M.TECH. RESEARCH

- **Defeaturing of CAD models using Deep Learning**
  (M.Tech. Project, Advisor: Prof. S.S.Pande) *(May'19-till date)*
  - **Objective:** To extract features from CAD model and study its effect on Finite Element Analysis simulation
  - Developing system to generate 10K 3D models with distinct topological features in Python
  - Extracting features from CAD models using concept based **3D Convolution Neural Network**
  - Aiming to reduce simulation computational time using **autoencoder** and **principal component analysis**

- **Application of Machine Learning in CAD/CAM**
  (M.Tech. Seminar, Advisor: Prof. S.S.Pande) *(Jan'19-Apr'19)*
  - Carried out the literature survey of machine learning application in CAD/CAM and explored its implementation
  - Studied research papers proposing applications such as feature recognition, defeaturing of CAD models
  - Explored CNN for analysis of 3D models and inspected key drawbacks present in the implementation

WORK EXPERIENCE & INTERNSHIP

- **CEAT Ltd, Vadodara**
  (Graduate Engineer Trainee) *(Jul'16-Jul'17)*
  - Worked with design and product development team to provide analysis led design solution
  - Increased **productivity by 5%** through implementing projects such as **optimization** of tire and its components
  - Studied the effect of friction on contact patch area and dimensions of tire
  - Hands on experience to do non-linear structural simulation of tire with scripting in **Abaqus** software

- **Ador Welding Ltd, Pune**
  (Internship) *(Nov'14-Dec'14)*
  - Studied the overall business of Ador Welding to evaluate the strategic position of the business brand portfolio and used BCG matrix framework to know its potential

TECHNICAL AND ACADEMIC PROJECTS

- **Machine Learning based Image Classification System to Analyze Changing Fashion Trends**
  (*Course Project, Foundations of Machine Learning, Advisor: Prof. Ganesh Ramakrishnan)* *(Jul'18-Nov'18)*
  - **Objective:** To classify shirts into various classes such as T-shirt, V-neck, Collar T-shirt classes
  - Pre-processing of videos involved face detection and neck region feature to create dataset by using **OpenCV**
  - Developed the shirt classification system using **KNN, SVM, CNN** with **Scikit-learn** and **TensorFlow** libraries
  - Achieved **accuracy of 84%** for all the classes using **AlexNet** architecture as a base framework

- **Development of ML Algorithm for Flood Prediction on Azure Cloud Service**
  (Microsoft Codefundo++) *(July'18-Oct'18)*
  - **Objective:** Designing and deploying Machine Learning workflow (flood prediction) on **Azure Cloud Services**
  - Dataset gleaned from Indian meteorology websites comprised of features like historical rainfall, location & altitude
  - Successfully completed all three stages and implemented web application on Azure Cloud Services

- **Mahindra Rise Driverless Car Challenge**
  (*Innovation Cell, IIT Bombay)* *(Dec'18-Apr'19)*
  - Part of a team of **20 members** aiming to build Self Driving Car; India's **1st** driverless car
  - One of the **11 finalists** out of 259 teams (IV Level) and received a **Mahindra E2O Car** for further development
  - Headed the mechatronics subsystem to design mechanisms to mount LIDAR, Camera on the car
  - Led fabrication of movable mechanism to mount **3D LIDAR** on the car to scan the environment

- **GPU accelerated implemetation of Machine Learning algorithms using CUDA**
  (*Course Project, High Performance Scientific Computing, Advisor: Prof. Shiva Gopalakrishnan)* *(Jan'19-Apr'19)*
  - **Objective:** To implement the parallelization of **k-fold cross validation** for regression and classification on GPU
  - Defined CUDA kernels in C for **Linear Regression** and **Logistic Regression** using Gradient Descent algorithm
  - Achieved speed up of **3.5X** for regression and **2.5X** for classification as compared with serial code

- **Implementation of Neural Network based Classifier**
  (*Course Project, Foundations of Machine Learning, Advisor: Prof. Ganesh Ramakrishnan)* *(July'18-Nov'18)*
  - **Objective:** To implement Deep Neural Network from scratch to classify the Facebook comments into 5 categories
  - Implemented NN architecture using **NumPy, Pandas** library and trained using Back Propagation Algorithm
  - Improved accuracy by using different activation functions along with hyper-parameters tuning

- **Voxelization of 3D model and Cutting Forces Prediction**
  (Course Project, Computer Graphics and Product Modelling, Advisor: Prof. S.S.Pande) *(Jul'18-Nov'18)*
  - **Objective:** To develop voxelization algorithm of 3D CAD model for visualization using **OpenGL**
  - Predicted the cutting forces and material removal rate during machining using voxelized CAD model

- **Kinematic and Dynamic Simulation of Robotic Arm Mechanism**
  (Course Project, Computer-aided simulation of Machines, Advisor: Prof. Anirban Guha) *(Jan'18-Apr'18)*
  - **Objective:** To develop the Model and Simulation of Robotic Arm mechanism using **ADAMS** software
  - Analyzed the theoretical static force analysis of mechanism with the simulated model
  - Achieved **95% accuracy** by comparing the theoretical Kinematic parameters with the simulated model

MAJOR COURSES

- Foundations of Machine Learning
- Engineering Data Mining and Applications (Audit)
- High Performance Scientific Computing
- Robotics
- Computer Graphics and Product Modelling
- Mathematical Methods in Engineering

POSITIONS OF RESPONSIBILITY

- **Teaching Assistant, IIT Bombay** *(Prof. S.S.Pande)*
  - **Computer Graphics and Product Modelling** *(Apr'19-till date)*
    Assisted a diverse batch of Bachelors and Masters to clear their difficulties, also helping the professor in evaluation
  - **Materials Processing and Simulation Laboratory** *(Jul'18-till date)*
    Worked in a team mentoring students, evaluated exams and provided assistance in the course
- **Mentor ITSP, IIT Bombay** *(May'19-July'19)*
  - Guided **8 students** on the topics OCR recognition, handwritten character recognition using **Deep Learning**
  - Provided the basic training of Python and Machine Learning to students
- **Campus Ambassador, InterviewBit** *(May'19-till date)*
  - Organized coding competitions to help students for campus placement preparation

TECHNICAL SKILLS

- **Programming and Scripting Languages:** C++, Python, MATLAB and R
- **Tools and Technologies:** PyTorch, TensorFlow, Keras, Scikit-learn, OpenCV
- **CAD/CAM/CAE Software's:** Abaqus, ANSYS, FreeCAD, SolidWorks

ACHIEVEMENTS & EXTRACURRICULAR ACTIVITIES

- Secured **Gold level** position in the **2019 WorldQuant Challenge** organised by WorldQuant VRC *(2019)*
- Achieved **Rank 1 on Kaggle** among 112 students for Machine Learning Challenge *(2018)*
- Secured **Department Rank 1** among 210 students of UG 2016 batch *(2016)*
- Secured **Department Rank 3** in Diploma of 2012 batch *(2012)*
- Represented IIT Bombay in **Microsoft Codefundo++** and completed all three stages of the competition *(2018)*
- Attended 3 days **GPU** bootcamp using CUDA conducted by **NVIDIA** *(2019)*
- Scored **99.31** percentile in GATE 2018 ME among **194,496** candidates *(2018)*
- Completed **Neural Networks and Deep Learning** course by DeepLearning.ai on Coursera *(2019)*
- Volunteered for **Python Workshop** conducted by PG Academic Council *(2018)*

INTEREST AND HOBBIES

- Swimming, Badminton, Cricket.