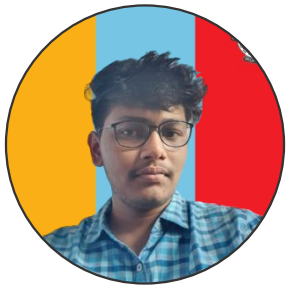
# Jash **Shah**


Embedded Systems · Robotics · AI-ML · Blockchain · Electronics

*Ram Bhavan, BITS Pilani, Rajasthan, India - 333031*

(+91) 98258-46159 | jashshah0801@gmail.com | Jash-2000.github.io/Jash-Shah.me | Jash-2000 | jash-shah-98ab171a0


*"The best way to predict the Future is to Invent it."*



## Education

**BITS Pilani (Birla Institute of Technology and Science, Pilani)** — *Pilani, Rajasthan, India*

B.E.(Hons.) in Electronics and Instrumentation Engineering — *Aug. 2018 - May. 2022*

- Among top 15% of Indian students with a BITSAT score of 325/450
- Among top 10% in the department with overall CGPA of 7.7/10

**Shiv Ashish Higher Secondary School** — *Ahmadabad, Gujarat, India*

Higher Secondary Education — *March. 2017 - May. 2018*

- Scored 96.2% (PCM) in class 12 National Examination affiliated by the Central Board of Secondary Education (CBSE)
- Major in Physics, Mathematics and Chemistry

**Nirma Vidyavihar** — *Ahmadabad, Gujarat, India*

Secondary Education — *March. 2015 - May. 2016*

- Recieved the certificate of excellence for scoring 10/10 CGPA in 10th Grade, by the Indian Central Board of Secondary Education (CBSE)

## Relevant Courses

### Electronics and Embedded Systems

Microprocessor Interfacing, Network Programming, Control Systems, Sensors and Transducers, Digital Design, Analog and Digital VLSI, Electro-Mechanical Machines, Signal analysis, Electronic devices and Micro Electronic Circuits, Embedded OS, Electrical Science.

### Computer Science

Artificial Intelligence and Intelligent Algorithms, Natural Language Processing, Computer Vision, Computer Programming, Computer Networks, OS kernel programming, Data Structures.

### Mathematics

Advance Optimization Techniques, Probability and Statistics, Algebra and Matrices, Advance Calculus, Higher Order Differential Equations, Cryptography, Mathematical Problem Solving.

## Skills

| | |
|---|---|
| **Programming languages** | Python, Embedded C, C++, C#, Java, Assembly language, Node.js, Bash, Latex |
| **Platforms / Frameworks** | MATLAB, FreeRTOS, CubeMX,Hyperledger, Unity, Keras - Tensorflow, Pandas,OpenCV, Fusion360, NetworkX, Github |
| **HDL and EDA tools** | Verilog, LTSpice, Proteus, Cadence,Microwind, NI Multi Sim, KiCAD, EagleCAD |
| **Hardware skills** | Rasberry Pi, Arduino, Xilinx FPGA, STM32, Engineering Mechanics |
| **OS** | Windows, ROS, UNIX and GNU/Linux, Kali Linux |
| **Languages** | English, Hindi, Gujarati, Sanskrit |

## Experience

**Inspired Karters - Formula Student** — *Pilani, Rajasthan, India*

Head - R&D dept.( Embedded System Design) — *Nov. 2018 - Present*

- Started off with a junior engineer in 2018, got promoted to Electronics Specialist in 2019 and am currently the responsible for designing the Control and Coordination, and Firmware for an Electric Vehicle. I was among the founding member of EV sub section under Inspired Karters.
- Previously, I simulated all the Electronics of the car including safety, control, and management (Battery) circuits using KI CAD and Multi Sim.
- Currently, responsible for designing Drive Control Module and Touch Screen display using STM32 board and integrating the same in a CAN controlled network. I also developed an additional application layer protocol for tackling starvation issues.
- Working with off the shelf Kvaser Memorator and extending its functionality by adding customized firmware for over the air updates.
- Integrated IMUs with inbuilt Kalman Filters and GPS for effective road data acquisition. This is used for real time fuel efficiency determination.

### Silvertouch Technologies Pvt. Ltd.

*Ahmadabad, Gujarat, India*

Research Intern — *May. 2020 - Aug. 2020*

- Worked for developing a high accuracy Facial demographics module that can be used in Real-World situations and developing an algorithm to use it as an Song Prediction system for Cafes/Bars.
- My tasks included experimenting with high level algorithms in Digital Image Processing. SVM and Random forest based unique hybrid ensambled model was developed with for age regression and Gender classification.
- Real world errors were reduced using measures like PSNR and Noise - Contrast Trade-offs.
- This model was used to develop an active learning based model to predict the Songs based on Age and Gender features of members present in the Cafe/Bar.
- Iot based APIs were also developed for communicating with the MQTT controlled media player. A Web based prototype was also created using Python based wrapper of Flask.

### Acyte Robotics - Center for Robotics and Intelligent Systems

*Pilani, Rajasthan, India*

Trainee — *Aug. 2018 - Dec. 2018*

- Was one of the top 8 people who got selected for this training, from entire freshers batch of 2018, comprising of 1500+ students.
- Did a literature review on Inverse Kinematics, Fourier Transforms, Potential Field approach and Genetic Algorithm.
- Built a USB to TTL Hardware driver from scratch. The PCB was designed on Eagle CAD.
- Partially designed the CAD design of robotic arm manipulator for a humanoid bot, having 5 DOF, on Fusion 360
- Developed "Chess move verifying" module for automatic chess playing bot, that was in the development phase.

## Relevant Projects

### RISC-V based Drone Driver

*Dr. Pramod Kumar Tanwar*

Centre for Electronics Engineering and Research Institute ( CSIR-CEERI) — *Present*

- This is an ongoing project, where we are aiming to build a stand alone drone driver with inbuilt IMUs, GPS and balancing capabilities using Indian origin RISC-V microprocessor - "Shakti".
- Currently in the configuration stage of bootloader installation and the peripheral configuration on Xilinx FPGA board.
- It is planned to be kept as an open source and initiate an community of Indian developers and experts, similar to that of Arduino.

### Lunar Lander Game using Reinforcement learning

*Coursera, University of Alberta*

Reinforcement Learning Specialization — *Sept.2020*

- Implemented Neural network based action-value pair using Softmax action selection.
- Coded the Adam algorithm as optimization technique.
- Successfully automated the Lunar Lander game, taking the drone as the agent and the game play as the environment.

### Autonomous Stair Climbing Robot

*Online*

Flipkart Grid Robotics 2.0 — *July.2020*

- Implemented a semi-automatic, robust robotic cart , capable of lifting 4-5 kg of weight, up and down the stairs.
- The entire control system was developed using Rasberry PI3, aided with ultrasonic and camera sensors and motors and actuators.
- The system was simulated using ROS based Gazebo simulator.
- YoloV3 based stair detection and classification, along with centre-point localising control logic was implemented using Fuzzy PID control. The bot could sense the environment to search for stairs, and even sense accent/descent, automatically.
- The bot was intelligent enough to make way for elderly and children. It also raised an alarm in case of theft.
- Extendable hand actuators could carry even large sized parcels, making it market ready.

### Speech to Image generator of Facial expressions

*Stanford Online*

Deeplearning.AI — *May.2020*

- Applied attention based sequence model for detecting certain words in audio.
- Used DeepFake and DCGAN with Keras API to generate image of the trigger word detected.
- Used Vision based sentimental analysis to aid the GAN network to generate the correct facial expression.

### Self Driving Car Simulation model

*Coursera, University of Torronto*

Self-Driving Car Specialization — *Jun.2020*

- Successfully implemented a longitudinal and lateral vehicle controller for CARLA simulator.
- Simulated the Lidar and GPS controlled ES-EKF(Error State Extended Kalman Filter) to localize the car position.
- Provided Visual perception to the car using segmented Neural networks to detect the lane and obstacles in 2-D as well as 3-D.

### Intelligent Micromouse using Genetic algorithm

IEEE Student Section — *Jan.2020*

- Successfully implemented a fully automatic high speed Micromouose capable of solving the IEEE micromouse maze.
- The bot was developed using Omni wheels, Ultrasonic sound sensors,and powered by Arduino controller.
- Implemented the maze solving using modified flood fill algorithm and optimized using Genetic algorithm.
- Created a dummy software simulator using Python, for simulating the path planning algorithm.

### Development of clock synchronous ALU

*Proff. Pawan.K Ajmera*

Digital Design Laboratory — *Nov.2019*

- Designed the Arthimetic Logic unit, imitating 74181 IC.
- Used basic components like shift registers, MUX-DeMUX, and basic gates.
- FSM based designed to make the unit clock synchronous.
- Verified the circuit on Verilog.

### E-voting System using Blockchain

*Online*

Self *Dec.2018*

- Developed a dummy blockchain using JAVA.
- Developed a Web based e-voting application and ran successful simulations on my self built network.
- Shifted to Etherium network using Truffle framework. The entire application was built using Node.JS.
- The application was capable of successfully conducting unhampered and unbiased elections. An additional consensus algorithm gave the results in real time.

## Achievements

| | | |
|---|---|---|
| 2020 | **Formula Bharat 2020 Concept Design Challenge,** International Winner | *India* |
| 2020 | **Flipkart Grid Robotics 2.0,** Part of India's top 20 teams out of 150 shortlisted | *Online* |
| 2018 | **Joint Entrance Examination(JEE),** All India Rank 3426 among 1.6 million candidates | *India* |
| 2009 | **The Malaysia Book of Records,** Received ORDINARY GRADE 11 in the International Standard of ABACUS COMPUTATION competition | *Malaysia* |

## Workshops

### Electric Vehicle Conference

*Online*

Orator *Aug. 2020*

- Presented my work in Control and Coordination system of an Electric Vehicle.
- Explained the basic components and their working, that are required for building the embedded system. This included detailed discussion of Networking Protocol(CAN in detail), Motor drivers and Motor Controller, Battery Management Systems, Data Acquisition unit, Drive Control Module and other control circuits.
- Mentioned about recent advancements in the sector like Regenerative Braking, Over the air updates and Kalman filtering for efficiency analysis.

### Machine Learning Synopsis

*Pilani, India*

Facilitator and Speaker *Oct.2019*

- Organized the event under IEEE, for bringing together all the ML enthusiast and create a platform for them to exchange their ideas.
- Guided a group of freshers to develop their first ever ML project.

### CES Asia 2019

*Shanghai, China*

Industry Atendee *May. 2019*

- Attended the CES Asia, to gain industrial exposure and learn about recent developments in the Technological Sectors.
- Built my network with various Swiss based startup groups and research giants.
- Part of various launch events and keynote speeches, including that of Huwaii 5G and concept cars by Mercedes Benz and AUDI.

## Position of Responsibility

### Teaching Assistant

*Pilani, India*

Digital Design Lab *Aug.2020 - Present*

- Assist professor during Digital Design sessions
- Helped Students in doubt clarification during Labs and theory lectures
- Frame questions for tests.

### Executive Committee Member

*Pilani, India*

IEEE Student Chapter BITS Pilani *Aug.2020 - Present*

- Member of executive committee as Apogee and Oasis Co-ordinator which are official Technical and Cultural fests of BITS Pilani with collective footfall of over 3000+ students.
- Lead and manage all the IEEE organized events and their funding, which includes RoboSoccer, Micromouse, CodeHunter 2.0, Arduinox. The budget involves transactions of over 30k - 40k INR
- ML - SIG head and Senior member in Electronics SIG.
- Founder - member of IEEE Women in Engineering Sub section, that aims to empower woman's role in engineering and innovation. Several project funds are granted for the same.

### Student Faculty Council

*Pilani, India*

Electronics and Electrical Dept. BITS Pilani *Aug 2019 - Dec 2019*

- I was student representative of SFC, which is a collective body of the department HOD, top professors and selective students, with the sole aim to enhance the research environment
- My role was to suggest solutions to various problems like suggesting effective tools and software that can be used for Online Teaching
- Council's role included effective collaboration and communication of views of all the students and alumni, and taking these views to staff to bring about positive change in the teaching practices and keeping the course content updated