

Nicklas Hansen

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Research Interest

I am broadly interested in developing intelligent agents that continuously learn, generalize, and adapt. My work is at the intersection of **reinforcement learning**, **robotics**, and **computer vision**.

Education

University of California, San Diego

PhD student, Computer Science and Engineering, GPA: 3.85/4.0
· Advised by Xiaolong Wang and Hao Su.

San Diego, CA, USA

Fall 2021 - present

University of California, Berkeley

Visiting Student, GPA: 4.0/4.0
· Spar Nord Fonden's FinTech scholarship recipient, SCET's Collider Cup finalist.

Berkeley, CA, USA

Spring 2020

Technical University of Denmark

MSc Mathematical Modeling & Computation, GPA: 11.2/12.0
· Special topics in machine learning. Advised by Ole Winther.

Kongens Lyngby, Denmark

Feb 2019 - Jan 2021

Technical University of Denmark

BSc Software Technology, GPA: 8.2/12.0, final year GPA: 10.8/12.0
· **Nanyang Technological University, Singapore** - semester abroad, Fall 2017.

Kongens Lyngby, Denmark

Sep 2015 - Dec 2018

Publications & Preprints (17)

TD-MPC2: Scalable, Robust World Models for Continuous Control

arXiv preprint

Nicklas Hansen, Hao Su*, Xiaolong Wang*

<https://arxiv.org/abs/2310.16828>

Preprint

2023

Open X-Embodiment: Robotic Learning Datasets and RT-X Models

arXiv preprint

Open X-Embodiment Collaboration, [...], Nicklas Hansen, [...] (173 authors)

<https://arxiv.org/abs/2310.08864>

Preprint

2023

MoDem-V2: Visuo-Motor World Models for Real-World Robot Learning

arXiv preprint

Patrick Lancaster, Nicklas Hansen, Aravind Rajeswaran, Vikash Kumar

<https://arxiv.org/abs/2309.14236>

Preprint

2023

Finetuning Offline World Models in the Real World

Conference on Robot Learning (CoRL)

Yunhai Feng*, Nicklas Hansen*, Ziyang Xiong*, Chandramouli Rajagopalan, Xiaolong Wang

<https://arxiv.org/abs/2310.16029>

Oral

2023

Multi-Task Real Robot Learning with Generalizable Neural Feature Fields

Conference on Robot Learning (CoRL)

Yanjie Ze, Ge Yan, Yueh-Hua Wu, Annabella Macaluso, Yuying Ge, Jianglong Ye, Nicklas Hansen, Li Erran Li, Xiaolong Wang

<https://arxiv.org/abs/2308.16891>

Oral

2023

On Pre-Training for Visuo-Motor Control: Revisiting a Learning-from-Scratch Baseline

International Conference on Machine Learning (ICML)

Poster

2023

Nicklas Hansen*, Zhechen Yuan*, Yanjie Ze*, Tongzhou Mu*, Aravind Rajeswaran[^], Hao Su[^], Huazhe Xu[^], Xiaolong Wang[^]

<https://arxiv.org/abs/2212.05749>

MoDem: Accelerating Visual Model-Based Manipulation with Demonstrations

International Conference on Learning Representations (ICLR)

Poster

2023

Nicklas Hansen, Yixin Lin, Hao Su, Xiaolong Wang, Vikash Kumar, Aravind Rajeswaran

<https://arxiv.org/abs/2212.05698>

On the Feasibility of Cross-Task Transfer with Model-Based Reinforcement Learning

International Conference on Learning Representations (ICLR)

Poster

2023

Yifan Xu*, **Nicklas Hansen***, Zirui Wang, Yung-Chieh Chan, Hao Su, Zhouwen Tu

<https://arxiv.org/abs/2210.10763>

Visual Reinforcement Learning with Self-Supervised 3D Representations

IEEE Robotics and Automation Letters (RA-L)

Journal & Poster

2023

International Conference on Intelligent Robots and Systems (IROS)

Yanjie Ze*, **Nicklas Hansen***, Yinbo Chen, Mohit Jain, Xiaolong Wang

<https://arxiv.org/abs/2210.07241>

Graph Inverse Reinforcement Learning from Diverse Videos

Conference on Robot Learning (CoRL)

Oral

2022

Sateesh Kumar, Jonathan Zamora*, **Nicklas Hansen***, Rishabh Jangir, Xiaolong Wang

<https://arxiv.org/abs/2207.14299>

Temporal Difference Learning for Model Predictive Control

International Conference on Machine Learning (ICML)

Short Presentation

2022

Nicklas Hansen, Xiaolong Wang*, Hao Su*

<https://arxiv.org/abs/2203.04955>

Look Closer: Bridging Egocentric and Third-Person Views with Transformers for Robotic Manipulation

IEEE Robotics and Automation Letters (RA-L)

Journal & Poster

International Conference on Robotics and Automation (ICRA)

2022

Rishabh Jangir*, **Nicklas Hansen***, Sambaran Ghosal, Mohit Jain, Xiaolong Wang

<https://arxiv.org/abs/2201.07779>

Learning Vision-Guided Quadrupedal Locomotion with Cross-Modal Transformers

International Conference on Learning Representations (ICLR)

Spotlight

2022

Ruihan Yang*, Minghao Zhang*, **Nicklas Hansen**, Huazhe Xu, Xiaolong Wang

<https://arxiv.org/abs/2107.03996>

Stabilizing Deep Q-Learning with ConvNets and Vision Transformers under Data Augmentation

Conference on Neural Information Processing Systems (NeurIPS)

Poster

2021

Nicklas Hansen, Hao Su, Xiaolong Wang

<https://arxiv.org/abs/2107.00644>

Generalization in Reinforcement Learning by Soft Data Augmentation

International Conference on Robotics and Automation (ICRA)

Poster

2021

Nicklas Hansen, Xiaolong Wang

<https://arxiv.org/abs/2011.13389>

Self-Supervised Policy Adaptation during Deployment

International Conference on Learning Representations (ICLR)

Spotlight

2021

Nicklas Hansen, Rishabh Jangir, Yu Sun, Guillem Alenyà, Pieter Abbeel, Alexei A. Efros, Lerrel Pinto, Xiaolong Wang

<https://arxiv.org/abs/2007.04309>

Short Term Blood Glucose Prediction Based on Continuous Glucose Monitoring Data

IEEE Engineering in Medicine and Biology Conference (EMBC)

Ali Mohebbi, Alexander R. Johansen, **Nicklas Hansen**, Peter E. Christensen, Jens M. Tarp, Morten L. Jensen, Henrik Bengtsson, Morten Mørup

<https://arxiv.org/abs/2002.02805>

Poster

2020

Teaching

Technical University of Denmark

Reinforcement Learning

Co-organizer

Jan 2021

· Special course that I co-organized w/ Prof. Ole Winther for a group of students. Three weeks of full-time study.

Technical University of Denmark

02456 Deep Learning

Teaching Assistant

Fall 2019, Fall 2020

· Significant course material contributions, **supervised 100+ students' projects** on reinforcement learning.

02454 Introduction to Cognitive Science

Fall 2019

· Assisted tutorial sessions, corrected assignments.

Current and Former Mentees

Rishabh Jangir (MS, UCSD -> Robotics Engineer, Nimble)	2020 - 2022
Mohit Jain (MS, UCSD -> ML Engineer, Pinterest)	2020 - 2022
Xinyue Chen (BS, NYU Shanghai -> PhD, UC Berkeley)	2021 - 2022
Sateesh Kumar (MS, UCSD -> Research Engineer, ByteDance)	2021 - 2023
Jonathan Zamora-Anaya (BS, UCSD -> MS, USC)	2021 - 2023
Sambaran Ghosal (MS, UCSD)	2021 - 2023
Zirui "Colin" Wang (BS, UCSD -> PhD, Cornell)	2022 - 2023
Ziyan Xiong (BS, Tsinghua University)	2022 - 2023
Yanjie Ze (BS, SJTU)	2021 - 2023
Yunhai Feng (MS, UCSD)	2022 -
Chandramouli Rajagopalan (MS, UCSD)	2022 -
Aayushmaan Jain (MS, UCSD)	2023 -

Invited Talks

Tsinghua IIIS	"The Next Generation of World Models"	Mar 2023
MILA/ServiceNow	"World Models with Behavioral Priors"	Feb 2023
Georgia Tech	"Towards Sample-Efficient Robot Learning with World Models"	Jan 2023
Meta AI (FAIR)	"Pretraining for Control: Current Challenges and Solutions"	Jan 2023
TU Delft	"Model-Based Reinforcement Learning: A Path Towards Generalist Agents?"	Oct 2022
UCSD RoboGrads	"Model-Based Reinforcement Learning: A Path Towards Generalist Agents?"	Oct 2022
Generally Intelligent	Podcast: https://generallyintelligent.com/podcast/2022-12-16-podcast-episode-25-nicklas-hansen/	September 2022
Intel AI	"Temporal Difference Learning for Model Predictive Control"	April 2022
Intel AI	"Agents that Generalize"	August 2021
G-Research	"Agents that Generalize and Adapt"	February 2021
Neural AI	"An Introduction to Reinforcement Learning"	June 2019

Academic Service

2024	International Conference on Learning Representations (ICLR)	Reviewer
2024	IEEE International Conference on Robotics & Automation (ICRA)	Reviewer
2023	Foundation Models for Decision-Making, Workshop @ NeurIPS	Reviewer
2023	Self-Supervised Learning - Theory and Practice, Workshop @ NeurIPS	Reviewer
2023	Journal of Machine Learning Research (JMLR)	Reviewer
2023	International Journal of Computer Vision (IJCV)	Reviewer
2023	Conference on Neural Information Processing Systems (NeurIPS)	Top Reviewer
2023	Learning Dexterous Manipulation, Workshop @ RSS	Reviewer

2023	International Conference on Computer Vision (ICCV)	Reviewer
2023	Structural and Compositional Learning on 3D data, Workshop @ CVPR	Reviewer
2023	IEEE Robotics and Automation Letters (RA-L)	Reviewer
2023	International Conference on Intelligent Robots and Systems (IROS)	Reviewer
2023	International Conference on Machine Learning (ICML)	Reviewer
2023	Conference on Computer Vision and Pattern Recognition (CVPR)	Reviewer
2023	International Conference on Representation Learning (ICLR)	Assisted review
2023	IEEE International Conference on Robotics & Automation (ICRA)	Reviewer
2022	Self-Supervised Learning - Theory and Practice, Workshop @ NeurIPS	Reviewer
2022	Conference on Neural Information Processing Systems (NeurIPS)	Reviewer
2022	European Conference on Computer Vision (ECCV)	Reviewer
2022	IEEE Robotics and Automation Letters (RA-L)	Reviewer
2022	Generalizable Policy Learning in the Physical World, Workshop @ ICLR	Reviewer
2022	International Conference on Machine Learning (ICML)	Reviewer
2022	Conference on Computer Vision and Pattern Recognition (CVPR)	Reviewer
2022	IEEE Robotics and Automation Letters (RA-L)	Reviewer
2021	Association for the Advancement of Artificial Intelligence (AAAI)	Reviewer
2021	International Conference on Machine Learning (ICML)	Assisted review
2020	Annual Conference of the Association for Computational Linguistics (ACL)	Assisted review
2020	SIGNLL Conference on Computational Natural Language Learning (CoNLL)	Assisted review

Workshop Presentations

TD-MPC2: Scalable, Robust World Models for Continuous Control	Poster
Foundation Models for Decision-Making @ NeurIPS	2023
Robot Learning @ NeurIPS	2023
Pre-Training Robot Learning @ CoRL	2023
On Pre-Training for Visuo-Motor Control: Revisiting a Learning-from-Scratch Baseline	Poster
Pre-Training Robot Learning @ CoRL	2022
On the Feasibility of Cross-Task Transfer with Model-Based Reinforcement Learning	Poster
Pre-Training Robot Learning @ CoRL	2022
Foundation Models for Decision Making @ NeurIPS	2022
Deep RL Workshop @ NeurIPS	2022
MoDem: Accelerating Visual Model-Based Reinforcement Learning with Demonstrations	Poster
Pre-Training Robot Learning @ CoRL	2022
Deep RL Workshop @ NeurIPS	2022
Look Closer: Bridging Egocentric and Third-Person Views with Transformers for Robotic Manipulation	Poster
Workshop on Deployable Decision Making in Embodied Systems @ NeurIPS	2021
Deep RL Workshop @ NeurIPS	2021
Learning Vision-Guided Quadrupedal Locomotion End-to-End with Cross-Modal Transformers	Poster
Deep RL Workshop @ NeurIPS	2021
Visual Learning and Reasoning for Robotics Workshop @ RSS	2021
Stabilizing Deep Q-Learning with ConvNets and Vision Transformers under Data Augmentation	Poster
Unsupervised RL Workshop @ ICML	2021
Visual Learning and Reasoning for Robotics Workshop @ RSS	2021
Self-Supervised Policy Adaptation During Deployment	Poster
Microsoft Research RL Day	2021
Deep RL Workshop @ NeurIPS	2020
Workshop on Robot Learning @ NeurIPS	2020

Work Experience

Meta AI (FAIR)

Student Researcher

· Model-Based Reinforcement Learning. Mentored by Aravind Rajeswaran.

Menlo Park, CA, USA

June 2022 - Dec 2022

raffle.ai

Machine Learning Intern

· I built and open-sourced a cross-domain text-to-SQL parser in PyTorch.

Copenhagen, Denmark

Summer 2019

Retune DSP

Student Assistant

· I helped a team of engineers build and maintain deep learning pipelines for embedded voice control.

Kongens Lyngby, Denmark

Feb 2019 - Dec 2019

Nordic Transition

Student Software Developer

· I developed and maintained a data management and analysis platform for the HR industry.

Gentofte, Denmark

July 2016 - Dec 2019

Awards and Scholarships

2023 NVIDIA Graduate Fellowship 2024-25

· An award of \$60,000 to cover stipend and tuition for 1 year (10 recipients nation-wide).

Fellowship

2021 Robotics Summer School Scholarship

· A scholarship to participate in a two-week summer program in Denmark.

Scholarship

2020 Spar Nord Fond Scholarship

· A scholarship to study a semester at UC Berkeley (5 recipients nation-wide).

Scholarship

2020 UC Berkeley's SCET Collider Cup Finalist

· Biannual startup competition. Best student project from each class is nominated.

Award

2020 Innovation Center Denmark's SPARK Winner

· Best project in a 6-month entrepreneurial program in the Bay Area.

Award

2017 Otto Mønsted Fonds Legat

· A grant for students with a GPA ≥ 8.0 who wish to study a semester abroad.

Scholarship

Volunteering

2023 UC San Diego GradAMP Mentor (PhD Applications)

2022 · Supported prospective students through weekly mentor-mentee meetings in Fall.

Mentorship

Misc. Open-Source Projects

TD-MPC2 Official Implementation (★93)

· Public code release for "TD-MPC2: Scalable, Robust World Models for Continuous Control".

<https://github.com/nicklashansen/tdmpc2>

2023

MoDem Official Implementation (★76)

· Public code release for "MoDem: Accelerating Visual Model-Based Manipulation with Demonstrations".

<https://github.com/facebookresearch/modem>

2022

TD-MPC Official Implementation (★225)

· Public code release for "Temporal Difference Learning for Model Predictive Control".

<https://github.com/nicklashansen/tdmpc>

2022

DMControl Generalization Benchmark (★137)

· Benchmark for generalization in continuous control from pixels.

<https://github.com/nicklashansen/dmcontrol-generalization-benchmark>

2020

PAD Official Implementation (★110)

2020

· Public code release for “Policy Adaptation During Deployment”.
<https://github.com/nicklashansen/policy-adaptation-during-deployment>

Voice Activity Detection in Noisy Environments (★176)

2019

· Code for training and running a neural Voice Activity Detector (VAD) in PyTorch.
<https://github.com/nicklashansen/voice-activity-detection>

How to build RNNs and LSTMs from scratch with NumPy (★223)

2019

· Educational material on recurrent neural networks.
https://github.com/nicklashansen/rnn_lstm_from_scratch

Nov 2023