Ning **Gao**

Research Scientist · Software Engineer

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*Recently, I joined Google as a Machine Learning engineer. Before that, I obtained my PhD degree in Autonomous Learning Robots (ALR) at KIT supervised by Prof. Gerhard Neumann. I was a doctoral researcher at Bosch Center for Artificial Intelligence (BCAI), Renningen, Germany. My research interests lie in the field of **meta-learning** and **self-supervised learning** towards **efficient** and **generalizable** representation on **novel** tasks across various robotic applications, e.g. **natural language processing**, **robotic grasping**, **6D object pose estimation**, **object segmentation** and **scene understanding**.*

Education

Ph.D. in Computer Science
Karlsruhe, Germany

Karlsruhe Institute of Technology — *05/2020 - Exp. 05/2024*

- Meta-learning on robotic vision applications supervised by Prof. Gerhard Neumann

M.Sc. in Mechanical Engineering
Karlsruhe, Germany

Karlsruhe Institute of Technology — *10/2016 - 11/2019*

- Major in Robotics and computer vision
- Thesis: Benchmarking Deep Learning Algorithms for 6DoF Object Pose Estimation in a Robotic System

B.Sc. in Automotive Engineering
Shanghai, China

Shanghai Tongji University — *10/2011 - 07/2016*

- Honors & Awards: Shanghai Outstanding Graduate Award, National Student Scholarship, Infineon Scholarship

Skills

Language	Chinese (native), English (fluent), German (proficient), Japanese (basic)
Machine Learning	Pytorch, Open3D, OpenCV, Blender Python API, MuJoCo, Pybullet, Numpy, Pandas, Scikit, Tensorflow
Software Engineering	Python, Git, C/C++, Jupyter, Slurm, Ros, Docker
Other	LaTeX, Microsoft Office, Linux

Research Experience

Machine Learning Engineer
Mountain View, USA

Google LLC — *03/2025 - Now*

- Evaluated the performance of Large Language Model (LLM) on device.
- Integrated LLM to process raw user data from various sources on device, such as Gmail, Calendar, SMS (Google Message).
- Improved LLM to facilitate efficient retrieval and utilization by downstream applications like Magic Recall, Magic Action, and Personalized AI Widgets invented by Google.

Graduate Research Assistant
Karlsruhe & Renningen, Germany

Karlsruhe Institute of Technology & Bosch Center for AI — *05/2020 - Exp. 05/2024*

- Evaluated the performance of meta-learning algorithms, including MAML-based and those within the Neural Processes, on freshly designed vision regression tasks. Proposed a functional contrastive learning loss to enhance learning efficiency among task representations and facilitate knowledge transfer to novel tasks.
- Integrated meta-learning and few-shot learning approaches across a range of robotic applications, such as robotic grasping, object segmentation and pose estimation, and generated various synthetic dataset using Mujoco, Pybullet and Blenderproc.
- Implemented adaptive and versatile algorithms for 6D pose estimation of novel objects across categories without the need of retraining or any object-specific information as prior knowledge.
- Investigated conditional slot representation for enhancing scene understanding and object abstraction.

Research Intern
Renningen, Germany

Bosch Center for AI — *05/2019 - 10/2019*

- Benchmarked Deep Learning Algorithms (Yolov2, Yolov3, RetinaNet, DOPE, AAE) for 6DoF Object Pose Estimation in a robotic system.
- Generated a novel industrial data using OpenGL and Blender.

Research Intern
Renningen & Abstatt, Germany

Bosch Corporate Research
03/2018 - 02/2019

- Predicted driver's behavior based on gaze estimation.
- Built interior camera system prototype for autonomous driving and collected real-world video data for training.

Research Assistant
Karlsruhe, Germany

Institute of Measurement and Control Systems (MRT), KIT
11/2017 - 05/2018

- Implemented joint tracking of multiple pedestrians and vehicles on KITTI dataset using C++ and Matlab.

Publications

[1] **Ning Gao**, Bernard Hohmann, and Gerhard Neumann. "Enhancing Interpretable Object Abstraction via Clustering-based Slot Initialization". In: *The 34th British Machine Vision Conference (BMVC)* (2023).

[2] **Ning Gao**, Vien Anh Ngo, Hanna Ziesche, and Gerhard Neumann. "SA6D: Self-Adaptive Few-Shot 6D Pose Estimator for Novel and Occluded Objects". In: *7th Annual Conference on Robot Learning (CoRL)*. 2023.

[3] **Ning Gao**, Jingyu Zhang, Ruijie Chen, Ngo Anh Vien, Hanna Ziesche, and Gerhard Neumann. "Meta-Learning Regrasping Strategies for Physical-Agnostic Objects". In: *IEEE International Conference on Robotics and Automation (ICRA) Workshop on Scaling Robot Learning*. 2022.

[4] Yumeng Li*, **Ning Gao***, Hanna Ziesche, and Gerhard Neumann. "Category-Agnostic 6D Pose Estimation with Conditional Neural Processes". In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshop on Women in Computer Vision (WiCV)*. 2022.

[5] **Ning Gao**, Hanna Ziesche, Ngo Anh Vien, Michael Volpp, and Gerhard Neumann. "What Matters for Meta-Learning Vision Regression Tasks?" In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. June 2022, pp. 14776–14786.

Teaching Experience

Student Supervision

2023	**Yifan Huo**, Category-Agnostic 6D Object Pose Estimation with Online Rendering. (M.Sc.)	*Bosch Center for AI*
2023	**Jingyu Zhang**, Context-Aware Active Grasping on Unseen Objects. (M.Sc.)	*Bosch Center for AI*
2022	**Bernard Hohmann**, Scene Representation and Manipulation. (2x Intern)	*ALR, KIT*
2021	**David Graf**, Multi-object and multi-view Learning (Intern)	*ALR, KIT*
2021	**Alex Vasilache**, Multi-object and multi-view Learning (Intern)	*ALR, KIT*
2021	**Yumeng Li**, Information Aggregation for 6D Pose Estimation (M.Sc.)	*Bosch Center for AI*
2021	**Ruijie Chen**, Few-shot Grasping on Physical-Agnostic Objects (M.Sc.)	*Bosch Center for AI*

Community Service

Workshop Organization
- **IROS 2023**: Policy Learning in Geometric Spaces, Detroit, USA (Main Organizer)

Reviewer
- ICRA2021, ICRA2022, IROS2022, CoRL2022, CVPR2023, CoRL2023

Summer School
- The Machine Learning Summer School (MLSS), 2020, Tübingen, Germany
- International Workshop of Intelligent Autonomous Learning Systems (IWIALS), 2023, Kleinwalsertal, Austria