



**Aditya Arvind**  
**Systems & Control Engineering**  
**Indian Institute of Technology Bombay**

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**M.Tech.**  
**Gender: Male**  
**DOB: 15-06-1997**

Examination	University	Institute	Year	CPI / %
Post Graduation	IIT Bombay	IIT Bombay	2022	7.77
Graduation	Dr. APJ Abdul Kalam Technical University	Harcourt Butler Technological Institute	2019	69.12%
Graduation Specialization: Electrical Engineering				

## SCHOLASTIC ACHIEVEMENTS

- Secured **AIR 253** in **GATE-2020 (Electrical Engineering)** among 93,526 candidates
- Secured **AA grade** in **Applied Predictive Analytics** course

## MAJOR PROJECT AND SEMINAR

- M.Tech Project: Predictive Modelling and Maintenance for Distribution Network**  
*Guide: Prof. PSV Nataraj, System and Control Engg., IIT Bombay (June'21 - present)*
  - Objective: FDD** (Fault Detection and Diagnosis), **Anomaly detection** and **RUL Prediction** for Engineering Systems using **MATLAB**.
  - Working on **DC Motor Toolkit** and **Hybrid Two Tank System** for FDD of software and hardware faults using **Predictive Maintenance** and **Deep Learning Toolbox** of MATLAB
  - Deploying **ML** and **DL models** for anomaly detection and condition monitoring of system
  - Predicting RUL using identified models or specialized RUL estimator models
  - Impact:** Creating a **dashboard** for **real time machine health monitoring** to plan maintainance in advance for eliminating unplanned downtime
- M.Tech Seminar: Deep Reinforcement Learning and Model Free Control** (Sept'20 - Dec'20)  
*Guide: Prof. PSV Nataraj, System and Control Engg., IIT Bombay.*
  - Understood the basics of RL, Model free control, Policy optimization and Q learning method
  - Studied policy, value functions, exploitation & exploration, **multi arm and contextual bandits**
  - Conducted a literature review and understood the implementation of **Policy gradient and DQN**

## KEY PROJECTS

- Control of Continuous Stirred Tank Reactor System (CSTR)** (Jan-April'21)  
(*Guide: Prof. Sachin C Patwardhan*) (Course: Advanced Process Control)
  - Designed **Multi-loop PI** controller, Pole Placement controller with Leunberger Observer
  - Implemented multi-variable **LQG**, **MPC** controllers with **Kalman Predictor** as state estimator through **Innovation Bias** and **State Augmentation** approach
  - Comparative analysis of simulation results of controllers for servo and regulatory problem of CSTR system
- Seminar: Blood Glucose Control in Type I Diabetic Patients** (April'21)  
(*Guide: Prof. Sachin C Patwardhan*) (Course: Advanced Process Control)
  - Conducted the literature review and presented a summary of paper on model predictive control for blood sugar control in diabetic patients
  - Studied **Linear MPC** incorporating state estimation, utilizing a Kalman filter and compared results with Linear MPC scheme for regulating insulin injection into bloodflow
- Modelling and Control of Single Board Multi Heater System** (Jan-April'21)  
(*Guide: Prof. Leena Vachhani*) (Course : Systems and Control Lab)
  - Identified **ARMAX** and **ARX** model for SBMHS using MATLAB's System Identification toolbox
  - Implemented multi-loop PI and Decentralized PI controller for servo and regulatory problem and estimated parameters for ARMAX model using Extended Least Square method
  - Designed **LQOC** and Linear MPC for **ARMAX** Model using **State Augmentation** approach

- **Path Tracking and Control of Wheeled Mobile Robots** (Jan-April'21)  
(Guide: Prof. Arpita Sinha) (Course: System and Control Lab)
  - Simulated simplified car like vehicle dynamics using Bicycle and Ackermann model
  - Implemented motion of robot vehicle along paths such as Lissajous figures and incorporated P and PI controller for position and heading control of vehicle.
- **Prediction of Air Quality Index (PM 2.5) using Various Regression Techniques** (July'21)  
(Self Project)
  - Analyzed underlying trends in AQI based on **Visualization and Exploratory Data Analysis**
  - Applied ML algos like **Decision trees, Random forest, Xgboost** to achieve **RMSE of  $36.8 \mu\text{g}/\text{m}^3$**
  - Used **RandomizedSearchCV** of **Scikit-learn** for hyperparameter tuning of models
- **Predicting Loan Approval Status using Machine Learning** (July'21)  
(Self Project)
  - Applied various ML techniques to perform classification on **Kaggle dataset of Loan Prediction Problem** and achieved the best accuracy of **80%** with Logistic Regression
  - Performed data imputation and extracted new features for improved performance

## PUBLICATIONS

- R. Sachan, N. Kumar, **A. Arvind**, A. K. Arya and S. Kumar, "Reduced Switch Count 36 level Inverter for Open End Winding Induction Motor Drive," 2019 2nd International Conference on Power Energy, Environment and Intelligent Control (PEEIC), 2019, pp. 180-185

## ONLINE COURSES

- Deep Learning Specialization | (GUVI) (May-July,2021)  
*Instructor: Prof. Mitesh Khapra and Prof. Pratyush Kumar, IIT Madras*
  - FNN, CNN architectures, optimization algorithms and sequence models using PyTorch, Tensorflow, Keras .
- Foundations of Data Science | Guvi (May-July,2021)  
*Instructor: Prof. Mitesh Khapra and Prof. Pratyush Kumar, IIT Madras*
  - Descriptive and Inferential Statistics, Probability Theory and Hypothesis Testing
- Machine Learning Specialization | Coursera (Offered by University of Washington) (June-Aug'21)

## POSITIONS OF RESPONSIBILITY

- **Department Placement Coordinator | Placement Team, IIT Bombay** (Aug'21-present)
  - Pitching the skills and projects of SysCon department students to companies of different sectors and domains
  - Smoothly executed the online resume verification processor for **1800+** students as a part of team with **65+** DPCs
  - Mentoring students for resume verification process and conducting 20+ Coding Tests, Aptitude Tests, Buddy Talks and GD's
- **Interview Coordinator, IIT Bombay** (Nov-Dec'20)
  - Coordinated with a team of **250+** members for interviews of **1700+** students
  - Assisted in conducting Tests for **15+** firms and handling student queries
- **Teaching Assistant, SysCon Department, IIT Bombay** (Aug'20- present)

## RELEVANT COURSES

- |   |  |
|---|--|
| • Advanced Process Control                          | • Introduction to Probability and Random Processes |
| • Intelligent Feedback and Control                  | • Optimization                                     |
| • Modelling and Identification of Dynamical Systems | • Systems Theory                                   |
| • Control of Nonlinear Dynamical Systems            | • Applied Predictive Analytics                     |

## SKILLS

- **Languages/Tools/Libraries:** C++, Python, MATLAB, L<sup>A</sup>T<sub>E</sub>X, Scikit-Learn, Tensorflow, Keras, Pytorch