

MOHIT MEHNDIRATTA

Doctoral Student
School of Mechanical and Aerospace Engineering
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CURRICULUM VITAE

OBJECTIVE

I believe that enthusiasm and dedication can overcome all possibilities of failure. Along with my qualification and my hard work, I want my growth to be fully justified by your organization's growth.

PERSONAL INFORMATION

Date of Birth : 28th June 1990
Father's Name : R. P. Mehndiratta
Mother's Name : Seema Mehndiratta
Nationality : Indian

ACADEMIC QUALIFICATIONS

Doctorate of Philosophy (PhD.) in Mechanical and Aerospace Engineering (Jan 2016 – Jun 2020)

Nanyang Technological University (NTU), Singapore.

- Title: Optimization-based Learning Control of Aerial Robots Operating in Uncertain Environments.
- Research Focus:
 - Gaussian process for nonlinear regression
 - Deep neural network-based modeling
 - (Nonlinear) model predictive controller
 - (Nonlinear) moving horizon estimation

Master of Science (MSc.) in Aerospace Engineering (2012 - 2015)

Joint degree offered by Nanyang Technological University (NTU), Singapore - Technical University of Munich (TUM), Germany.

- Score: GPA (Grade Point Average) - 4.86/5 and CAP (Grading for TUM) - 1.58 (high distinction).
- Relevant Courses: Aerodynamics, Aircraft Propulsion, Aircraft Structure and Materials, Flight Performance and Dynamics, Fracture Mechanics and NDT, Plates and Shells, Flight Control Systems, Turbulent Flows, Advanced Flight Dynamics, Advanced Flight Controls (Nonlinear and Adaptive Controls), Boundary Layer Theory, Computational Fluid Dynamics, Turbo Compressors.

- Practical Courses: **Flight Test Engineer** for PA-28 Aircraft in TUM.
Design of Medium Haul Aircraft in NTU. (Guide: Prof .T. G. Pai)

Bachelor of Technology (B.Tech.) in Aerospace Engineering (2008 - 2012)

Amity University, Uttar Pradesh, India.

- Score: CGPA - 7.85/10
- Relevant Courses: Aircraft Propulsion Systems, Aircraft Structures, Aerodynamics, Stability & Control, Flight Dynamics, Aircraft Performance, Aircraft Design, Principles of Helicopter Engineering.
- Practical Course: Design and Construction of a Hovercraft.

RELEVANT WORK EXPERIENCE

- September 2015 – January 2016: Working as a **Research Associate** in *Singapore Center for 3D printing, NTU.*
 - Design and fabrication of **3D printed UAV**, including its Modelling and Parameter Estimation.
 - Involved in implementing various algorithms for UAV control, focussing on *Model Predictive* and *Fuzzy-Logic* controller.
- April 2015 – August 2015: Working as a **free-lancer** on platforms including **Fiverr** and **Elance**. Undertaken various Matlab/Simulink projects including **Signal Processing, Image Processing, Communication channel setup, Motion control system design** of a moon rover.
- December 2014 – February 2015: Institute of Flight System Dynamics (FSD), TUM (Germany) Completed an internship, title: “”.
 - Implementation of filters in **Matlab** using an **object oriented approach**.
- April 2014 – October 2014: Institute of Flight System Dynamics (FSD), TUM (Germany) Accomplished master’s dissertation, title: “*Comparison of Extended Kalman Filter and Unscented Kalman Filter for Flight Path Reconstruction in System Identification*”.
 - Execution was done in **Matlab** and **Simulink** in an **object oriented** way.
 - Performance evaluation of both the filters was illustrated on the simulated flight data generated using **X-Plane**.

LIST OF PUBLICATIONS

Book Chapters:

- [1] Mohit Mehndiratta, Erkan Kayacan, Siddharth Patel, Erdal Kayacan and Girish Chowdhary, "Learning-based fast nonlinear model predictive control for custom-made 3D printed ground and aerial robots." In *Handbook of Model Predictive Control*, pp. 581-605. Birkhäuser, Cham, 2019.

Journal Papers:

- [1] Mohit Mehndiratta, Erkan Kayacan, Mahmut Reyhanoglu and Erdal Kayacan. "Robust Tracking Control of Aerial Robots via a Simple Learning Strategy-based Feedback Linearization." In *IEEE Access*. (Accepted)

- [2] Mohit Mehndiratta and Erdal Kayacan. "A constrained instantaneous learning approach for aerial package delivery robots: onboard implementation and experimental results." In *Autonomous Robots* 43, no. 8 (2019): 2209-2228.
- [3] Mohit Mehndiratta and Erdal Kayacan. "Receding horizon control of a 3 DOF helicopter using online estimation of aerodynamic parameters." In *Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering* (2017): 0954410017703414.

Conference Papers:

- [1] Mohit Mehndiratta and Erdal Kayacan. "Gaussian Process-based Learning Control of Aerial Robots for Precise Visualization of Geological Outcrops." In *European Control Conference (ECC)*, 2020. (Submitted)
- [2] Mohit Mehndiratta, Efe Camci and Erdal Kayacan. "Can Deep Models Help a Robot to Tune Its Controller? A Step Closer to Self-tuning Model Predictive Controller." In *International Conference on Robotics and Automation (ICRA)*, 2020. (Submitted)
- [3] Mohit Mehndiratta, Efe Camci and Erdal Kayacan. "Automated Tuning of Nonlinear Model Predictive Controller by Reinforcement Learning." In *2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 3016-3021. IEEE, 2018.
- [4] Mohit Mehndiratta and Erdal Kayacan. "Reconfigurable fault-tolerant NMPC for Y6 coaxial tricopter with complete loss of one rotor." In *2018 IEEE conference on control technology and applications (CCTA)*, pp. 774-780. IEEE, 2018.
- [5] Mohit Mehndiratta, Erkan Kayacan and Erdal Kayacan. "A Simple Learning Strategy for Feedback Linearization Control of Aerial Package Delivery Robot." In *2018 IEEE Conference on Control Technology and Applications (CCTA)*, pp. 361-367. IEEE, 2018.
- [6] Mohit Mehndiratta and Erdal Kayacan. "Online Learning-based Receding Horizon Control of Tilt-rotor Tricopter: A Cascade Implementation." In *2018 Annual American Control Conference (ACC)*, pp. 6378-6383. IEEE, 2018.
- [7] Wilson Ying Jun Lee, Mohit Mehndiratta and Erdal Kayacan. "Fly without borders with additive manufacturing: a microscale tilt-rotor tricopter design." In *Proceedings of the 3rd International Conference on Progress in Additive Manufacturing (Pro-AM 2018)*, pp 256–261, 2018.
- [8] Ruddhi Gokhale, Yi Wan, Mohit Mehndiratta and Erdal Kayacan. "Fixed-wing vertical-takeoff-and-landing UAV with additive manufacturing: a dual-rotor version." In *Proceedings of the 3rd International Conference on Progress in Additive Manufacturing (Pro-AM 2018)*, pp 250–255, 2018.
- [9] Mohit Mehndiratta, Anna Prach and Erdal Kayacan. "Numerical Investigation of Gaussian filters with a combined type Bayesian filter for nonlinear state estimation." *IFAC-PapersOnLine* 49, no. 18 (2016): 446-453.
- [10] Mohit Mehndiratta, Erdal Kayacan and Tufan Kumbasar. "Design and experimental validation of single input type-2 fuzzy PID controllers as applied to 3 DOF helicopter testbed." In *2016 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE)*, pp. 1584-1591. IEEE, 2016.

LANGUAGES KNOWN

- English (Proficiency), German (Elementary Proficiency), Hindi (Native), Punjabi (Native).

COMPUTER KNOWLEDGE

- Known Languages: C & C++ (Advanced), MatLab (Advanced), Simulink (Advanced); ROS-GAZEBO (Advanced), Fluent (Intermediate), Ansys (Intermediate), CFD (Intermediate), AutoCAD (Intermediate); Visual Basics (Basic), SQL (Basic).

ACHIEVEMENTS

- NTU Research Scholarship for doctoral studies.
- DAAD Scholarship holder during master's course at NTU - TUM.
- Received Prestigious Award on 'Strategic Thinking' at the end of the 4 year Bachelor's Degree.
- Team leader for the Final Year Bachelor project.
- Lean Management Certified by British Standard Institution (BSI).
- Awarded the best volunteer at 'XIX Commonwealth Games'.

INTERESTS AND HOBBIES

- *Books* : history, technical journals
- *Sports* : physical fitness, cricket, hockey
- *Recreation* : driving, travelling
- Team Activities

A handwritten signature in blue ink that reads "Mohit Chandra". The signature is stylized with a large 'M' and a horizontal line underneath.

Singapore, 07.09.2019