

# Yang Wang

Learning-based Control, Optimization, Machine Learning, Robotics

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## EDUCATION

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<b>Technical University of Kaiserslautern</b>	Kaiserslautern, Germany
Master of Science in Electrical and Computer Engineering, CGPA: 1.6/1.0	10/2019–03/2022
<b>Swiss Federal Institute of Technology in Lausanne</b>	Lausanne, Switzerland
Visiting Student for Master's Thesis at Automatic Control Laboratory, Grade: 1.0/1.0	10/2021–03/2022
<b>Polytechnic University of Catalonia</b>	Barcelona, Spain
Erasmus Exchange Student in Automatic Control and Robotics, GPA: 8.14/10.00	03/2021–07/2021
<b>Tomsk Polytechnic University (Double Degree)</b>	Tomsk, Russia
Bachelor of Science in Automation of Technological Processes and Production, CGPA: 4.74/5.00	08/2016–06/2018
<b>Shenyang Ligong University (Double Degree)</b>	Shenyang, China
Bachelor of Science in Automation, CGPA: 90/100, Top 3%	09/2014–07/2016

## RESEARCH EXPERIENCES

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<b>Master's Thesis Project</b>	Lausanne, Switzerland
Automatic Control Laboratory, Swiss Federal Institute of Technology in Lausanne	10/2021-03/2022
<ul style="list-style-type: none"><li>– Proposed a novel black-box safe optimization algorithm solving non-linear, non-convex optimization problems where the objective and constraint functions are not explicitly known. This algorithm utilized the Lipschitz and smoothness properties of unknown functions to achieve safety-guarantee throughout the optimization process.</li></ul>	
<b>Student Research Assistant</b>	Kaiserslautern, Germany
SmartFactory-KL, German Research Center for Artificial Intelligence	10/2021-03/2022
<ul style="list-style-type: none"><li>– Improved robustness and functionality of a novel continuous-time neural network for time series prediction and simulation problems. Prepared benchmark datasets for validating the performance of the developed model. During the work, PyTorch, Scipy, NumPy, Pandas and Git were mainly practiced.</li></ul>	
<b>Seminar Project</b>	Kaiserslautern, Germany
Chair of Automation and Control, Technical University of Kaiserslautern	05/2020-09/2020
<ul style="list-style-type: none"><li>– Developed a method for learning robotic movement from human demonstrations with obstacle avoidance, using the framework of dynamic movement primitives (DMPs). The proposed method learned a nonlinear function inherent in the observed movement using a RBF network and achieved the obstacle avoidance by constructing a dynamical potential field. The performance of the proposed method was demonstrated via simulations with a robotic arm.</li></ul>	

## WORK EXPERIENCES

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<b>Guangzhou Zhihuihe Education Technology Co., Ltd.</b>	Guangzhou, China
High School STEM Teacher	10/2018-07/2019
<ul style="list-style-type: none"><li>– As an invited STEM teacher at renown high schools, e.g., Zhixin High School, Guangzhou Nanwu High School, I prepared and taught STEM classes to high school students, motivated student's interests in science and engineering, encouraged their critical thinking and trained their problem-solving ability.</li></ul>	

## SKILLS

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- **Programming Languages:**  
C/C++, Python, MATLAB
- **Tools and Platform:**  
Git, Latex, Linux, ROS, PyTorch, Pandas, Scipy, sklearn
- **Knowledge:** Robotic Dynamics, Localization, SLAM, Motion Planning, Navigation, Learning-Based Control, Model Predictive Control, Robust Control, Machine Learning, Deep Learning, Reinforcement Learning, Convex Optimization, Bayesian Optimization, etc.

## LANGUAGES

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- **English:** Professional Working Proficiency
- **German:** Intermediate Proficiency
- **Russian:** Intermediate Proficiency
- **French:** Elementary Proficiency
- **Chinese:** Native Proficiency

## PROJECTS

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- **Linear/Nonlinear MPC Controller Designs in Case Studies**  
Designed a linear MPC controller for water level control of a Quadruple-Tanks System using toolbox Yalmip, and a nonlinear MPC controller for the component concentration control of a chemical process using package CasADi.
- **Human Speech Emotion Recognition using CNN and LSTM Network**  
Collected and processed audio soundtrack data from people's daily conversation, built MLP, CNN and LSTM models to classify the emotions of speakers, and compared and analysed the classification performance of each model.
- **Mobile Robots SLAM and Map Exploration in Unknown Environments**  
Implemented frontier-based algorithms for map exploration of unknown environments in simulations using ROS, and developed a novel strategy to optimize the exploration performance by maximizing a designed reward function.
- **Control of UR3 Robotic Arm for Chess Gaming on ROS**  
Developed a UR3 robotic arm control system for playing chess games, including designing a sensing module using a depth camera, a motion planning and collision check module, and communication and action execution modules.
- **Mobile Robot Project**  
Worked in a team for a mobile robot project, developed an autonomous driving system using a PID controller for maintaining the robot within the driveway and avoiding obstacles, using the perception information from other modules.

## SCHOLARSHIPS AND AWARDS

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| • PROMOS DAAD Scholarship   | 2022–2022 |
| • Erasmus Exchange Grant  | 2021–2021 |
| • China Scholarship Council Scholarship   | 2016–2018 |
| • Tomsk Polytechnic University Scholarship for Excellent Performance (full GPA) | 2017–2017 |
| • National Encouragement Scholarship (GPA in Top 5%)                            | 2016–2016 |

## VOLUNTEER EXPERIENCE

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| <b>TelcoDR Inc.</b><br>Robot Expert Volunteer in MWC2021                       | Barcelona, Spain<br>07/2021-07/2021 |
| <b>Guangzhou Youth Science and Technology Museum</b><br>Museum Guide Volunteer | Guangzhou, China<br>06/2019-07/2019 |

## HOBBIES

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- Reading about Psychology, History, Popular Philosophy, Biographies, Fitness, Photography, Photo/Video Editing.