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   *San Diego, CA, USA*
PhD student, Computer Science and Engineering, GPA: 3.85/4.0   *Fall 2021 - present*
 · Advised by Xiaolong Wang and Hao Su.

University of California, Berkeley   *Berkeley, CA, USA*
Visiting Student, GPA: 4.0/4.0   *Spring 2020*
 · Spar Nord Fonden's FinTech scholarship recipient, SCET's Collider Cup finalist.

Technical University of Denmark   *Kongens Lyngby, Denmark*
MSc Mathematical Modeling & Computation, GPA: 11.2/12.0   *Feb 2019 - Jan 2021*
 · Special topics in machine learning. Advised by Ole Winther.

Technical University of Denmark   *Kongens Lyngby, Denmark*
BSc Software Technology, GPA: 8.2/12.0, final year GPA: 10.8/12.0   *Sep 2015 - Dec 2018*
 · **Nanyang Technological University, Singapore** - semester abroad, Fall 2017.

Publications & Preprints

Finetuning Offline World Models in the Real World   *Under review*
Under review   *2023*
Yunhai Feng*, **Nicklas Hansen***, Ziyan Xiong*, Chandramouli Rajagopalan, Xiaolong Wang
https://owmcorl.github.io

Multi-Task Real Robot Learning with Generalizable Neural Feature Fields *Under review*
Under review   *2023*
Yanjie Ze, Ge Yan, Yueh-Hua Wu, Annabella Macaluso, Yuying Ge, Jianglong Ye, **Nicklas Hansen**,
Li Erran Li, Xiaolong Wang
https://gnfactor-robot.github.io

MoDem-V2: Visuo-Motor World Models for Real-World Robot Learning   *Under review*
Under review   *2023*
Patrick Lancaster, **Nicklas Hansen**, Aravind Rajeswaran, Vikash Kumar
https://sites.google.com/view/modem-v2

On Pre-Training for Visuo-Motor Control: Revisiting a Learning-from-Scratch Baseline   *Poster*
International Conference on Machine Learning **(ICML)**   *2022*
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   *Poster*
International Conference on Learning Representations **(ICLR)**   *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 *Poster*
International Conference on Learning Representations **(ICLR)** *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 *Journal*
IEEE Robotics and Automation Letters **(RA-L)** *2023*
Yanjie Ze*, **Nicklas Hansen***, Yinbo Chen, Mohit Jain, Xiaolong Wang
https://arxiv.org/abs/2210.07241

Graph Inverse Reinforcement Learning from Diverse Videos *Oral*
Conference on Robot Learning **(CoRL)** *2022*
Sateesh Kumar, Jonathan Zamora*, **Nicklas Hansen***, Rishabh Jangir, Xiaolong Wang
https://arxiv.org/abs/2207.14299

Temporal Difference Learning for Model Predictive Control *Short Presentation*
International Conference on Machine Learning **(ICML)** *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 *Spotlight*
International Conference on Learning Representations **(ICLR)** *2022*
Ruihan Yang*, Minghao Zhang*, **Nicklas Hansen**, Hauzhe Xu, Xiaolong Wang
https://arxiv.org/abs/2107.03996

Stabilizing Deep *Q*-Learning with ConvNets and Vision Transformers under Data Augmentation *Poster*
Conference on Neural Information Processing Systems **(NeurIPS)** *2021*
Nicklas Hansen, Hao Su, Xiaolong Wang
https://arxiv.org/abs/2107.00644

Generalization in Reinforcement Learning by Soft Data Augmentation *Poster*
International Conference on Robotics and Automation **(ICRA)** *2021*
Nicklas Hansen, Xiaolong Wang
https://arxiv.org/abs/2011.13389

Self-Supervised Policy Adaptation during Deployment *Spotlight*
International Conference on Learning Representations **(ICLR)** *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 *Poster*
IEEE Engineering in Medicine and Biology Conference **(EMBC)** *2020*
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

Teaching

Technical University of Denmark *Co-organizer*
Reinforcement Learning *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 *Teaching Assistant*
02456 Deep Learning *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*
Zirui "Colin" Wang (BS, UCSD -> PhD, Cornell) *2022 - 2023*
Sambaran Ghosal (MS, UCSD) *2021 -*
Yanjie Ze (BS, SJTU) *2021 -*
Chandramouli Rajagopalan (MS, UCSD) *2022 -*
Yunhai Feng (MS, UCSD) *2022 -*
Aayushmaan Jain (MS, UCSD) *2022 -*
Ziyan Xiong (BS, Tsinghua University) *2022 -*

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

2023 Conference on Neural Information Processing Systems (**NeurIPS**) *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*

Workshop Presentations

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/Oral*
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/Oral*
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)   *Menlo Park, CA, USA*
Student Researcher   *June 2022 - Dec 2022*
 · Model-Based Reinforcement Learning. Mentored by Aravind Rajeswaran.

raffle.ai   *Copenhagen, Denmark*
Machine Learning Intern   *Summer 2019*
 · I built and open-sourced a cross-domain text-to-SQL parser in PyTorch.

Retune DSP   *Kongens Lyngby, Denmark*
Student Assistant   *Feb 2019 - Dec 2019*
 · I helped a team of engineers build and maintain deep learning pipelines for embedded voice control.

Nordic Transition   *Gentofte, Denmark*
Student Software Developer   *July 2016 - Dec 2019*
 · I developed and maintained a data management and analysis platform for the HR industry.

Awards and Scholarships

2021   **Robotics Summer School Scholarship**   *Scholarship*
         · A scholarship to participate in a two-week summer program in Denmark.
2020   **Spar Nord Fond Scholarship**   *Scholarship*
         · A scholarship to study a semester at UC Berkeley (5 recipients nation-wide).

2020	**UC Berkeley's SCET Collider Cup Finalist**	*Award*
	· Biannual startup competition. Best student project from each class is nominated.	
2020	**Innovation Center Denmark's SPARK Winner**	*Award*
	· Best project in a 6-month entrepreneurial program in the Bay Area.	
2017	**Otto Mønsted Fonds Legat**	*Scholarship*
	· A grant for high-achieving students (GPA >= 8.0) that wish to study a semester abroad.	

Volunteering

2022	**UC San Diego GradAMP Mentor (PhD Applications)**	*Mentorship*
	· Supported prospective students through weekly mentor-mentee meetings in Fall.	

Misc. Open-Source Projects

DMControl Generalization Benchmark *2020*
· Benchmark for generalization in continuous control from pixels.
https://github.com/nicklashansen/dmcontrol-generalization-benchmark

Optimization in Deep Learning *2019*
· Implementation and benchmark of deep learning optimization algorithms.
https://github.com/nicklashansen/neural-net-optimization

How to build RNNs and LSTMs from scratch with NumPy *2019*
· Educational material on recurrent neural networks.
https://github.com/nicklashansen/rnn_lstm_from_scratch