

Pranav Deshpande | Curriculum Vitae

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"Strength is Life, Weakness is Death!" - Swami Vivekananda

Education

Indian Institute of Technology

Masters of Technology, CGPA – 8.3

Electronics and Communication

Bhubaneswar

2013–2015

University of Mumbai

Bachelor of Engineering, Percentage – 66.39

Electronics Engineering

Mumbai

2006–2010

Skills

Domain

Signals: Digital Signal Analysis and Processing (Motion Sensors, Basic Biomedical and Audio Signal Processing, Basic Image Processing), Sensor Fusion (IMU)

Filtering: Digital filter design (IIR, FIR), Filter Banks, Adaptive Filtering

Data Science: Feature Extraction, Basics of Machine Learning, Soft and Evolutionary Computing

Tools

MATLAB: Code conversion (Coder), Simulation and Scripting with Toolboxes: Signal Processing, DSP System, Statistics and Machine Learning, etc.

Python: Basic of NumPy, SciPy, pandas, matplotlib, OpenCV, scikit-learn, TensorFlow (Keras)

C/C++: Mainly worked with C for Signal Processing Algorithm Development, Sensor Library Integration, Basic openCV, CMSIS DSP etc. Basic level competency in C++

Hardware: Basics of STM32F407 Discovery Board, Arduino UNO, Raspberry Pi 3 etc.

Others: Basics of Shell Scripting, GNU Make, SQLite, Jenkins, Git, \LaTeX , scrum practices, Ubuntu and Microsoft Windows.

Professional Experience

Industrial.....

AMD India Pvt. Ltd.

Member of Technical Staff Software System Design Engineer

Serving as an Algorithm Developer.

Bengaluru

Mar 2022–Dec 2024

KEY RESULT AREA: Algorithm development for AMD Sensor Fusion Hub Library

- Provided Algorithm solution for
 - Hand Gesture Detection using ToF Array Sensors for Laptop usecase.
 - Laptop state detection, viz. on table, on lap, in bag etc with only accelerometer sensor.
 - Laptop Mode detection, viz. book, tent, tablet etc. using two accelerometers.
 - Laptop Screen Orientation Detection using single accelerometer.
- **Designed signal pre-processing modules**, viz. offset removal and noise filtering for accelerometer, gyroscope and distance sensors.
- Designed and executed POC for Laptop device state detection, viz. on table, on lap, in bag etc..
- Wrote software in MATLAB and Python scripts to develop simulators for Sensor Fusion Library. Also implemented C codes for same.
- Trained Machine Learning Models for hand gesture detection using ToF Sensor for laptop mouse such as scroll, click etc.
- Integrated third party sensor libraries on AMD's platform.
- **Innovation**
 - Presented a conference paper at AMD's Internal GTAC 2023 Conference.
 - Presented a poster at at AMD's Internal AATC 2023 Conference.
 - Submitted 3 innovation reports which are under scrutiny of AMD's patent team.
 - Submitted papers and research work at AMD's iExpo, AATC 2023, 2024 platforms.
- Lead and mentored a team of two Juniors.
- Improved software development cycle process by incorporating automation (Python) such as BIOS creation, SW release etc. This reduced time consuming manual process and improved entire team's efficiency.

Tektronix India Pvt. Ltd.

Software Engineer

Served as a Software Developer for PCIe team.

Bengaluru

Sept 2021–Mar 2022

Brigisha Technologies Pvt. Ltd.**Bengaluru***Associate Research Engineer**Sept 2017–Sept 2021*

Serving as an Algorithm Developer at client location, i.e. Robert Bosch Engineering and Business Solutions Pvt. Ltd. (RBEI), Coimbatore.

KEY RESULT AREA: Algorithm development for Sensor Fusion Library

- Provided innovative algorithm solution for
 - Laptop Gesture and state detection with only accelerometer sensor. (Two Indian **patents** published.)
 - FlipCam and FastFlash gestures detection with only accelerometer sensor. (Indian **patent** published.)
 - 9DoF based heading angle error reduction under slowly varying magnetic field. (Indian **patent** published.)
 - Temperature compensated gyroscope bias estimation.(Submitted to RBEI IP Dept.)
- **Developed automated MATLAB framework to convert trained keras CNN model into c code convertible MATLAB code.**
- **Designed signal pre-processing modules**, viz. offset removal and noise filtering for accelerometer, gyroscope and pressure sensors. Specified signal and noise characteristics for different applications, viz. cars, drones and robots.
- Done fine tuning of **sensor fusion algorithms** such as Kalman filters, Mahony filters.
- Wrote Python script for fitting a curve to gyroscope bias vs. temperature characteristics using **Linear Regression**.
- **Designed Kalman Filter state model** for online estimation of temperature coefficient of gyroscope sensor offsets (TCO).
- Developed harsh acceleration and sudden braking detection algorithm for driving quality assessment.
- Wrote scikit-learn based Python scripts for motion activity and event classification.
- Wrote software in MATLAB and Python scripts to develop simulators for Motion Sensor Library. Also implemented C codes for same.
- Trained CNN for hand gesture detection for video conferencing application
- Developed PoC for facial landmark based speech activity detection from video stream using MediaPipe.

Atreya Innovations Pvt. Ltd.**Pune***Research Scientist**Nov 2016– Aug 2017*

Had an experience of **10 months**. Primarily worked on the development of multi-modal signal analysis framework, i.e. Naadi (the Radial Artery Pulse), Voice and Image of the subject, for Naadi and other Parikshas (Pulse based Diagnosis in Ayurveda). For this, we interacted with a team of Ayurvedic Doctors. The main tasks include data collection (, i.e. Pulse signals, Face and tongue images, voice) at medical camps and analyzing them by feature extraction and machine learning algorithms.

KEY RESULT AREA: Multi-modal signal based Health Analysis: Machine Learning Approach

- Done literature survey on multi-modal signal analysis (, viz. radial artery pulse signals (*Naadi*), voice samples, face and tongue images) for health (*Prakruti*) diagnosis.
- Provided technical specifications and rules for data quality for creating database with voice and image samples.
- Implemented MATLAB software for signal conditioning and pre-processing modules for voice and pulse signals data.
- Implemented MATLAB software for voice activity detection algorithm.
- Wrote Python script for extracting voice specific features, viz. MFCC, time and frequency domain features.
- Wrote MATLAB scripts for time domain, frequency domain and geometric feature extraction for pulse rate variability analysis.
- Wrote Python scripts for different supervised and unsupervised machine learning algorithms with scikit-learn library for data classification using multi-modal signal features.
- Set up regression model to establish relation between of Ayurvedic definitions and voice and pulse specific features.
- Guided two intern M.Sc. projects related with pulse parameter and rate variability with machine learning approach.

Academic Research.....

Indian Institute of Technology

Bhubaneswar

Research Scholar

2013–2016

Had around **03 years** of research experience while working as a M. Tech. scholar and Ph.D. scholar at IIT Bhubaneswar. Published one conference and two journals. Explored areas like stochastic signal modeling, speech and biomedical signal processing and analysis, Image processing.

Teaching.....

Teaching Assistant and Lecturer

2010–2016

Had around **05 years** teaching experience and taught subjects like signal processing, microprocessors and analog circuit design.

Extra Certifications

- 1: **TensorFlow in Practice Specialization** by Laurence Moroney, deeplearning.ai, on Coursera, (<https://www.coursera.org/account/accomplishments/specialization/certificate/DRE9N5W8K3GV>)
- 2: **Deep Learning Specialization** by Andrew Ng, deeplearning.ai, on Coursera, (<https://www.coursera.org/account/accomplishments/specialization/certificate/K3AVXND549SD>)
- 3: **Machine Learning** by Andrew Ng, Stanford University on Coursera, (<https://www.coursera.org/account/accomplishments/verify/JBRXBMHC86RY>)

Patents and Publications

Patents.....

- 1: **INA 202241037881** , "A POWER CONTROL APPARATUS AND A POWER CONTROL METHOD FOR A MOBILE DEVICE ", Jan 5, 2024.
- 2: **INA 202141027914** , "A LAPTOP POSITION DETECTION SYSTEM ", Dec 30, 2022
- 3: **INA 201941053086** , "A SYSTEM AND METHOD FOR DETECTING GESTURES USING ACCELEROMETER", Jun 25, 2021
- 4: **INA 201841040798** , "A METHOD OF FILTERING STATIC MAGNETIC FIELD DISTORTION DURING CALCULATION OF HEADING ANGLE", May 1, 2020.

International Journals.....

- 1: **Pranav S. Deshpande** and M. S. Manikandan, "Effective Glottal Instant Detection and Electroglottographic Parameter Extraction for Automated Voice Pathology Assessment", *IEEE J. Biomed. Health Inform.*, vol.PP, no.99, pp.1-1, Jan 2017.
- 2: **Pranav S. Deshpande** and M. S. Manikandan, "Glottal Opening Instants Detection from Speech Signals Using Variational Mode Decomposition", *IEEE Trans. Instrum. Meas.*, (To be submitted), 2018.
- 3: M. S. Manikandan, B. Ramkumar, **Pranav S. Deshpande**, T. Choudhary, "Robust Detection of Premature Ventricular Contractions Using Sparse Signal Decomposition and Temporal Features", *IET Healthcare Technology Letters*, vol.2, no.6, pp.141-148, Nov 2015.

International Conference.....

- 1: **Pranav S. Deshpande** and Kashif M.S., "Enabling Touchless Control using Gesture Detection derived from Time of Flight (ToF) non-camera Sensor using INH algorithm", in *4th Annual AMD Global Technical Authors Conference (GTAC '23)* , Dec. 2023

2: **Pranav S. Deshpande** and M. S. Manikandan, "Improving Accuracy of Glottal Closure Instant Detection Methods in Nonstationary Noise", in *Proc. IEEE Int. Conf. on Signal Processing and Integrated Networks (SPIN-2015)*, Feb. 2015

Professional Awards

- 1: AMD Innovation Expo 2024 Honorary Award
- 2: AMD Director's spotlight award for Q4 2024
- 3: AMD spotlight award for Q4 2023
- 4: Brigosha Best Performer of the year Award 2019

Extras and Achievements

Academic.....

2013: Secured **All India Rank 800** with score 649 in GATE 2013.

Leadership and Management.....

2014-2015: Worked as M.Tech. Electrical **Student's Representative at Career Development Cell** of IIT Bhubaneswar.

2014-2015: Worked as a **Mess Wing Counselor** at IIT Bhubaneswar Boys' Hostel; Madanpur.

2008-2010: Worked as **Field Officer, Assistant Coordinator and Coordinator** for the Publicity Comity of national level competition *Brainwaves*.

2008: Worked as **Field Officer** for Orchestra Comity of cultural gathering *Utopia*.

Music and Literature.....

2021: Won first prize at essay writing competition organized by Marathi Weekly Saptahik Vivek

2017: Authored an article on Marathi News Portal Smart Maharashtra

2013: Worked as **Assistant Music Director** for the Music Album *Na Jaanu Kaisa Ishq Hai* .

2005: Got **First Class** in Pune Bharat Gayan Samaj's first year classical Singing exam.

Interests

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|---|--------------------------------|
| - Certified Yoga Teacher | - Playing Guitar and Harmonium |
| - Singing and composing songs, Poetry Writing | - Cooking, Swimming |

Languages

Marathi: Mother-tongue

Conversationally fluent

English: Fluent

Medium of education after 10th std. class