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SUMMARY

Tech Lead Manager of foundation models for robotics and embodied AI. We cannot prepare an agent for everything that it may ever encounter. Thus our strategy should be to learn models that generalize as best as possible, bf and enable agents to find new solutions at test time. Combining policies with learned multi-modal world models, pre-trained on large-scale heterogenous data, are a potential solution to this problem. My team is currently focused on training (action-conditioned) world models, utilizing pre-trained video world models, and evaluating them in the real world for manipulation tasks.

EXPERIENCE

Meta Aug 2022 - Present

TLM of the Cortex Team [8 researchers, 2 contractors] @FAIR

Managing and leading a team of researchers working on multi-modal foundation models for embodied agents. As TLM, (co-)lead several high-impact research projects, resulting in 8 publications, 2 benchmark, 1 datasetf and 3 model releases:

- **Training action-conditioned multi-modal world models for robotics:** Leveraged video-pretraining. Benchmarked video-diffusion (Cosmos) vs latent auto-regressive models for robot manipulation tasks. Showed superior manipulation performance of action-conditioned VJEPA2 in novel environments. [signficantly contributed to VJEPA2 release]
- **Locating objects in 3D from referring expressions:** Curated diverse 3D scene data for self-supervised pre-training of point cloud transformer models, and trained an end2end transformer model for 3D referring expressions tasks [ICML 2025, **spotlight, top 2.6% of 12,107 submissions**, open-sourced models and dataset, developed demo]
- **Benchmarking VLMs for open-vocab embodied question answering (EQA)** Developed a new benchmark for passive and active open-vocab EQA real 3D environments [captured through videos], developed baselines and evaluated SOTA models. Found SOTA models to be lacking in spatial reasoning. [CVPR 2024]
- **Pre-training visual (2D) foundation models for Embodied AI:** Curated diverse video and image datasets and studied the datas effect on model performance for a diverse set of robotic downstream tasks. Studied efficient adaptation of the backbone to achieve maximum performance. For the first time one backbone achieved on par or better performance on 15+tasks when compared to SOTA on each task. [Neurips 2023, VC-1 models and benchmark released]

Meta Aug 2018 - Aug 2022

Research Scientist @FAIR

· Drove research agenda on *Learning Loss and Reward Functions*, across 10+ researchers, selected work:

- *BC-IRL: Learning generalizable reward functions from demonstrations*: Demonstrated that SOTA inverse reinforcement learning methods overfit reward functions on the demonstrations, and cannot learn general rewards. Developed a novel algorithm to learn rewards that do generalize. [ICLR 2023 **spotlight, top 8% of 4900 submissions**]
- Meta-Learning via learned loss. Developed a general loss and reward function learning paradigm that can learn loss/reward functions either autonomously through interactions with the environment or by utilizing demonstrations. [ICPR 2021, **best paper award**]
- *Model-Based Inverse Reinforcement Learning* Trained a visual visual dynamics models, and developed cost learning approach that enables zero-shot mimicking of skills shown in visual demonstrations. [CoRL 2021]

University of Washington Jan 2017 - Jul 2018
PostDoctoral Researcher

· Led research on lifelong learning investigating meta-learning and visual dynamics models

- **Lifelong Meta-Learning** Developed novel algorithms for continual meta-learning for computer vision and robotics applications. [ICRA 2018, **nominated for best paper award**]
- **Structured Visual Dynamics Models** Developed Visual Dynamics Models that utilize structural biases such as enforcing consistent SE3 transformations, evaluated on robotic manipulation

Max-Planck Institute for Intelligent Systems Aug 2016 - Feb 2018
Research Scientist

· Led research on reactive and dynamic motion generation for real-time execution on hardware utilizing learned dynamics models

- **Robotics systems** Co-developed a (modular) End2End Bimanual manipulation systems for pick&place in dynamic environments. Benchmarked several approaches on this real world setting and demonstrated that reactive motion generation is essential to handling dynamic environments [IEEE RAL Journal 2018]
- **Continual Dynamics Learning for Real Time Control** Developed several online (inverse) dynamics learning algorithms that can stably run at 1000Hz - involving significant run-time optimization of compute heavy algorithms such as Gaussian Processes.

SKILLS/EXPERIENCE

Research Expertise	multi-modal modeling (vision, language, 3d, tactile, actions), lifelong learning, data-efficient adaptation of foundation models curating and analyzing data sources to train foundation models, large scale data annotations, fine-tuning video world models/training world models for robotics
Research Service	regularly invited to serve as reviewer, area chair, or associate editor in machine learning and robotics conferences (journals).
Management/Leadership	5 years of experience leading ambitious research involving cross-team collaborations 3 years TLM of a team between 4-8 people, landing high-impact research while leading team through multiple re-orgs
Programming	Pytorch, Python, C++

EDUCATION

University of Southern California *2009 - 2016*
Ph.D. in Computer Science, 2009

Technical University of Munich, Germany *2006 - 2009*
MSc in Computer Science, Minor in Biology 2009