Department of Electronics and Communication Engineering
Acharya Institute of Technology
Soladevanahalli, Bengaluru 560 107

Project Phase -I Presentation on

CROP WEED DETECTION BY IMAGE PROCESSING & DEEP LEARNING

Presented by

Group No	Name	USN
06	AAYUSHI SHARAN	1AY17EC001
	JANANI B	1AY17EC030
	KUSHAGRA TANDON	1AY17EC038
	MOHAMMAD PARVEZ R S	1AY17EC046

Under the guidance of

Mr. SANDEEP KUMAR K

Asst. Profs. Grade I

Department of ECE,

Acharya Institute of Technology

2020-2021

OBJECTIVES

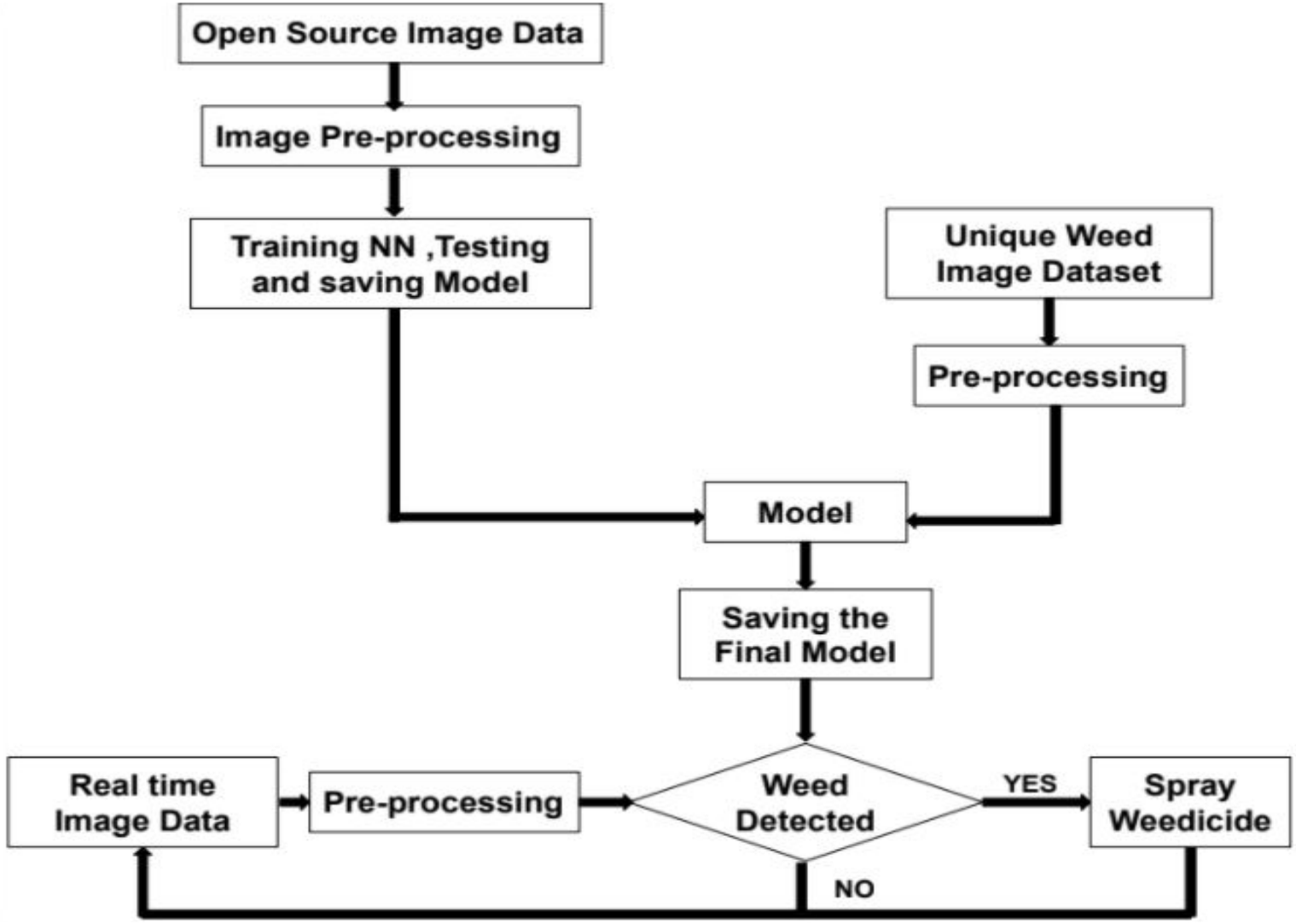
- Creating a unique Weed Image Dataset for high accuracy
- Developing an efficient algorithm to detect the existence of wide variety of weeds, non-specific to a particular crop.
- Designing a mechanism to spray weedicide if weeds are detected, using portable weed detection and spraying mechanism, attachable to tractors

MOTIVATION : Weeding is a tedious process, few conventional methods include tilling before sowing crops, manually pulling out weeds, or using a trowel. Hence a precise automation model will replace the repetitive manpower requirements

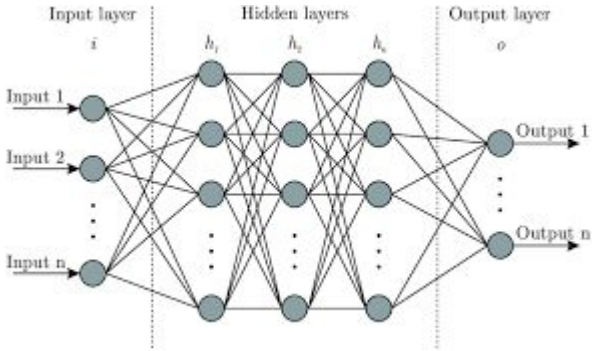
PROBLEM STATEMENT : Automating Weed detection and destruction overcoming the problem of existing models which are either specific to detect weeds of a particular crop or restricted to detect very few types of weeds

Our project divulges the idea of developing a weed detection mechanism that can be non-specific to a crop variety detecting wide varieties of weeds and deploying it on a gantry robot which will spray weedicides accurately.

BLOCK DIAGRAM



METHODOLOGY



- Selection & Creation of DataSet
- Pre-Image Processing
- Training the Model
- Saving the Model
- Deploying the Model

REQUIREMENTS

- Coding Language
  - Python 3.5.7V
- Machine Learning Libraries
  - TensorFlow 2.0
  - Keras
- Editors For Python & Machine Learning
  - Google Colab - With GPU/TPU Config
  - VS CODE / Visual Studio
  - Jupyter Notebook
- FLASK - Micro Web Framework Coding
- Deployment Servers
  - Amazon AWS - EC2 or S3 Bucket
  - Heroku - Free For 1 Year
- Gantry Robot

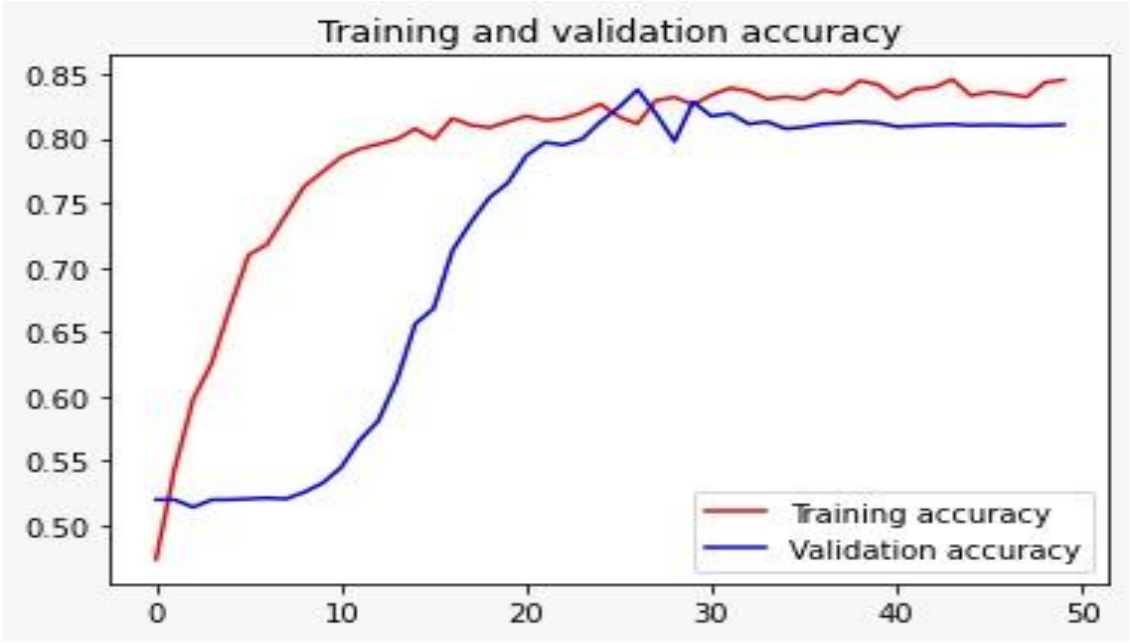
OBTAINED RESULTS

Fig: Original image

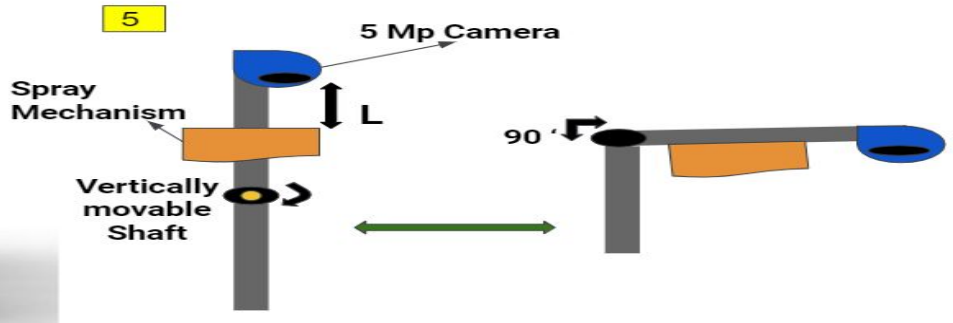
Fig: Vertical flip and shear

Fig: Rotation and brightness

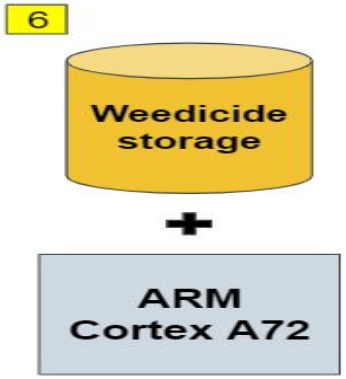
Accuracy obtained for MobileNetV2 : 83.768 %



PRODUCT DESIGN



L - Length between camera and spray mechanism will be based on the Time complexity of Detection model.



Storage can be kept invisible even at the bottom of the tractor. But such placement is avoided since that might demand extra power to pump the liquid to higher altitude vertically.

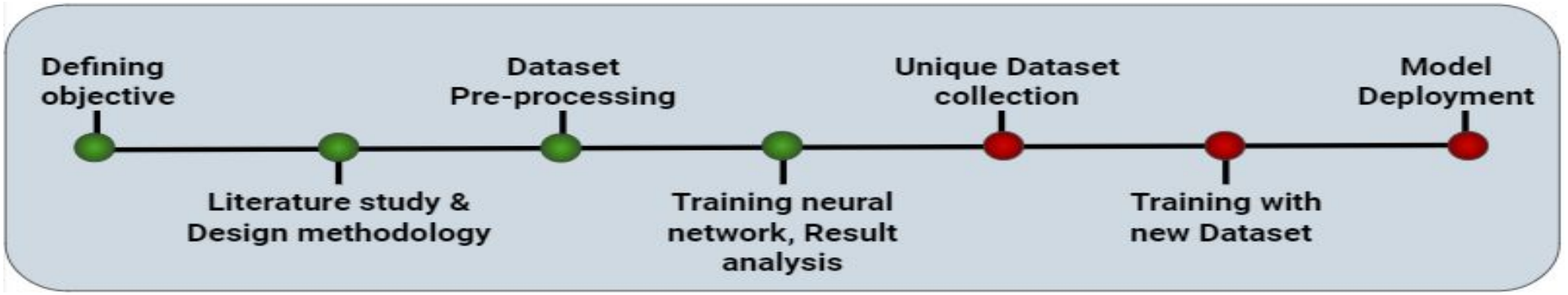
ACCOMPLISHED WORK

- Literature study of the related works
- Open source dataset collection
- Comparative study of Neural network architectures, and finalizing with MobileNetV2 architecture
- Dataset preprocessing, Model training and Result analysis
- Product design for real time application

FURTHER WORK

- Unique weed image dataset collection
- Training, testing and saving the model with new dataset
- Assembling and programming Gantry Robot (For Demonstration)
- Model deployment on Gantry

MILESTONE CHART



* Applying for project funding from KSCST, IEEE etc,.
* Journal publications and Tech fests post obtaining results

REFERENCE

1. A. J. Irías Tejeda and R. Castro Castro, "Algorithm of Weed Detection in Crops by Computational Vision," 2019 International Conference on Electronics, Communications and Computers (CONIELECOMP), Cholula, Mexico, 2019, pp. 124-128, doi: 10.1109/CONIELECOMP.2019.8673182.
2. C. Andrea, B. B. Mauricio Daniel and J. B. José Misael, "Precise weed and maize classification through convolutional neuronal networks," 2017 IEEE Second Ecuador Technical Chapters Meeting (ETCM), Salinas, 2017, pp. 1-6, doi: 10.1109/ETCM.2017.8247469.
3. Dadashzadeh, Mojtaba et al. “Weed Classification for Site-Specific Weed Management Using an Automated Stereo Computer-Vision Machine-Learning System in Rice Fields.” *Plants (Basel, Switzerland)* vol. 9,5 559. 27 Apr. 2020, doi:10.3390/plants9050559
4. Prof. Michelle Araujo E Viegas, Mr. Avinash Kurian, Mr. Victor Joshua Rebello, Mr. Niraj Mangaldas Gaunker, IJSRD - International Journal for Scientific Research & Development| Vol. 4, Issue 11, 2017 | ISSN (online): 2321-0613 All rights reserved by www.ijsrd.com 660” Weed Detection using Image Processing”
5. Pulido-Rojas, Camilo & Molina-Villa, Manuel & Solaque-Guzmán, Leonardo (2016) “Machine vision system for weed detection using image filtering in vegetables crops”. Revista Facultad de Ingeniería Universidad de Antioquia. 2016. 10.17533/udea.redin.n80a13.
6. S. Umamaheswari, R. Arjun and D. Meganathan, "Weed Detection in Farm Crops using Parallel Image Processing," *2018 Conference on Information and Communication Technology (CICT)*, Jabalpur, India, 2018, pp. 1-4, doi: 10.1109/INFOCOMTECH.2018.8722369.