Aniket Shashikant Adsule | **183106003**
Mechanical Engineering | **M.Tech.**
Indian Institute of Technology, Bombay | **Gender: Male**
Specialization: Manufacturing Engineering | **DOB: 20-12-1994**

Examination	University	Institute	Year	CPI / %
Post Graduation	IIT Bombay	IIT Bombay	2021	9.19
Graduation	Dr BAMU, Aurangabad	MIT, Aurangabad	2017	9.35
Graduation Specialization: Mechanical Engineering				
Intermediate	MSBTE	MIT, Aurangabad	2014	83.16%
Matriculation	Maharashtra State Board	Shri Saraswati Bhuwan, Aurangabad	2011	89.27%

Technical Skills

- **Programming Languages & Databases:** Python, C++, MATLAB, PHP, HTML, CSS, JS, AJAX, SQL, NoSQL, AutoIT
- **Hardware:** Arduino, ESP32, Raspberry Pi, Intel NCS2
- **CAD/CAE Packages:** PTC Creo, Ansys
- **Libraries & Platforms:** OpenCV, TensorFlow Keras, PyTorch, Darknet, Django, AWS

Professional Experience

Machine Intelligence Program *(Project Research Assistant | Dept: IoT and Data Analytics | IIT Bombay)* *[Aug'19 - Present]*

- Leading a team of 7 people with diverse backgrounds - Mechanical, Electronics and CS for ML and IoT based projects
- Mentored 10+ interns for ML, computer vision & IoT projects; Prepared stepwise course content for initial training

Digitization Solution for Gold Assaying & Hallmarking Process to Enhance Credibility & Efficiency *(Industrial Project)*

- Integrated IoT at each process stage, CNN & object detection for surveillance & display reading
- Developed authority wise dashboards with a combination of local server & cloud computing
- Achieved traceability of jewellery using RFID & blockchain with unique hash-code containing metadata

Generic IoT Device & Platform Development *(Research Project)*

- Features: Analog, digital, I2C & SPI sensor communication protocols, on the air update, onboard FFT, local data storage on SD card, RTC, access point to set up a device, GPS, OLED, HTTPS & MQTT communication, 4 treads for simultaneous processing
- Customizable dashboard & analytics engine with machine learning algorithm – MLR, LR, KNN, SVM, Tree-based algorithms

National Centre for Aerospace Innovation and Research *(Research Assistant | Dept: IoT & Data Analytics)* *[Jun'17 - Jul'19]*

Remote, Secure & Real-Time Machine Effectiveness & Status Monitoring Solution, Deployed in HAL, Bengaluru *(Industrial Project)*

- Developed ESP32 based IoT device, firmware for data collection, its conditioning & transmission to the server using HTTPS
- Developed Random Forest Classifier as back-end ML algorithm with cross-validation & hyperparameter tuning
- Developed an interactive dashboard with PHP, HTML Bootstrap, JS & AJAX which generates real-time SMS & email alerts

Furnace Automation with Remote Intelligent Control *(Industrial Project)*

- Developed a cyber-physical system using regression data model & deployed over ESP32 development board
- Implemented IoT solution for real-time monitoring & remote control; Developed an interactive dashboard

M.Tech Research Project

Development & Demonstration of Service-Based Industry 4.0 Architecture with Digital Twin & Analytics
(Guide: Prof. Asim Tewari & Prof. Makarand Kulkarni) *[July'19 - Present]*

- **Objective**: Develop service-based Industry 4.0 architecture to cater the manufacturing ecosystem in achieving interoperability
- **Methodology**:
  - Transform conventional 3-axis CNC milling machine into a smart machine using ZVIE's smart product criteria
  - Develop machine's digital twin for condition-based maintenance & production system's digital twin for optimized scheduling
  - Secure M2M communication with OPC-UA, edge devices & IoT with sensors
  - Demonstrate communication between machine, digital twin, service & product to achieve their own & global objectives
  - Use of Analytics viz. ML, DL, RL & computer vision to achieve overall operations planning
- **Impact**: Transforming existing facilities into a smart factory while achieving overall organizational objective

Machine Learning & Computer Vision Projects

Reinforcement Learning for Optimal Policy Learning in Condition Based Maintenance (CBM)
(Research Project | Guide: Prof. Makarand Kulkarni) *[Oct'19 - Feb'20]*

- Objective: Develop an agent for CBM, which prescribe maintenance action & inspection interval for long term cost optimization
- Modelled multi-objective optimization problem using Semi MDP with 100 states, 4 maintenance actions & 19 inspection intervals
- Developed Reinforcement Learning based Q-learning algorithm (SMART algorithm) to prescribe optimal policy

Personal Protective Equipment (PPE) Conformity Detection using YOLO *(Research Project | Guide: Prof. Asim Tewari)* *[Jan'20 - Jun'20]*

- Objective: To ensure workers wear PPE on the shop floor using real-time application based on YOLO & transfer learning
- Trained YOLO on custom labelled data and achieved 83% mAP with parameter tuning

Machine Learning-Based Image Classification System to Predict Changing Fashion Trends
(Course Project | Machine Learning for Remote Sensing-I | Guide: Prof. Biplab Banerjee) *[Apr'20 - Jun'20]*

- Objective: To classify garment into a full sleeve, half sleeve and ¾th sleeve using ML algorithms
- Utilized OpenCV for image pre-processing like background removal & thresholding; Employed **KNN, SVM, Decision Tree, Gradient Boosting** classifier using **scikit-learn** python libraries along with hyperparameter tuning & cross-validation technique
- Compared their performance using **accuracy, ROC & confusion matrix**; Got the best accuracy of **95%** using KNN

Digital Twin Based on ML Data Model for Electronic Chip Cooling System
(Course Project | Computational Tools for Process Modeling | Guide: Prof. Shyam Karagadde) *[Mar'20 - Jun'20]*

- Objective: To develop a **digital twin** of the processor's cooling system to control cooling parameters in real-time
- Developed physics-based 2D transient heat transfer model using a **finite difference method** (FDM)
- Developed a digital twin using a **regression model** with **0.9919 R^2**, trained on large simulation data generated by the FDM model

Flight Delay Classification Model for the Airport Authorities
(Course Project | Machine Learning for Remote Sensing-I | Guide: Prof. Biplab Banerjee) *[Feb'20 - Mar'20]*

- Performed EDA, one-hot encoding, data engineering, feature selection, hyperparameter tuning & cross-validation
- Developed a Decision Tree Classifier as the best model with **92.5%** accuracy compared to KNN, RBF SVM & Logistic Regression

Industry 4.0, Automation & Social Responsibility Projects

Automatic Internal Thread Inspection Machine – 3rd prize in IMTEX-17, Bengaluru *(Industrial Project | SS Controls)* *[Jun'18 & Jun'16]*

- Achieved **ROI: 642.85%**; Developed a novel method based on monitoring the current data of inspection gauge motor
- Deployed in **Dekson Castings Ltd & Accrete Electromech Pvt Ltd** to inspect respective daily **1500 & 5500** components
- Updates inspection data of each thread using **IoT** and employed **dashboard** for process monitoring

Analytics & IoT Implementation in Powder Coating Plant & Assembly Line *(Industrial Project | SS Controls)* *[Jun'18 - Oct'19]*

- Objective: Achieve **JIT & kitting process, product tracing, OEE calculation & utility monitoring**
- Installed proximity & temperature sensors at powder coating plant & RFID for Job tracking along with **ERP data** integration
- Provided **HMI** to each worker for monitoring & action execution

Economical & Easily Manufacturable Face Shield Development *(Social Responsibility Project)* *[Mar'20 - Apr'20]*

- Designed economical, easily scalable and manufacturable face shield following **WHO guidelines** amid COVID-19 pandemic, which requires simple tailoring equipment & consists only 2 components
- Achieved **3000+ sales** to industries with unit manufacturing cost of **₹ 4.0** whereas **1000+** face shields **donated** to hospital & police

Modular Camera Recording System in Hospital Operation Theatre (OT) for Clinical Training & Legal Evidence
(Course Project | Collaborative Engineering | Guide: Prof. B. Ravi) *[Jan'20 - Jun'20]*

- Analyzed shortcomings of the existing system by attending the live surgery and visiting the manufacturing facility
- **Improved performance of an existing system** with features: compact size, modularity, 180-degree adjustable camera, 10x optical zoom, auto-white balance, rechargeable battery, sterilizable cover, wireless 1080p video transmission
- **Appreciated by doctors** of Nanavati Super Speciality Hospital & Reliance Hospital, Mumbai

Key Courses

- Machine Learning for Remote Sensing-I [AU]
- Foundations of Intelligent and Learning Agents [AU]
- Reliability Modelling & Analysis for Engineering Systems
- Engineering Data Mining and Applications
- Computer Integrated Manufacturing
- Computational Tools for Process Modeling

International Journal Publication

Title: Reinforcement Learning for Optimal Policy Learning in Condition Based Maintenance *['20]*
Status: Provisionally accepted in IET Collaborative Intelligent Manufacturing Journal

Positions of Responsibility

Teaching Assistant *(ME 781 Engineering Data Mining & Applications | Guide: Prof. Vinay Kulkarni)* *[Jan'19 - May'19]*

- Assisted in organizing exams, correction of answer sheets & **mentored 30 student groups** for their course projects

Institute Student Companion *(Institute Student Companion Programme, IIT Bombay)* *[Apr'19 - Arp'20]*

- Got trained from Student Wellness Centre & Gender Cell; **Mentored 8 PG freshmen** on academic & non-academic fronts

Key Achievements

Awards	• **2nd rank at University** in B.Tech Mechanical Engineering *(Dr BAMU University, Aurangabad)* *['17]* • **3rd Prize in IMTEX-2017, Bengaluru** *(Among 70 national-level participants)* *['17]* Project Title: Internal Tread Inspection using IoT • **Best Demonstration Award** in International Conference on Precision, Meso, Micro & Nano Engineering, IITI *['19]* Demonstration Entitled: Condition Based Maintenance Learning using SMART Algorithm	
Certifications	• **Deep Learning Specialization** of 5 courses on Coursera *['20]* • Green Belt - Lean **Six Sigma** Certification *['19]*	• Online Certifications - **Blockchain, Big Data & Computer Vision**
Sports & Travel	• **Gold Medal** in Inter Dept. Kho-Kho Competition, IITB *['19]*	• Hampta pass trekking, (14100 ft Altitude) *['19]* • Love to travel new places

Scholastic achievements and extracurricular activities are not verified by the Placement Cell