Nitish Vikas **Deshpande**

Junior Undergraduate Student

Indian Institute of Technology, Kanpur · Electrical Engineering

(+91) 9769839971 | nitishvd@iitk.ac.in | home.iitk.ac.in/ nitishvd/ | NitishVikasDeshpande | nitishvdeshpande

Education

Indian Institute of Technology, Kanpur — *Kanpur, India*

Bachelor of Technology, Major in Electrical Engineering — *July 2017 - PRESENT*

- C.G.P.A of **9.1/10** at the end of 4th semester

R.W.J.C College — *Mumbai, India*

HSC 12th STD — *July 2015 - April 2017*

- Scored 94 % in Science Stream with Electrical Maintenance as vocational subject

S.E.S High School — *Mumbai, India*

SSC 10th STD — *2005 - 2015*

- Scored 96 %, School Topper

Research Interest

Signal Processing and Communication, Machine learning, Music Information Retrieval, Natural Language Processing, Robotics and Automation, Reinforcement learning

Honors & Awards

International

2019	**3rd Place**, IEEE International Conference on Robotics and Automation, Robomaster AI Challenge	*Montreal, Canada*

Domestic

2019	**SURGE scholarship awardee**, Students-Undergraduate Research Graduate Excellence, IITK	*Kanpur, India*
2019	**Best Research and Development project**, for the project "Through the wall human tracking" among 45+ projects in Science and Technology Council, Students' Gymkhana, IITK	*Kanpur, India*
2019 & 2018	**Academic Excellence Award**, Awarded to top 10% of the batch for distinguished **Academic Performance** in IITK	*Kanpur, India*
2018	**2nd Award**, for the research problem statement of **"Television Audience Measurement"** by **BARC INDIA** in the 7th INTER IIT Tech Meet held at IITB	*Mumbai, India*
2017	**All India Rank 656**, Joint Entrance Exam, Advanced, 2,50,000 candidates	*India*
2017	**All India Rank 1621**, Joint Entrance Exam, Mains, 1.4 million candidates	*India*
2016	**KVPY Scholarship Awardee**, Indian Institute of Science and Government of India	*Banglore, India*
2015	**Regional Mathematics Olympiad**, Homi Bhabha Centre for Science Education, Tata Institute of Fundamental Research	*Mumbai, India*
2014	**INSPIRE Scholarship Awardee**, Department of Science and Technology, Government of India	*Mumbai, India*

Projects

Score Following: Audio to Score Alignment — *IITK, Kanpur, India*

SURGE 2019 project under guidance of **Prof. Vipul Arora** (Music Information Retrieval lab) — *May.2019 - July. 2019*

- Developed a score following system which uses state-of-the-art techniques like using **convolutional gated auto-encoders** for feature extraction and variants of **Dynamic Time Warping** like ShapeDTW and FastDTW for alignment of performance audio to score MIDI
- The system after evaluation on the 10 songs of Bach10 collection reports median deviation in the range of 20ms-40ms

Development of autonomous robots for AI based warfare

IITK, Kanpur, India

Member of Equipe de Robotique Autonome (ERA-IITK) under guidance of **Prof. Laxmidhar Behera**

(Intelligent Systems and Controls Laboratory)

Sept.2018 - Present

- Formulated the 3 minute game as a **reinforcement learning problem** consisting of an **agent** which can shoot in a span of 180° and move based on a mecanum wheel system; an **environment** consisting of obstacles, enemy with similar capabilities as our agent, bonus zone and projectile supply zone; with **states** as Health Points and time left; the **rewards** as number of successful shots on the enemy; the **action space** consisting of firing speed, direction as well as the chassis speed, direction. Simulations of game done using **PyGame**. Algorithms like ***Actor-Critic*** were used.
- **First Indian Team** from IITK to qualify for the competition held at Montreal, Canada

WiTrack: Through the wall human tracking

IITK, Kanpur, India

Electronics Club project under guidance of **Prof. A R Harish** (Microwave lab)

May.2019 - July. 2019

- Mentored a team of **9 second year UG students** who implemented a **Frequency Modulated Carrier Wave RADAR** capable of tracking human beings over a distance of 3m in presence of a solid obstacle between the walking human and the antenna pair
- Won the **best RnD project** award

Television Audience Measurement

Mumbai, India

Collaboration with Broadcast Audience Research Council under guidance of **Dr. Sumit Chowdhury**

Dec. 2018 - Exp. Aug. 2019

- Implemented a non intrusive real time room occupancy estimation system using a single **PIR sensor**
- Implemented a speaker recognition system using **MFCC features and Gaussian Mixture Model**
- Used Audio fingerprinting, Remote IR decoder and Speech-to-text modules for automatic recognition of channels played on television

FPGA based Real Time Image Convolution

IITK, Kanpur, India

Project under Electronics Club, SnT council

May. 2018 - July. 2018

- Implemented single convolution filters like sobel filter on real time video data on Virtex 5 board after performing simulations on Xilinx ISE.
- Designed a data pipeline for the convolutional filter using **FIFO** (First In First Out) data structure in **VHDL** language.

Extracurricular Activity

Electronics Club, Science and Technology Council, Students' Gymkhana

IITK, Kanpur, India

Coordinator and Core Team Member

March. 2019 - PRESENT

- Working in a team of **4 coordinators and 25 secretaries** managing and maintaining Electronics Club, a hub of electronics activities and projects with annual budget of **1.5L**
- Envision, plan and organize institute wide lectures, workshops, hackathons for electronics enthusiasts, mentoring project teams and representing the club in national level competitions like INTER IIT Tech Meet
- Organized Institute wide lecture on **"Machine Learning for Signal Processing"** with demo of live training and testing of speaker recognition system
- Initiative of collaborating with faculty members and PhD students of Electrical Engineering Department for club projects

Counselling Service, IITK

Kanpur, India

Student Guide and Academic Mentor

July 2018 - LIFE LONG

- Assisted **4 first year students** academically as well as emotionally, ensuring the smooth transition to college life
- Helped in smooth conduction of Orientation Session for the incoming batch consisting of 900 students
- Mentored academically weak students in the 1st year Institute Core Physics Course on Mechanics.

Relevant Courses

* ongoing

Signals, Systems and Networks	Probability and Statistics	Differential Equations(ODE & PDE)	Micro-Electronics(BJT & MOSFET)	Data Structure and Algorithms	Machine Learning for Signal Processing*
Linear Algebra	Control Systems	Communication Systems*	Power Systems*	Digital Electronics*	Complex & Real Analysis

Skills

Languages	Python, C/C++, Verilog, VHDL
Software	Octave, Xilinx ISE, Arduino IDE, LabView, Proteus, ROS, LaTeX
Hardware	FPGA, micro-controllers boards like arduino/NodeMCU, Single Board Computers like Rpi, IOT boards like ESP, USRP software defined radio