

# Bontalakoti Venkata Harshavardhan

**Portfolio:** Personal Portfolio

**Github:** Mandred009

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## EDUCATION

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- **National Institute of Technology, Silchar** Assam, India  
*Bachelor of Technology - Mechanical Engineering; CGPA: 9.12* December 2021 - June 2025
- **Doon International School** Dehradun, India  
*CBSE ; Percentage: 93.8* July 2019 - June 2021
- **Bright Lands School** Dehradun, India  
*ICSE ; Percentage: 98* July 2009 - June 2019

## EXPERIENCE

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- **Indian Institute of Technology Madras** Onsite  
*Summer Intern (Full-time)* May 2024 - July 2024
  - Selected for the prestigious Summer Fellowship Program(SFP-2024) under the Aerospace Department.
  - Worked on creating an open-source simulation environment based on Unity and ROS2.
  - This novel simulator helps in developing control algorithms and advanced interactions between ships and drones in a environment with simulated ocean and wind physics.
- **Instruments Research and Development Establishment** Onsite  
*Summer Intern (Full-time)* May 2023 - July 2023
  - Entrusted with the critical task of designing and analyzing ammunition mountings for drones, terrain vehicles, and naval vessels.
  - This role equipped me with a valuable opportunity to deepen my knowledge of vehicle dynamics and the specific requirements of different platforms. Gained practical experience in design and analysis techniques.
  - Played a key role in conceptualizing an innovative approach to utilize Ocean Buoys for advanced coastline surveillance. This novel idea significantly enhanced our ability to monitor coastal activities thereby reducing the costs by up to 30-percent.
- **National Institute of Technology Silchar** Onsite  
*Research Assistant (Part-time)* September 2022 - July 2024
  - Actively worked on the design and development of machine learning models. These models leveraged data from IoT devices to predict human activity patterns, contributing to a more informed understanding of user behavior in varying environments.
  - Evaluated the pros and cons of existing Human Activity Recognition data sets, and presented the result of our custom model (faster by 200-percent) at the International Federation for Information Processing (IFIP) Conference on the Internet of Things.
  - Tasked with the setup of a micro-stereo lithography system, and this entailed: conducting a detailed comparison between the printed outputs and actuators constructed using Nitinol springs. Implemented a novel method of resin injection, which significantly improved the printing time by 25-percent and accuracy of the micro stereo lithography system by 15-percent.

## PROJECTS

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- **Drone Design Aerothon 2023**  
*Team Praveg*
  - As part of Team Praveg, we were entrusted with the challenge of designing a drone capable of autonomous operations and weight transportation. Our mission was to deliver a comprehensive report detailing our design and implementation process.
  - My specific role involved spearheading the development of the avionics section and the integration of machine learning algorithms for enabling autonomous control of the drone.
  - A pivotal aspect of our project was the application of OpenCV for image processing. Designed and trained a custom Convolutional Neural Network (CNN) model which had a 90-percent accuracy in detecting targets.
- **Desktop Assistant Bot**  
*Mandred Tech*
  - Cyclops is an open-source desktop assistant bot which runs on a Large Language Model(Mistral 7B).
  - The bot is engineered for various features which includes idleness reminders, emotion detection, user presence verification, news reading, scheduling, music playing, camera operations, gaming, and more.
  - Leveraged Vosk's Text-to-Speech model for efficient conversion of voice commands into text. Moreover, sensor like DHT11 provides the functionality of detecting room temperature and humidity.
  - *Github Repo:* Cyclops

- **Survive-RL**

- *Mandred Tech*

- As part of our startup, we created an open source reinforcement learning environment, which is hosted on GitHub.
- The environment is inspired by the natural behavior of animals and is a multi-agent environment, where the agents have to survive and cooperate in a dynamic world.
- The environment is implemented in Python and can be flexibly used for different problems, such as training swarm robots or understanding emergent behavior in agents.
- *Github Repo*: Survive-RL

- **Quasar Rover**

- *Team Four Square*

- As part of Team Four Square, we designed and built a solar-powered rover capable of transporting loads. This was in response to the problem statement given by ASME EFX 2023, a global engineering competition.
- Involved designing and simulating the stresses in the bot design, ensuring its structural integrity and durability using Solidworks and ANSYS respectively.
- Also engineered the communication system using radio modules, enabling the rover to receive and transmit signals from a remote controller.

## SKILLS

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- **Programming Languages**: Python, C, Matlab
- **Frameworks**: Tensorflow-Keras, Pandas, Scikit, OpenCV, Pygame, Google Colaboratory, ROS2
- **Tools**: SolidWorks, Ansys, Arduino, ESP32, Simulink, Unity Game Engine, Gazebo
- **Languages**: Fluent – English, Hindi ; Native – Telugu ; Beginner- German
- **Soft Skills**: Leadership, Teamwork, Problem Solving, Communication

## POSITION OF RESPONSIBILITY

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- **Team Four Squared (National Institute of Technology Silchar)** Onsite
- *Team Captain (Full-time)* *May 2023 - Present*
  - Our team took part in ASME EFX 2023 held in Bangalore and was among the top 5 teams.

## CERTIFICATIONS

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- **Matlab and Simulink Fundamentals**: Learned about the fundamentals of programming in Matlab and Simulink.
- **Robotics: Aerial Robotics(Coursera-UPenn)**: Learned about the control and simulation of drones and aerial robots.

## PUBLICATIONS

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- Improvement in Multi-resident Activity Recognition System in a Smart Home Using Activity Clustering  
*Springer Publication*: Internet of Things Advances in Information and Communication Technology