

# Harsh Alpeshkumar Senjaliya

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## EDUCATION

**University of Maryland (UMD)**, College Park, MD, USA  
M.Eng. Robotics

**2023-2025(Expecting)**

**Uka Tarsadia University (UTU)**, Bardoli, GJ, India  
B.Tech. Mechatronics Engineering (GPA:8.5/10)

**2019-2023**

## SKILLS

**Programming Languages** C/C++, Python, MATLAB, Embedded C, Assembly Language

**Software & Tools** Git, Proteus, SolidWorks, ROS2, NumPy, OpenCV, PyTorch, Scikit-learn, LaTeX

## RESEARCH EXPERIENCE

**Dalhousie University**, *AIES Lab*, Canada [Report][[GitHub](#)]

**May 2022–Aug 2022**

Research Internship under [Dr.Ahmad Al-Mallahi](#)

**Topic:** *Nutrient deficiency sensing technology using a spectrophotometer*

- Developed nutrient estimation sensing technique for potato plants based on spectroscopy.
- The developed sensing system was deployed into an integrated machine-learning system, which estimates the field's nutrients.
- Further employed YOLOv5 and YOLOv6 algorithms to identify and classify crop signs and illnesses in real time.

**Chhotubhai Gopalbhai Institute of Technology**, Bardoli, India [[GitHub](#)]

**Nov 2021–Apr 2022**

Research Supervisors [Dr.Paresh Gujarati](#) and [Dr.Pooja Shah](#)

**Topic:** *Design Optimization of Rocker-Bogie Mechanism using heuristic approaches.*

- Seven distinct algorithms were implemented and used to optimize the geometry and kinematics of the rover's wheel suspension system subject to the defined performance metrics.
- Compared the performance of the used algorithm which proved that Simulated Annealing (SA) was the best-performing technique empirically, with a fitness of 760.

**Nirma University's Institute of Technology**, Ahmedabad, India [[GitHub](#)]

**Jun 2021–Jan 2022**

Research Supervisors [Dr.Pooja Shah](#) and Asst.Prof.[Kirti Bardhan](#)

**Topic:** Comparative study on the modern deep learning architectures for predicting nutritional deficiency in rice plant

- Developed technique to identify nutrient insufficiency(N, K, Ca) in rice crop using MobileNet-v2, Resnet18, DenseNet, VGG16, and SqueezeNet.
- Developed data collecting system to acquire image and environmental parameters using RaspberryPi, Arduino Uno, DHT22, ESP32 and Micro SD card Module.
- Artificially deficiency was created to achieve desired sample symptoms through multiple treatment on the crop hybrid MC13.

## COURSE PROJECTS

**Developed industrial Pipe Inspection Soft Robot, This bio-inspired robot was built using concept of VAMPs (vacuum-actuated muscle-inspired pneumatic structures).**

- This bio-inspired soft robot, pneumatically actuated and capable of inspecting and navigating the inside and outside of an Industrial Pipelines.
- The robot being soft and compliant can grasp and move along a cylindrical pipe of varying dimensions.
- We have achieved a maximum 50 bending angle on the soft linear actuator by regulating the air pressure inside it.

**Optimized Ball Collector**

- Designed and implemented a Greedy algorithm to find approximately nearest path in C++
- Image processing was implemented to get balls in the area and serial communication to instruct the bot to follow the calculated path using the XBee module.

## SCHOLARSHIP AND ACHIEVEMENTS

**Mitacs GRI(Global Research Internship) program scholarship 2022**

- Mitacs Globalink Research Internship funded 15000 CA\$ to perform research in Canadian research institutes.
- Out of 25000+ applicants, I was chosen for the Mitacs GRI program 2022.

**Recognized by the GUSEC and UNICEF (INDIA) in 2021 for developing affordable farming solution.**

- Selected under top 100 innovative ideas.
- Developed Early Warning System for rice crop nutrition levels indication.

**The Spark Scholarship, 2017**

- This scholarship was achieved in Physics, Chemistry and Mathematics with rank 4th out of 700+ participants.

**Regional Mathematics Olympiad 2016**

- Awarded with Bronze Medal at school level

## PREPRINTS/PUBLICATIONS

**H. Senjaliya**, P. Gajjar, V. Dodia, P. Shah, K. Bardhan and M. Shukla, "A Comparative Study on the Modern Deep Learning Architectures For Predicting Nutritional Deficiency in Rice Plants," 2023 IEEE IAS Global Conference on Emerging Technologies (GlobConET), London, United Kingdom, 2023, doi: 10.1109/GlobConET56651.2023.10149936.

**Senjaliya, H.**, Gajjar, P., Vaghasiya, B., Shah, P. and Gujarati, P., 2022. Optimization of Rocker-Bogie Mechanism using Heuristic Approaches. *arXiv preprint arXiv:2209.06927*.