

# Harsh Alpeshkumar Senjaliya

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## EDUCATION

**Uka Tarsadia University (UTU)**, Bardoli, India

**2019-2023(Expecting)**

B.Tech. Mechatronics Engineering (GPA:8.5/10)

**Radiant English Academy**, Surat, India

**2017-2019**

Higher Secondary School - Physics, Chemistry, Mathematics

## 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

**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*.

**Senjaliya, H.**, Gajjar, P., Dodia, V., Shah, P. and Bardhan, K., 2022. A comparative study on the modern deep learning architectures for predicting nutritional deficiency in rice plants. *arXiv preprint*