Harsh Saiprasad Deshpande | **16D070011**
Electrical Engineering | **UG Third Year (Dual Degree)**
Indian Institute of Technology Bombay | **Male**
Specialization: Microelectronics | **DOB: 05/09/1998**

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2019	0.00
Intermediate/+2	HSC	Thakur Vidya Mandir High School and Junior College	2016	94.00
Matriculation	ICSE	Thakur International School	2014	96.83

Scholastic Achievements

- Ranked **3rd** in Electrical Engineering Dual Degree Department amongst a total of 69 students *(2018)*
- Pursuing a **Minor** in **Computer Science** with a minor CPI of 10.00 *(2018)*
- Awarded **AP** grade for excellent performance in **Electronic Devices Lab** (rank 1 out of 139 students) *(2017)*
- Secured **All India Rank 474** in **IIT JEE-Advanced Examination** among 150,000 candidates *(2016)*
- Bagged **All India Rank 458** in **JEE Mains** among 1.3 million candidates *(2016)*
- Bestowed with the prestigious **KVPY Fellowship** by DST, Govt. of India with **All India Rank 106** *(2016)*
- Awarded **Certificate of Merit** for being placed in the **Top 1 percent** students amongst 44,032 candidates at national level in NSEP conducted by IAPT *(2016)*
- Recepient of **National Talent Search Examination(NTSE)** Fellowship by NCERT, Govt of India *(2014)*
- Awarded **Silver Medal** in **Dr. Homi Bhabha Bal Vaidnyanik** Science Talent Search Competition and **MOM Junior Science Olympiad** organized by Maharashtra Olympiad Movement *(2014)*
- Bagged **11th rank** in Mathematics Olympiad conducted by IIT Bombay *(2013)*

Internships

Parametric Time Dependent Entropy of EEG *(May 2018 - July 2018)*
Prof. Anastasios Bezerianos | Cognitive Engineering, SINAPSE ***National University of Singapore***

- Developed and implemented algorithms in Python to calculate and analyze four distinct **Parametric Time-Dependent Entropies (TDE)** of an EEG (Electroencephalogram) signal
- Designed an algorithm using Time-Dependent Entropy to perform **real-time mental fatigue monitoring**
- Applied Support Vector Machine(SVM) to classify **Cognitive Fatigue** and **Mental Workload** achieving **75%** and **82%** classification accuracy respectively
- Developed a **Graphical User Interface** in Qt framework for projection of the aforementioned results

Projects

Mars Rover Project *(October 2017 - Present)*
(Part of a team which represented India at the international finals of University Rover Challenge(Utah, USA) in 2018 and bagged 31st position out of 95 participating teams worldwide)

- Implemented **Inverse Kinematics algorithm** for closed-loop control of the 6 DoF robotic arm, with **visual pose estimation** on RViz via URDF model using encoder feedbacks to aid remote operation
- Conceptualised onboard sensor fusing of GPS and IMU via **Kalman Filter** for robust localisation of the rover
- Responsible for integration of a Battery Management System with **Active Cell Balancing**

Autonomous Bipedal Robot with Object Tracking *(May 2017 - June 2017)*
Institute Technical Summer Project *Students Technical Activities Body, IIT Bombay*

- Designed a **Bipedal robot** to mimic the **human walk** and capable of recognizing & following objects
- Implemented Control Protocol using **RaspberryPi 3** and designed an algorithm to recognise spherical objects
- Incorporated servo motors to provide the bot with **two degrees of freedom** to mimic the human walk
- Used RaspberryPi camera along with **OpenCV 3.2** library to process video input and track the object

Cryptography and RSA Encryption-Decryption *October 2017 - November 2017*
Guide: Prof. Bernard L. Menezes | Course Project *IIT Bombay*

- Developed a **BigInteger** class to perform arithmetic and modular exponentiation operations on large numbers
- Designed an algorithm to compute the **modular inverse** and solve the **discrete logarithm** problem
- Implemented an algorithm to generate public-private key pair in **RSA encryption-decryption**

Semiconductor Device Parameter Extraction *(November 2017- March 2018)*
Prof. M. B. Patil | Electrical Engineering Department *IIT Bombay*

- Conducted a literary survey of variation in values of parameters of the **SPICE model of a bipolar junction transistor BC547** affect its device charecteristics and how they can be tweaked to obtain desirable features
- Developed an iterative method based on **Particle Swarm Optimization** to **determine parameters of the transistor** from device charecteristics accurately and in a **short convergence time**

Touchless Gesture Recognition *(March 2018 - May 2018)*
Prof. Siddharth Tallur | Course Project *IIT Bombay*

- Bestowed with **Best Project Award** among 70+ projects
- Designed and implemented a Touch-less gesture Audio **volume controller**, **Motion tracker** (using an LED matrix) and a Gesture **pattern lock** using **Infrared Emitters and Sensors**
- Used **Altera Quartus** to code in **VHDL** and **Krypton CPLD** board to implement digital logic.

Fastest Finger First Indicator (FFFI) *(March 2017 - April 2017)*
Prof. M.B.Patil | Course Project *IIT Bombay*

- Designed a **Quiz Buzzer** through an electronic circuit that determines as to which of the four contestants pressed the button first, locking the entries of the other three members
- Framed the logic to use the input from IC 7475 to produce **latch-disabling signal** using circuitry comprising of dual 4-input NAND gates of IC 7420
- Used **coupling logic** to display corresponding number on the 7-segment display (using IC 7447)

Reaction Game *(March 2018 - April 2018)*
Prof Madhav P Desai | Course Project *IIT Bombay*

- Designed a game (on the Krypton FPGA board) which displayed the accumulated reaction time of a person to a **randomly blinking LED**, which blinked a fixed number of times.
- Generated RTL and Gate Level simulations using Altera Quartus software and implemented the design in the **Krypton CLPD card** programmed using JTAG to perform the digital logic
- Used various concepts of registers, flip-flops, finite-state machines, etc in **structural VHDL** coding and also generated a **pseudo-random number** for the LED to blink after a random time
- Interfaced the design with the LCD controller to display the final time on the LCD pane

Technical Skills

Programming	C++, C, Python, Java, Arduino
Web Development	HTML, CSS, JavaScript, PHP
Software packages	MATLAB, Gnuplot, Git, AutoCAD, SolidWorks, Ngspice, LaTeX

Positions of Responsibility

Hostel Web and Computer Secretary *(August 2017 - May 2018)*
Hostel 5 *IIT Bombay*

- Administered and updated the Hostel Website with respect to hostel events, activities, festivals and mess
- Responsible for maintaining and updating hostel computer systems and networks
- Administered the hostel LAN and address network related issues faced by hostel inmates

Courses Undertaken

Core Courses	Microprocessors*, EM waves*,Communication Systems*, Control Systems**, Digital Signal Processing **,Microelectronics, Electronic Devices and Circuits, Signals and Systems, Analog Circuits, Digital Systems, Electrical Machines and Power Electronics
CS and Maths	Introduction to Machine Learning *, Data Structures and Algorithms,Computer Networks, Calculus, Complex Analysis, Probability and Random Processes *
Others	Quantum Physics and Application, Moral and Political Philosophy , Psychology

**to be completed by November 2018*
***to be completed by April 2019*

Extracurriculars

- Volunteered for the **Green Campus initiative** of National Service Scheme(NSS),IIT Bombay *(2016)*
- Bagged **2nd place** at Vigyasa, an Inter-College general knowledge quiz *(2015)*
- Cleared Elementary Drawing Examination organised by the Government of Maharashtra *(2010)*
- Maharashtra **State Champion** in Abacus Mental Arithmetic Exam oraganised by UCMAS *(2008)*