CURRICULUM VITAE

BALAJI.B
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Mobile no: +91 98941 93537 / +91 85954 68822

PROFESSIONAL OBJECTIVE:

"I will create success for the organization and for myself, I work leaving behind a mark of excellence."

ACADEMIC QUALIFICATION

PhD thesis submitted in the field of manufacturing automation in Mechanical engineering department at Shiv Nadar University, Greater Noida, India. I have addressed the thesis review comments and about to conduct my PhD defense in May'2022.

Completed Master of Engineering degree in Computer integrated manufacturing from P.S.G. College of Technology, Coimbatore, India in 2009 with 8.53 CGPA.

Completed Bachelor of Engineering degree in Mechanical from V.L.B.Janakiammal College of Engineering & Technology, Coimbatore, India in 2005 with 71.47%.

Obtained 72.55 in 10^{th} (1999) and 79.33% in 12^{th} (2001).

PROFESSIONAL EXPERIENCE

As part of the research, an indigenous impact test setup was designed and developed to test the impact absorption characteristics of auxetic structures using National Instruments USB 6008 DAQ. Designed and fabricated a CNC milling fixture that was used to fabricate cubes with different functional features. Developing a closed-loop part feeding system using NI MyRIO 1900. Worked extensively on FDM 3D printers to create functional parts. (Portfolio provided at the end of this CV for your perusal).

Worked as Assistant Professor for a year in Sri Krishna College of Engineering and Technology, Coimbatore. Was SAE Club - Faculty coordinator. Organized Indian GO-KART Championship 2016, apart from many other workshops. NBA Criteria II Head. Part of syllabus revision team.

Worked as Assistant Professor for 4 years in Sathyabama University. Was coordinator for Robotics club in Student Development Cell (SDC), Technology Business Incubator (TBI) coordinator for the department.

Was part of Tata consultancy services for 2 years in Mainframe systems operations and as a security analyst.

Worked as maintenance, service and troubleshooting engineer for ECCI Ltd. Was incharge of upkeeping heavy machinery to sensitive electronic controls.

Guided over 20 UG and 8 PG projects.

PACKAGES KNOWN:

CAD/CAM/CAE: SolidWorks and Ansys.

Automation aids: LabVIEW, FluidSIM, Arduino, Raspberry Pi and NVIDIA Jetson Nano.

Programming and other tools: LabVIEW, Mathematica, Python and Origin Pro.

AREA OF INTEREST:

📖 Manufacturing automation. 📖 Mechatronics 📖 Farm monitoring.

WORK EXPERIENCE:

S.No	Institution / Company	Designation	Duration	Period
1	Sri Krishna College of Engineering and Technology, Coimbatore.	Assistant Professor	May 2016 – May 2017	1yr
2	Sathyabama University, Chennai.	Assistant Professor	Feb 2012 – April 2016	4yrs 2months
3	Tata Consultancy Services Ltd.,	Systems Engineer	Dec 2009 – Feb 2012	2yrs 1month
4	East Coast Constructions and Industries Ltd.,	Assistant Mechanical Engineer	Nov 2005 – Aug 2007	1yr 8months

PUBLICATION DETAILS (Recent):

- Balaji, B., Ponniah, G. & Burela, R.G. Realizing the impact and compressive strengths of an arrowhead auxetic structure inspired by topology optimization. Int J Adv Eng Sci Appl Math 12, 211–217 (2020).
- B Balaji, Ramesh Gupta Burela and Ganeshthangaraj Ponniah, Mass production of re-entrant cubic auxetic structure, IOP Conference Series: Materials Science and Engineering, volume 1070, (2021).
- Balaji Boopathi, Ramesh Gupta Burela and Ganeshthangaraj Ponniah, Dynamics of part motion on a linear vibratory feeder, Proceedings of the IMechE, Part C: Journal of Mechanical Engineering Science, (2021).
- Balaji Boopathi, Ramesh Gupta Burela and Ganeshthangaraj Ponniah, Balanced feeder: An alternative to bowl feeder, AIP conference publishing, volume 2408 (2021).
- Balaji Boopathi, Ramesh Gupta Burela and Ganeshthangaraj Ponniah, Part dynamics in the intermediate regime, Proceedings of the IMechE, Part E: Journal of Process mechanical Mechanical Engineering Science, (2022).
- Throughput improvement through closed loop nesting control in a balanced vibratory feeder. (Communicated).
- Nesting prediction and throughput improvement of vision-based linear vibratory feeder using machine learning (In progress).

PROJECTS GUIDED: (Selected among the top 5 projects in the Faculty of Mechanical Engineering- Previous teaching experience)

- Design and fabrication of a weight-based potato sorting machine.
- NOx Reduction in IC engines using Pressure Swing Absorption.
- Design and fabrication of magnetic gear assembly.

PROJECTS DONE:

1) Throughput enhancement of a singularizing unit through closed loop control (Funded by Shiv Nadar University).
2) Development of a part feeding system to handle asymmetric components. (Sponsored by the Department of Science and Technology - India).
3) Adaptive cruise control system (ACC) in automobile.

MINI PROJECTS:

1) Automated brake liner inspection system using LabVIEW.
2) Automated irrigation using Humidity sensors.
3) Redesign of milling fixture to reduce production of defective components.

ACADEMIC RESPONSIBILITIES:

1) Support students, with mechatronics related projects and counselling
2) Develop lab and learning resources. Conduct lab for UG and PG students
3) Teach FluidSIM and LabVIEW software to students
4) Assist students in utilising FDM 3D printer and CNC machine
5) Train students to interface sensors with NI DAQ devices
6) Prepare project proposals and purchase requests
7) Taught UG and PG subjects like Mechatronics, Pneumatics, Industrial Automation, Manufacturing technology, Robotics, Rapid Prototyping, Engineering graphics, DFMA and CIM.

REFERENCES

Dr Ganeshthangaraj Ponniah PhD, Assistant Professor, Department of Mechanical Engineering, Shiv Nadar University, Greater Noida, Uttar Pradesh 201314, India. Ganeshthangaraj.Ponniah@snu.edu.in +91 9871340499	**Dr.Ramesh Gupta M.E., PhD,** Associate Professor, Department of Mechanical Engineering, Shiv Nadar University, Greater Noida, Uttar Pradesh 201314, India. ramesh.gupta@snu.edu.in +91 9891648578

Portfolio

BALAJI.B
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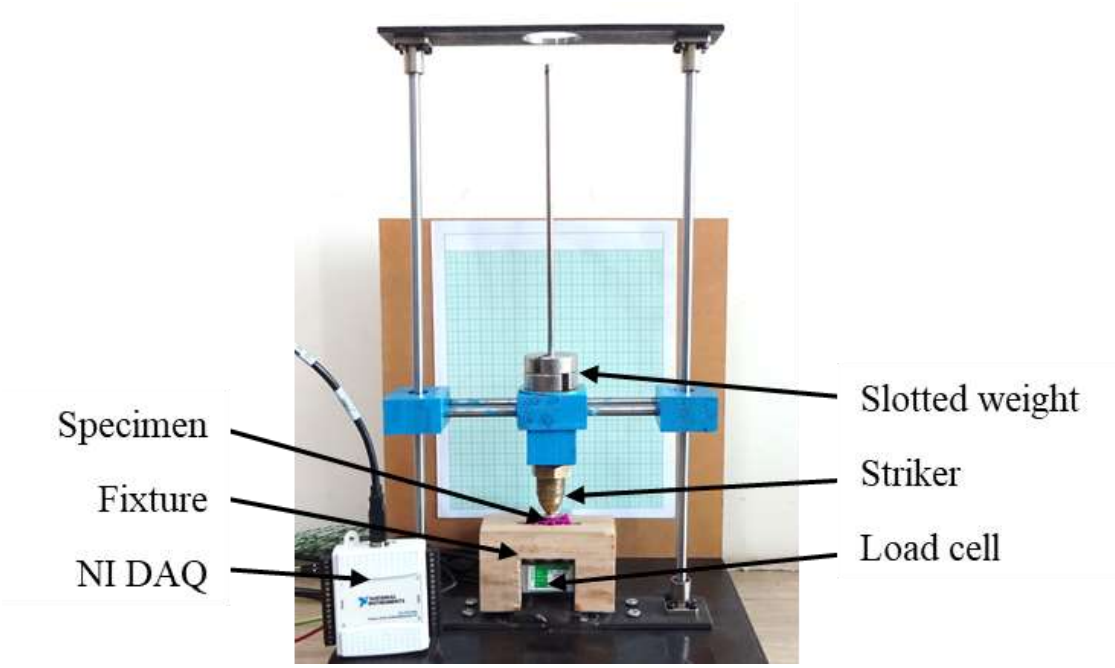
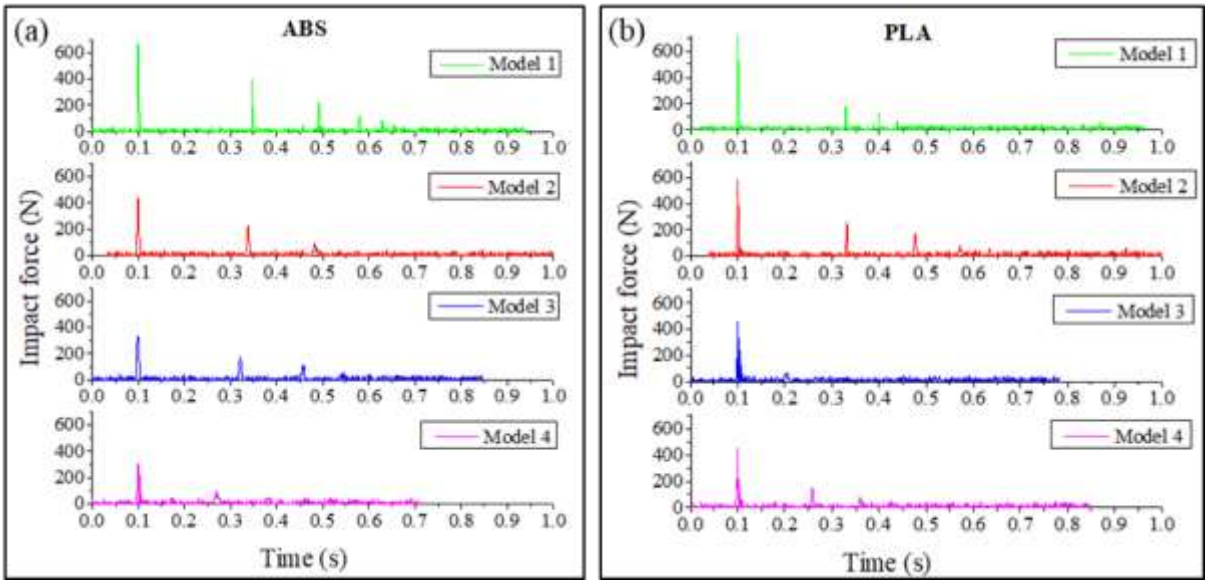
1) **In house development of a drop test and compression test setup to study the energy absorption potential of auxetic structures.** https://doi.org/10.1007/s12572-021-00286-w

Associated skills:

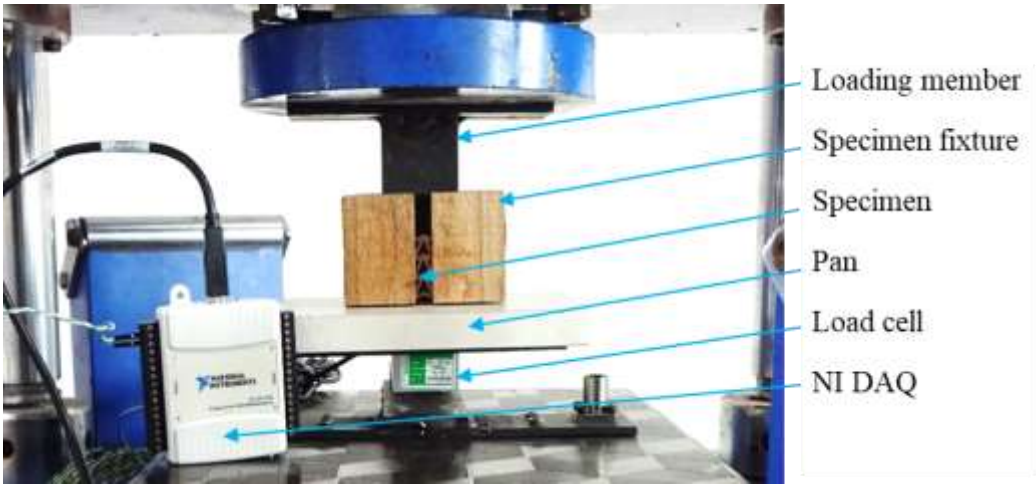
- Data acquisition using NI USB-6008 DAQ and LabVIEW
- Design and development of drop test setup using precision linear bearings
- Load cell calibration
- Data logging using TDMS file format
- Plotting using Origin Pro



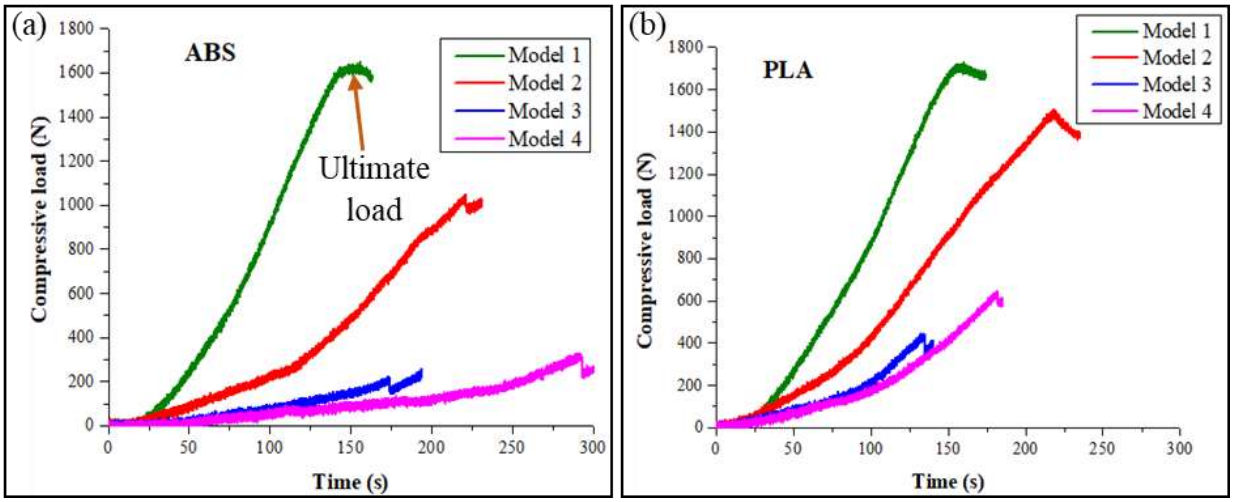
Drop test setup



Sample sensor data from drop test setup



Compression test setup on UTM

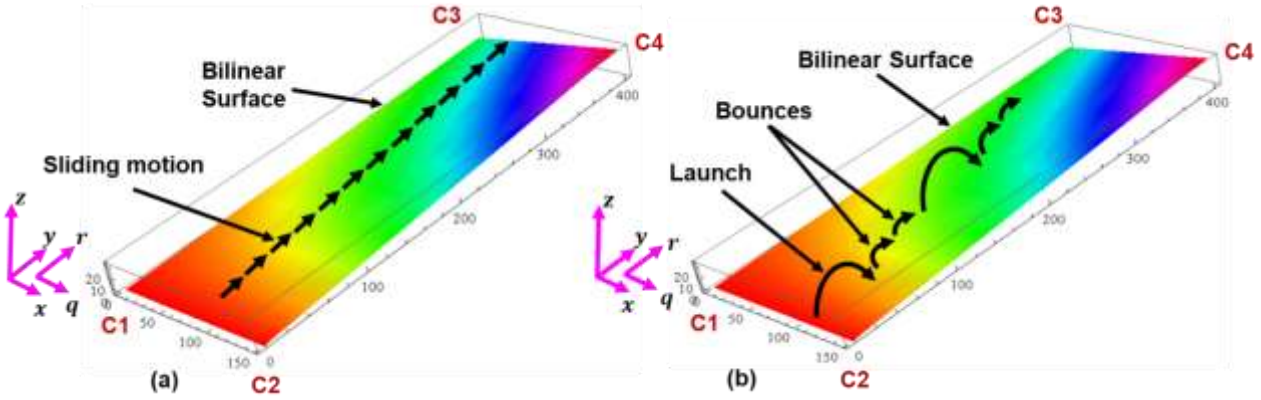


Sample sensor data from compression test setup

2) Simulation of part motion on a parametric surface
https://doi.org/10.1177/09544062211012711

Associated skills:

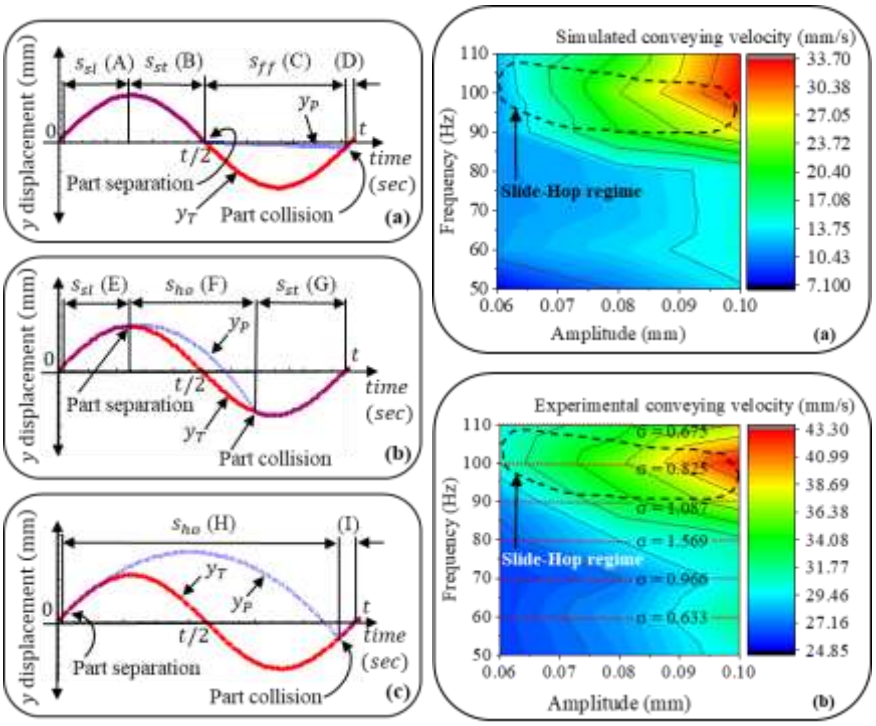
- Predicting part motion trajectory
- Simulating parametric surface with Mathematica software



3) Simulation and experimental validation of part dynamics
https://doi.org/10.1177/09544062211012711

Associated skills:

- Mathematical modelling
- Simulating part motion with Mathematica software
- Plotting conveying velocity trend in OriginPro software

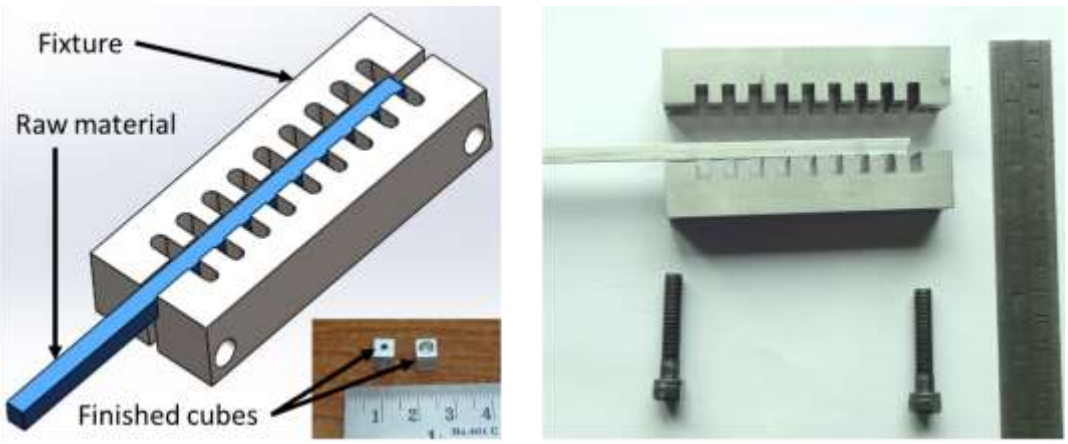


Part motion simulation and Trend plot

4) Development of a CNC milling fixture that was used to fabricate cubes with different functional features.

Associated skills:

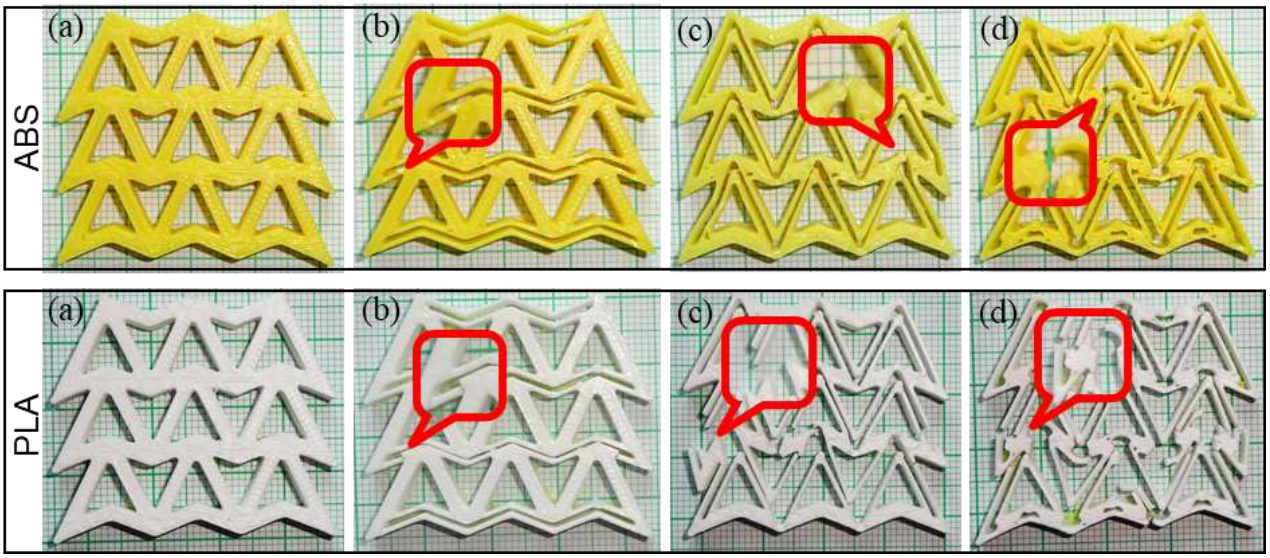
- Used 3 axis CNC milling machine
- Design and development of fixtures



5) Worked extensively on 3D printers.

Associated skills:

- Design for 3D printing
- Modular design
- Strategic use of slicing software to arrive at accurate prints
- Create functional structures and parts



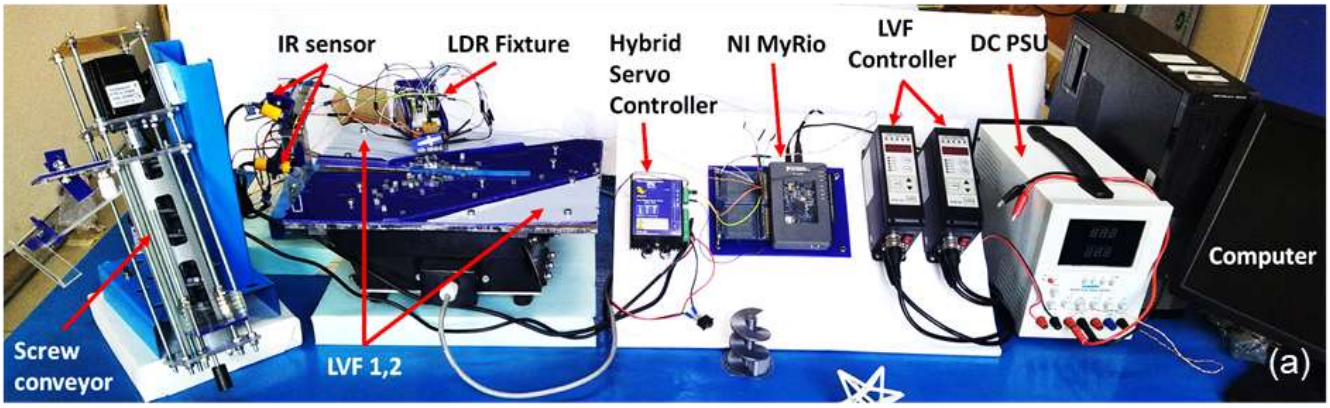
3D printed arrowhead auxetic structures depicting the location of failure.

3D printed screw for screw conveyor assembly

6) Developing a closed loop system to reduce nesting and increase the throughput of a balanced vibratory feeder.

Associated skills:

- FPGA, Real-Time module programming with LabVIEW
- NI MyRIO 1900 reconfigurable I/O device
- Real time condition monitoring and remedial action through closed loop control.
- Proximity sensor array
- Hybrid servo for precise control over feed rate
- Frequency and amplitude controller for linear vibratory part feeder
- Sensor mount and fixture design
- Design to isolate sensor from vibration
- Design for manufacturing and assembly



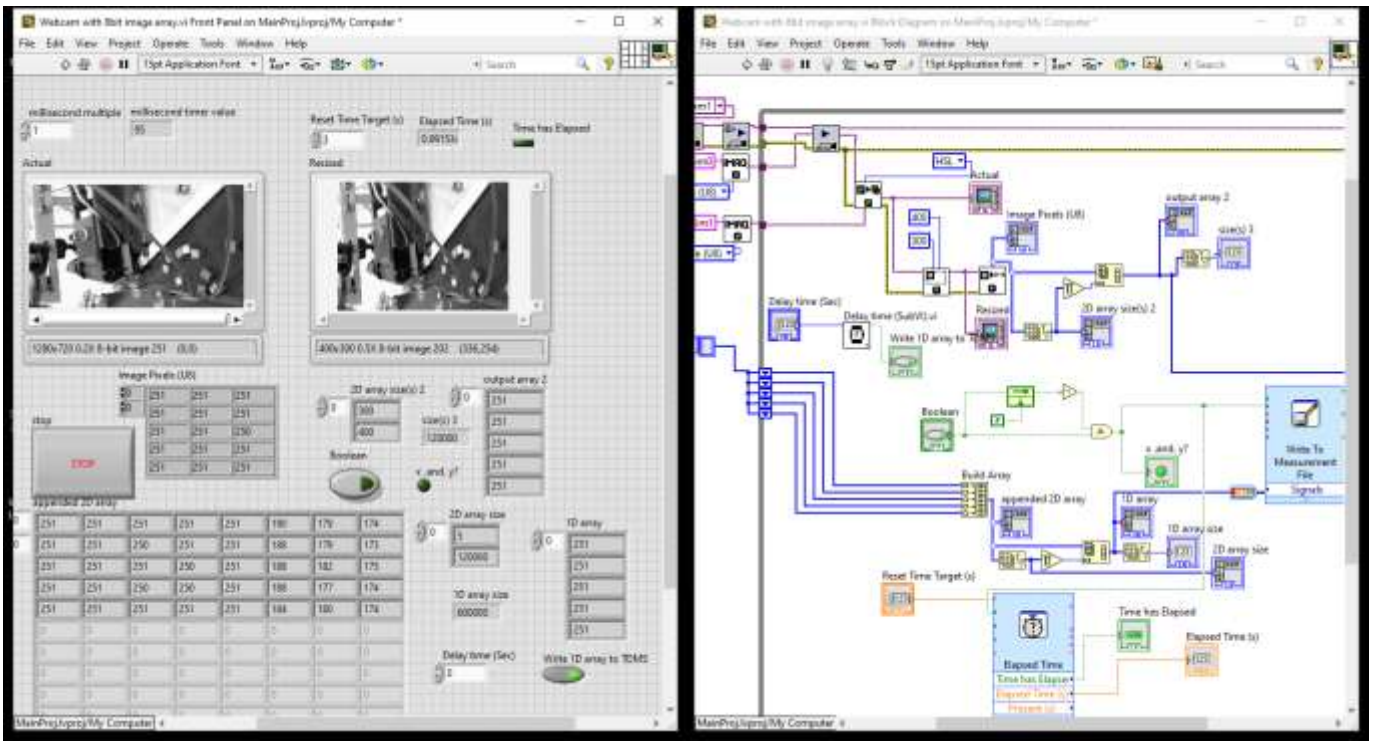
Experimental setup

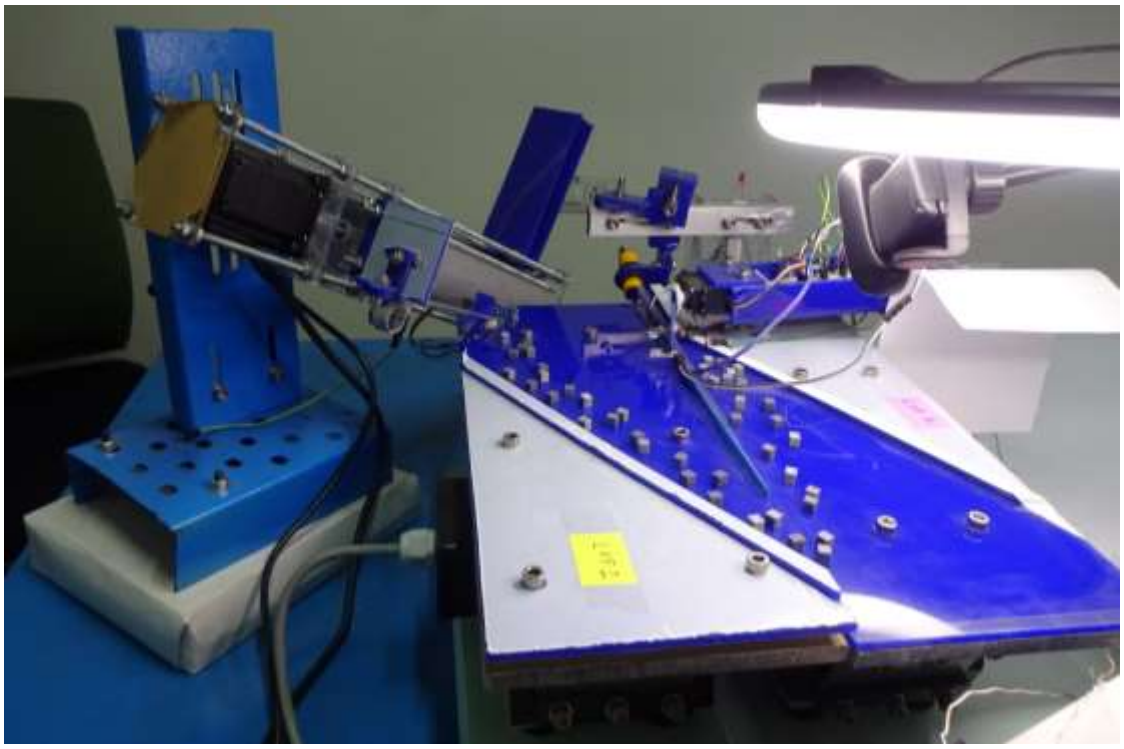
Proximity sensor mount

7) Machine vision-based Nesting control and implementing machine learning to avoid nesting(In progress)

Associated skills:

- Vision and Motion module in LabVIEW
- Cost effective USB webcam camera
- Image capture and resizing.
- Grey scale image to 2D array conversion
- Array stacking
- Data logging

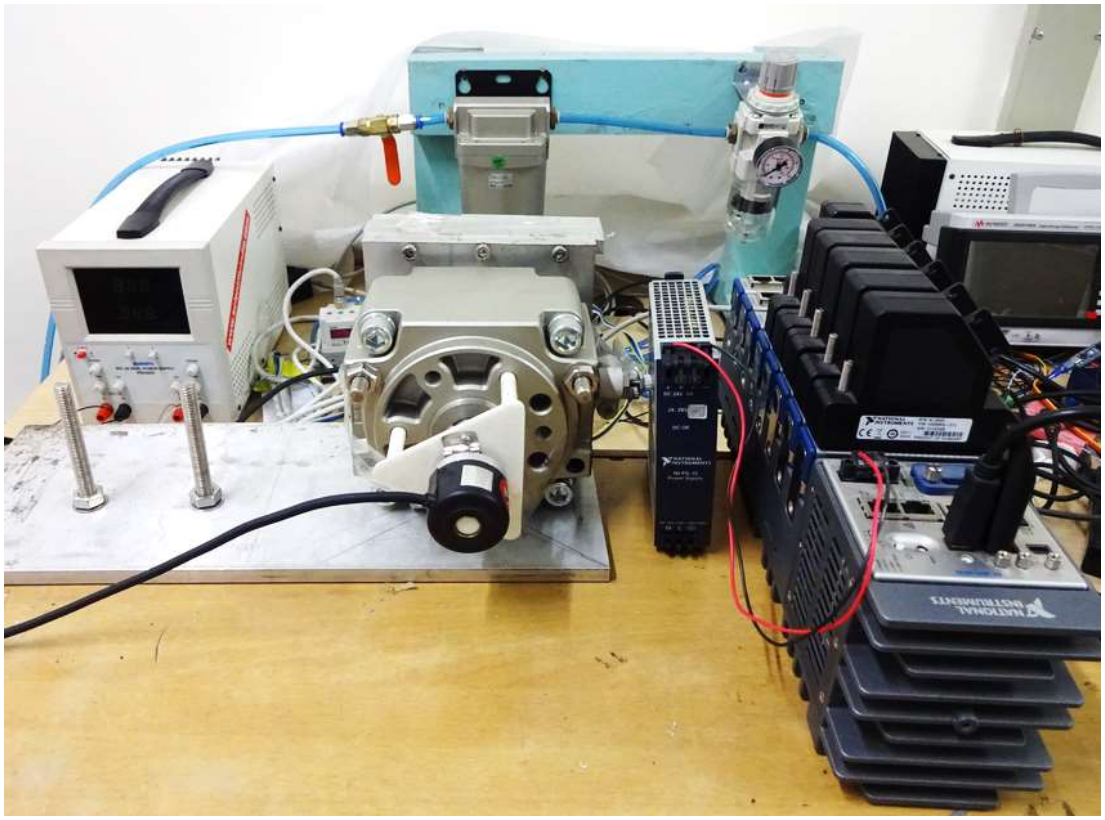




8) **Developing pneumatically actuated humanoid robot** (Assistance provided to research advisor)

Associated skills:

- FPGA, Real-Time module programming with LabVIEW
- NI cRIO-9032 embedded controller

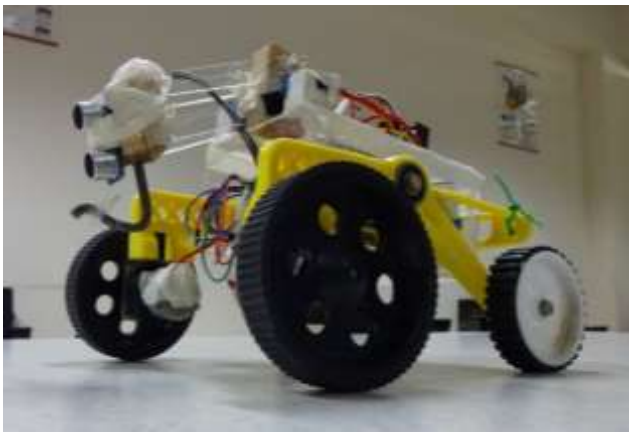


Guidance provided to student projects

1) **Obstacle avoiding and payload delivery robot**

Associated skills:

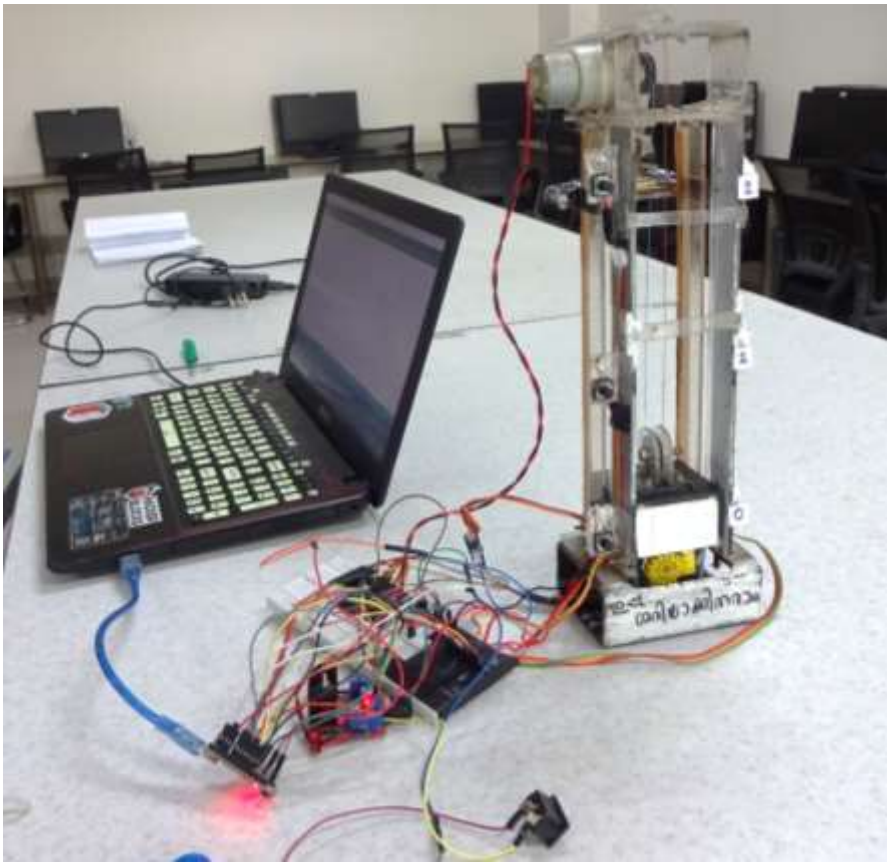
- Raspberry pi 3 programming with Python
- Using ultrasonic sensors, DC motors and servo motors



2) Developing a closed loop mini elevator

Associated skills:

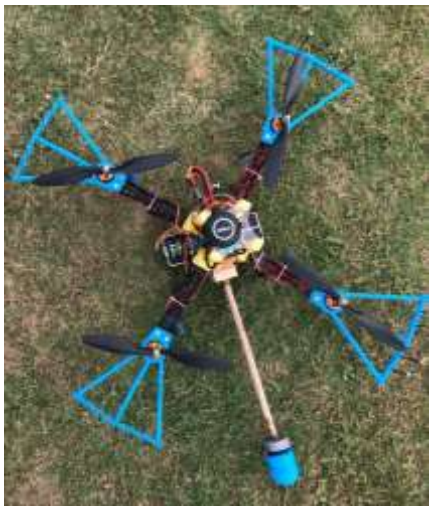
- Arduino nano programming with C++
- Using ultrasonic sensors, DC motors, servo motors and limit switches



3) Relay drone that can swap power source, mid flight

Associated skills:

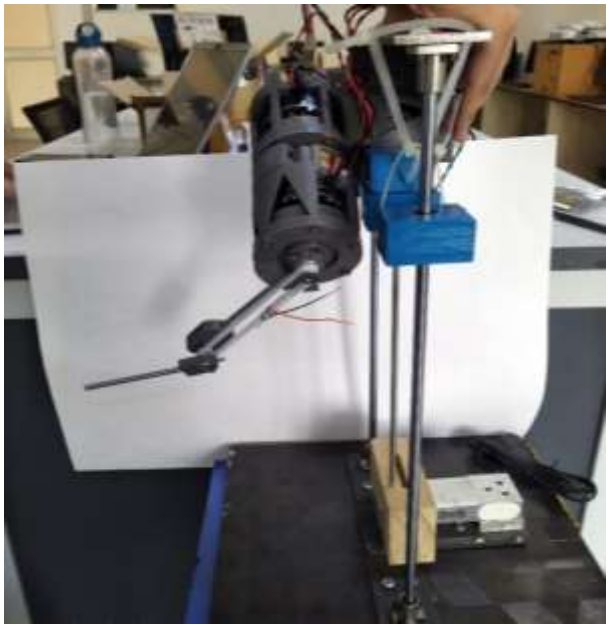
- Pixhawk flight controller
- Raspberry pi 3 with camera for marker detection
- A2212/6t 2200kv brushless DC motor
- Simonk 30A BLDC ESC Electronic Speed Controller



4) Cheetah robot limb development (In progress)

Associated skills:

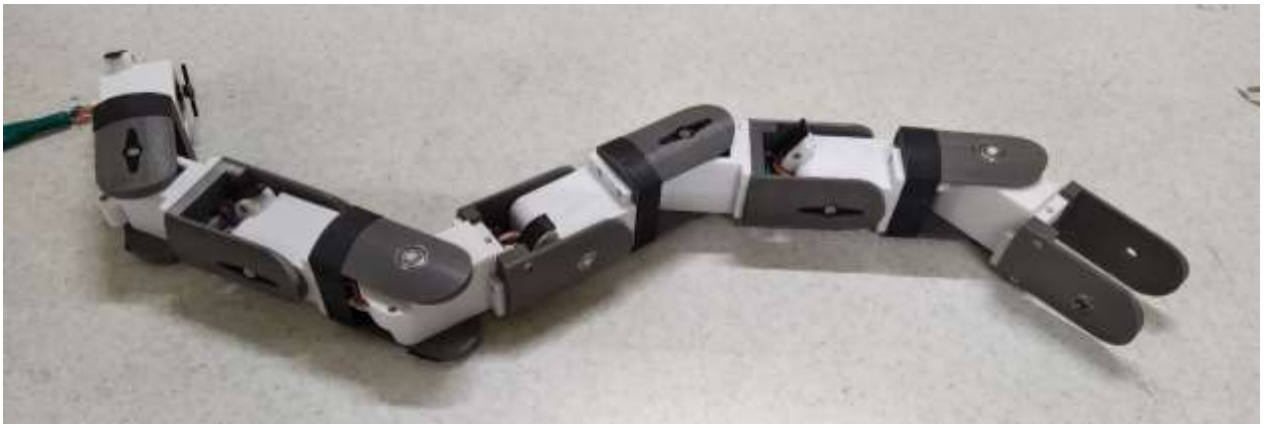
- Raspberry pi 3 with Mjbots pi3hat
- Mjbots power distributor
- Mj5208 brushless motor
- Polymer 3D printing
- Synchronous motion control
- 6x Reduction Planetary Gearset



5) Snack robot (In progress)

Associated skills:

- NVIDIA Jetson Nano
- PCA9685 16-Channel Servo Driver
- XH-M229 Power Supply Transfer Module
- LPS450 450 Watts PSU
- Polymer 3D printing



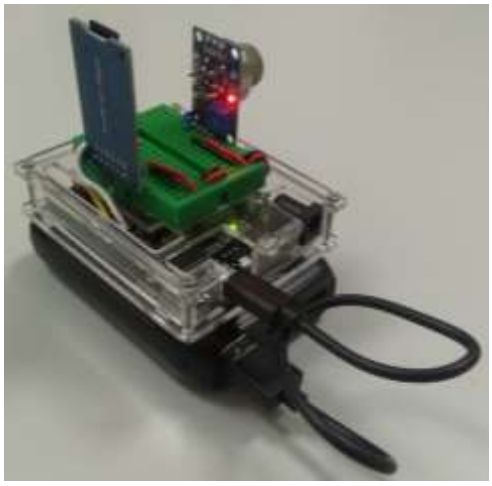
Collaborative work

Dr Gopalakrishnan B,
Scientist (Environmental Science),
Indian Council for Agricultural Research (ICAR),
Baramathi 413 115, Maharastra.

1) Monitoring stress levels in farm animals (In progress)

Associated skills:

- Arduino programming with C++
- MAX30102 - pulse rate sensor
- MAX30205 - temperature sensor
- MQ4 - Methane Gas Sensor




2) Mini weather station (In progress)

Associated skills:

- Arduino programming with C++
- AHT25 - temp and humidity
- BMP280 - atmospheric pressure and altitude
- TEMT6000 - ambient light