

# SAKET ADHAU

## Machine Learning and Optimization

✉ Department of Chemical Engineering (IKP),  
NTNU, Trondheim, Norway

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## EDUCATION

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### Machine Learning Research Assistant

*Sep'19–Ongoing*

- Norwegian University of Science and Technology (NTNU), Norway
  - Part of the project “*Intelligent use of data to build optimization tools for cyber-physical systems in the process industry*” funded by the Research Council of Norway.
  - By leveraging big data and machine-learning algorithms, task is to utilize process data to develop machine-learning based models (also known as digital-twins), that can be used for developing optimization tools. This will enable to address the challenges with respect to developing models for optimization.
  - Supervisor: Prof. Sigurd Skogestad

### Master of Technology, Instrumentation and Control

*Aug'17–June'19*

- College of Engineering Pune, India
  - Thesis Title: *Learning Based Model Predictive Control*
  - Supervisor: Prof. Dayaram Sonawane
  - CGPA: 8.16

### Bachelor of Engineering, Instrumentation and Control

*Aug'13–June'17*

- University of Pune, India
  - Project Title: *System Identification and PID Control of PMDC Motor using MATLAB and LabVIEW*
  - Supervisor: Dr. Milind Bongulwar
  - Mention: First Class with Distinction | Percentage: 69.67

## WORK EXPERIENCE

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### Trainee Engineer

*June'19–August'19*

- Aker Solution, Pune, India.
  - Post Graduate Trainee Engineer in the Application Engineering department.
  - Developed automated method for testing of the subsea module used in offshore oil fields.

## PUBLICATIONS

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### Articles in international conferences

#### 2021

- Mohanty N. R., **Adhau S.**, Ingole D., and Sonawane D., “Hardware Implementation of Low-complexity Deep Learning-based Model Predictive Controller”, *accepted for presentation and publication in the proceedings of the 2021 European Control Conference (ECC)*.
- **Adhau S.**, Naik Vihang, and Skogestad S., “Constrained Neural Networks for Approximate Nonlinear Model Predictive Control”, *submitted to 60<sup>th</sup> IEEE conference on Decision and Control (CDC)*.
- Jugade C., Patne V., **Adhau S.**, Ingole D., Sonawane D., “FPGA Implementation Framework for Accelerating Nonlinear MPC Through Machine Learning ”, *submitted to 7<sup>th</sup> IFAC conference on Nonlinear Model Predictive Control, NMPC 2021*.

#### 2019

- **Adhau S.**, Patil S., Ingole D., Sonawane D., “Embedded Implementation of Deep Learning-Based Linear Model Predictive Control”, *in Proceedings of 6<sup>th</sup> Indian Control Conference, IEEE, Hyderabad, India, 2019*.
- **Adhau S.**, Patil S., Ingole D., and Sonawane D., “Implementation and Analysis of Nonlinear Model Predictive Controller on Embedded Systems for Real-Time Applications”, *in Proceedings of the 17<sup>th</sup> European Control Conference (ECC’19), IFAC and IEEE, Naples, Italy, 2019*.

#### 2018

- **Adhau S.**, Phalke K., Nalawade A., Ingole D., Patil S., Sonawane D., “Implementation and Analysis of Offset-Free Explicit Model Predictive Controller on FPGA”, *in Proceedings of 5<sup>th</sup> Indian Control Conference, IEEE, Delhi, India, 2018*.

## RESEARCH INTERESTS

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1. Machine learning for MPC
2. Nonlinear model predictive control
3. Embedded systems
4. Optimization

## INTERNSHIP EXPERIENCE

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**Bosch Chassis Systems India Pvt. Limited, Chakan, Pune.**

**June’15 - July’15**

- Worked with the TeF department towards maintenance and predictive safety standards.
- Carried out analysis of Mean Time To Repair (MTTR) and Mean Time Between Repair (MTBR) on the assembly lines (NOAH, Line 51, TMC line).

## POSITIONS OF RESPONSIBILITY

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- **Co-ordinator for 3<sup>rd</sup> Winter School.** **Dec’18**
  - Served as convener and co-ordinator of **3<sup>rd</sup> Winter School on Optimization and Optimal Control – A Data-based Approach** at Embedded Systems Lab, COEP.

- **Teaching Assistant.**

*July'18–Dec'18*

- Served as TA for **Microcontroller Techniques and Its Applications** and **Embedded System Design** which was a special course.

## AWARDS AND FUNDING

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- Project accepted for oral presentation in **MATLAB Expo'19.** *May'19*
- Student support program for Indian Control Conference – IIT Delhi. *Jan'19*
- Xilinx University Program for researchers – Pynq development board and software. *Sep'18*

## SKILLS & INTERESTS

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- **General**
  - Nonlinear optimization, model-based control, nonlinear dynamic system modeling.
- **Programming languages**
  - C, C++, Python.
- **Tools**
  - MATLAB/Simulink, PyTorch, Keras, Tensorflow, Pandas, L<sup>A</sup>T<sub>E</sub>X.
- **Development**
  - Atmel Studio, Vivado, MPLAB X, HDL coder, LabView, Arduino IDE, Linux.
- **Toolboxes**
  - Protoip, MPT toolbox, ACADO Toolkit, CasADi, FORCES, GRAMPC.
- **Version control tools**
  - GitHub, GitLab.

## PERSONAL DETAILS

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- Full Name: Saket Adhau
- Citizenship: Indian
- Current Residence: Trondheim, Norway
- Languages: English - Fluent, Norwegian - Level 1
- Date of Birth: 29 May 1995