Anshuman Sharma | **203230018**
Systems & Control Engineering | **M.Tech.**
Indian Institute of Technology, Bombay | **Gender: Male**
DOB: 03-10-1997

Examination	University	Institute	Year	CPI / %
Post Graduation	IIT Bombay	IIT Bombay	2022	7.65
Graduation	CSVTU, Bhilai (C.G.)	Bhilai Institute of Technology, Durg(C.G.)	2019	74.74%

Graduation Specialization: Electrical Engineering

SCHOLASTIC ACHIEVEMENTS

- Secured **AIR 269** in **GATE-2020 (Electrical Engineering)** among 93,526 candidates *(2020)*
- Achieved **AA** Grade in **Applied Predictive Analytics** course

MAJOR PROJECT AND SEMINAR

- **M.Tech Project: Predictive Maintenance for Engineering Systems - Study and Applications**
  (Guide: Prof. PSV Nataraj, Systems and Control Engg., IIT Bombay) *(Jun'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 MATLAB
  - Deploying **ML** and **DL** models for Anomaly detection and Condition Monitoring of system
  - Prediction of RUL using Identified models or Specialized RUL Estimator models
  - **Impact:** Developing a **dashboard** for **real-time** machine health monitoring and to plan maintenance in advance for eliminating unplanned downtime
- **M.Tech Seminar :Machine Learning Indoor Localisation using Access point selection (APS) and Signal Strength Reconstruction (SSR)**
  (Guide: Prof. Leena Vachhani, Systems and Control Engg., IIT Bomaby) *(Sept'20 - Dec'20)*
  - Performed literature study on **RSSI** measurement based Indoor Localisation
  - Studied KNN and Support Vector Regression **(SVR)** model with **RBF** kernel for SSR
  - Compared performances of conventional SVR model with SVR model along with Access Point Selection **(APS)** and **SSR**

KEY PROJECTS

- **Control of Continuous Stirred Tank Reactor System (CSTR)** *(Jan'21-May'21)*
  (Guide: Prof. Sachin C Patwardhan) *(Course: Advanced Process Control)*
  - Designed and Implemented various strategies for the control of CSTR system
  - Implemented **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
  - Investigated simulation results of controllers for **servo** and **regulatory** problem of CSTR system
- **Seminar : Offset-Free Hybrid Model Predictive Control of BIS in Anesthesia** *(April'21)*
  (Guide: Prof. Sachin C Patwardhan) *(Course: Advanced Process Control)*
  - Presented an executive summary of application paper on offset-free hybrid model predictive control scheme for closed-loop control of anesthesia using BIS as a clinical effect
  - Studied formulation of non-linear optimal control problem into MIQP problem and presented simulation results of normal hybrid MPC and Offset-free hybrid MPC
- **Modelling and Control of Single Board Multiple Heater System (SBMHS)** *(Jan'21-May'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 using Extended Least Square method
  - Designed **LQOC** and **Linear MPC** for ARMAX Model using State Augmentation appraoch

- **Path Tracking and Control of Wheeled Mobile Robots** *(Jan'21-May'21)*
  (Guide: Prof. Arpita Sinha) *(Course: Systems and Control Lab)*
  - Simulated simplified car like vehicle dynamics using **Bicycle** and **Ackermann** model
  - Implemented motion of vehicle along paths such as **Lissajous figures** and incorporated P and PI controller for position and heading control of vehicle
- **BE Project : Maximum Power Point Tracking of PV system using Fuzzy Logic and PID Controller**
  (Guide : Dr. Archana Gupta, BIT Durg) *(April'18 - May'19)*
  - Simulated intelligence control scheme of **Fuzzy logic** controller for **MPPT** of PV system
  - Achieved better tracking capability in Fuzzy logic controller as compared to PID controller
- **Prediction of Loan Approval Status using Classification Techniques** | *Machine Learning*
  (Self Project) *(June'21)*
  - Applied various ML techniques like **Logistic Regression**, Random Forest, XGBoost on **Kaggle dataset** of **Loan Prediction Problem** and achieved best accuracy of **80%** with Logistic Regression
  - Performed uni-variate, multi-variate analysis and imputation for Exploratory Data Analysis
  - Utilized **GridSearchCV** of Scikit-Learn for hyperparameter tuning
- **Prediction of Air Quality Index (PM 2.5) using Regression techniques** | *Machine Learning*
  (Self Project) *(May'21)*
  - Analyzed underlying trends in AQI based on **Visualization** and **Exploratory Data Analysis**
  - Applied Machine Learning algorithms like **Decision trees, Random Forest, XGBoost** to achieve best **RMSE** of **36.8** $\mu g/m^3$ in XGBoost regressor
  - Used **RandomizedSearchCV** of **Scikit-learn** for hyperparameter tuning of models

RELEVANT COURSES

- Advanced Process Control
- Optimization
- Systems Theory
- Modelling and Identification of Dynamical Systems
- Introduction to Probability & Random Processes
- Intelligent Feedback and Control
- Control of Non-Linear Dynamical Systems
- Applied Predictive Analytics

ONLINE COURSES

- Machine Learning Specialization | Coursera (Offered by University of Washington) *(Jan'21-Aug'21)*
- Deep Learning Specialization | (GUVI)
  Instructor: *Prof. Mitesh Khapra and Prof. Pratyush Kumar,IIT Madras* *(Jan'21-July'2021)*
  FNN, CNN Architectures, Optimization, Sequence Models using PyTorch, Tensorflow, Keras

POSITIONS OF RESPONSIBILITY

- **Company Coordinator** | *Institute Placement Team, IIT Bombay* *(June'21- till date)*
  - Part of a **45+** member team responsible for the placement of **1800+** students from **18** departments in the institute.
  - Targeted **50+** new potential recruiters and currently managing the recruitment process for **45+** companies
  - Coordinated with PMs, DPCs for smooth conduction of the placement process in online mode
- **Interview Coordinator** | *Institute Placement Team, IIT Bombay* *(Dec'20)*
  - Coordinated with 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*

SKILLS

- **Languages:** C, C++, Python
- **Tools/Libraries:** MATLAB, Tableau, LaTeX, PyTorch, Tensorflow, NumPy, Keras, Pandas, Scikit-learn