alexei A. Efros and Dr. Isabelle Guyon

Guest Lectures: Berkeley Learn2Launch Series at UC Berkeley — Spring 2019

Guest Lecture: Visual Recognition Class at IIT Kanpur — Spring 2019

Guest Lecture: Computer Vision Class at IIT Kanpur — Spring 2017

Guest Lecture: Computational & Theoretical Neuroscience Journal Club, UCL — Spring 2017