Frederik Ebert

PhD Student

750 Sutardja Dai Hall
CA 94720, Berkeley
+1 510 918 0431
febert@berkeley.edu
https://febert.github.io/

Research Interests

Machine learning for robotics, computer vision, robotic manipulation, tactile sensing.

Education

2017 – today **PhD in Comptuer Science**, *Berkeley Artificical Intelligence Research (BAIR), UC Berkeley*, Advisor: Prof. Sergey Levine.

2016 – 2017 **Visiting Researcher**, *Berkeley Artificical Intelligence Research (BAIR), UC Berkeley*, Advisor: Prof. Sergey Levine.

2014 – 2016 **Master Program**, *Robotics Cognition Intelligence*, Technical University Munich.

2010 – 2014 **Bachelor of Science**, *Mechatronics Engineering and Information Technology*, Technical University Munich.

2012 – 2013 **Exchange Student, Tongji-University, Shanghai, China**, *2 semesters.*

Pre-Prints

2019 **Visual Foresight: Model-Based Deep Reinforcement Learning for Vision-Based Robotic Control**,
Frederik Ebert, *Chelsea Finn, Sudeep Dasari, Annie Xie, Alex Lee, Sergey Levine*,
arXiv, project-page, blog-post.

Publications

ICLR 2019 **Time-Agnostic Prediction: Predicting Predictable Video Frames**,
Dinesh Jayaraman, ***Frederik Ebert****, Alexei A. Efros Sergey Levine*,
arXiv, project-page.

RSS 2019 **Improvisation through Physical Understanding: Using Novel Objects as Tools with Visual Foresight**,
Annie Xie, ***Frederik Ebert****, Sergey Levine, Chelsea Finn*,
arXiv, project-page.

ICRA 2019 **Manipulation by Feel: Touch-Based Control with Deep Predictive Models**,
Stephen Tian,* ***Frederik Ebert****, Dinesh Jayaraman, Dinesh Jayaraman,Mayur Mudigonda, Chelsea Finn,Roberto Calandra ,Sergey Levine (* equal contribution)*,
arXiv, project-page, blog-post.

CoRL 2018 **Robustness via Retrying: Closed-Loop Robotic Manipulation with Self-Supervised Learning**,
Frederik Ebert, *Sudeep Dasari, Alex Lee, Sergey Levine, Chelsea Finn*,
arXiv, project-page.

CoRL 2017 **Self-Supervised Visual Planning with Temporal Skip Connections**,
Frederik Ebert, *Chelsea Finn, Alex Lee, Sergey Levine*,
arXiv, project-page.

Research Experience

2016 - today **Graduate Student Researcher**, *Berkeley Artifical Intelligence Research (BAIR), UC Berkeley*, Advisor: Prof. Sergey Levine.

- Model-based reinforcement learning and model-based planning for vision-based robotic manipulation both in simulation and on real robots
- Large-scale self-supervised learning for robotic manipulation
- Supervising undergraduates for robot learning research and development of miniature tactile sensor

2016 **Learning by Demonstration using Gaussian Mixture Regression**,
Course Project, Department for Dynamic Human-Robot-Interaction for Automation Systems, Prof. Dongheui Lee, Technical University Munich.

2015 **Deep-Learning for Robotic Grasping**, *Course Project*, Department for Biomimetic Robotics and Machine Learning, Prof. Van der Smagt, Technical University Munich.

2014 **Nonlinear Model-Predictive Control for Constrained Manipulator Control**,
Bachelor Thesis, Department for Dynamic Human-Robot-Interaction for Automation Systems, Prof. Dongheui Lee, Technical University Munich.

2014 - 2016 **German Aerospace Center (DLR)**, *Institute for Mechatronics*, Oberpfaffenhofen.

- Development of dynamic walking controller for series-elastically actuated robot leg
- Mechanical design and testing of series-elastically actuated robot leg

2011 - 2012 **Institute for Cognitive Systems**, *Technical University Munich*,
Prof. Gordon Cheng.

- Design and manufacturing of hydraulic actuator for humanoid robot
- Design and manufacturing of camera orienting system for humanoid stereo-vision
- Simulation and dimensioning of force-sensing cells for robotic skin using Ansys

Mentoring

Undergraduates **Sudeep Dasari, Stephen Tian, Akhil Padmanabha, Annie Xie**.

Press Coverage

2019 Learning to manipulate objects based on the sense of touch (second half) Venture Beat.

2018 Researchers train robots to see into the future TechCrunch.

Awards

2017 **EECS Department Fellowship**, *UC Berkeley*.

2016 **Scholarship of German Industrial Association**, *funding for research at UC Berkeley*.

2016 **Scholarship of German Academic Exchange Association (DAAD)**, *funding for research at UC Berkeley*.

2009 **"Jugend-Forscht" Science Fair**, *self-designed second generation exoskeleton-robot "R-BASE"*, 3. prize in German national competition (10.000 participants) .

2009 **German Aerospace Centre (DLR) Special Award for "Jugend-Forscht" Science Fair Project**, *Website of DLR award*.

2008 **"Jugend-Forscht" Science Fair**, *self-designed first generation exoskeleton-robot "EMVAS"*, 2. prize in Bavarian federal competition.

Relevant Coursework at UC Berkeley

Vision/ML/AI Deep Reinforcement Learning, Advanced Deep Learning Seminar, Stochastic Systems: Estimation and Control, Neural Computation, Convex Optimization, Applications of Parallel Computers.

Relevant Coursework at TU Munich

Robotics/AI Control Robot Motion Planning, Image Understanding, Machine Learning, Techniques in Artificial Intelligence, Human-Machine Communication, Approximate Dynamic Programming and Reinforcement Learning, Project Laboratory Human Centered Robotics, Robot Programming and Control for Human Interaction, Modern Control Theory, Introduction to Autonomous Systems, Practical Course Deep learning for the real world.

Internships

2010 **BMW Group**, *tool design department*, Munich, Germany.

- Setting up robot- and pneumatic devices for production line
- Engineering of stamp-tools for automotive body-parts

2009 **Audi Hungaria Motor Kft**, *Engine Production Plant*, Györ, Hungaria.

- Award from the Bavarian Entreprenerial Association for an outstanding project at "Jugend-Forscht" Science Fair

2009 **Fraunhofer Institute for Production and Automation (IPA)**, *Stuttgart, Germany*, Design of a light-weight-robot concept using "SolidWorks".

2008 - 2009 **Department for Intelligent Autonomous Systems**, *Prof. Beetz, Technical University Munich*.

- Design of hard- and software for exoskeleton-robot "R-BASE"
- Programming on Ubuntu, Inverse Kinematics, PID-Control

Key Technical Skills

Software Engineering

Languages	**Python, C/C++, Matlab, Java**.
Software-Packages	**Google Tensorflow (Machine Learning), Pytorch (Machine Learning), Caffe (Deep-Learning), Robot Operating System (ROS)**.
Platforms	**Linux, Windows**.
Version-control	**git**.

Languages

English	fluent
Mandarin	advanced (HSK4 of 6 levels)
French	intermediate
German	native

Interests and Activities

Sports	Swimming, Badminton, Sailing
Music	Playing piano for ca. 15 years.