



CAPSTONE PROJECT SYNOPSIS FORMAT ACY: 2022-23

Dear student(s) please fill all the details in this MS word file, insert images / diagrams wherever necessary. Get it approved from the project guide(s) and upload in MStteams as assignment. File must be named with your project group ID and upload the same copy in your respective channel also

Proposed Project Title: Design of automatized disease detection and fertilization system for agricultural crops					
Project ID: SVCE/2019-23/PROJ/116					
Program(s): Computer Science and Engineering					
Name(s) of project guide(s): <ol style="list-style-type: none"> Name: Prof. / Dr. / Mr. / Mrs: Dr.Poornima G R Email id: poornima.gr_ece@svcengg.in Contact No.: 98867 53829 Name: Prof. / Dr. / Mr. / Mrs.: Prof. Niranjana C Email id: niranjana.c_ece@svcengg.in Contact No.: 88706 45085 					
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Introduction:

India has a vast variety of climatic conditions and crops these days are all hybrid in nature hence in order to support during the climatic changes everyday there is huge challenge for the farmers and when doing so there is certain similar kind of diseases or deficiency problems developed in the crops this can sometimes be fatal for the crops.

The project aims to be a personalized care given to the crops based on the problems arising in the crops and provide proper fertigation for the crops to survive and produce good yields.

Fertigation:

Fertigation is a method of fertilizer application in which fertilizer is incorporated within the irrigation water by the drip system. In this system fertilizer solution is distributed evenly in irrigation. The availability of nutrients is very high therefore the efficiency is more. In this method liquid fertilizer as well as water soluble fertilizers are used. By this method, fertilizer use efficiency is increased from 80 to 90 per cent.

What is Smart Farming?

Smart farming or Smart Agriculture system is the term used to describe the adoption of modern information and communications technologies in order to enhance, monitor, automate or improve agricultural operations and processes.

Factors causing plant diseases:

Pathogens are the main reason for causing diseases in the plant. There is a department named after it called plant pathology it mainly deals with the study of the pathogen. There are two main factors which cause disease in plants and they are pathogens and environmental condition.

The microbes favouring plant diseases is enumerated below:

- Viral
- Fungi
- Bacteria

Literature survey:

Author	Year	Title	Research Work
Jayvant Devare; Neha Hajare	2019	A Survey on IoT Based Agricultural Crop Growth Monitoring and Quality Control	Fully automated crop monitoring based on IoT.
T. Rajeshwari; P. A. Harsha Vardhini; K. Manoj Kumar Reddy; K. Krishna Priya; K. Sreeja	2021	Smart Agriculture Implementation using IoT and Leaf Disease Detection using Logistic Regression	Detecting the diseases in the crops by scanning the leaves using logistic regression method.

Siddharth Singh Chouhan; Uday Pratap Singh; Sanjeev Jain	2021	Automated Plant Leaf Disease Detection and Classification Using Fuzzy Based Function Network	Plant leaf disease detection using the IoT based technique called Fuzzy Based Function Network.
Nancy; Prabhavathi; Sowmiya; Vasuki; Dr. P. Tamil Chelvan	2021	Automatic Agriculture Spraying Using Arduino	Arduino based mapping for automatic agriculture spraying.
Folasade Olubusola Isinkaye; Emmanuel Damilola Erute	2022	A Smartphone-based Plant Disease Detection and Treatment Recommendation System using Machine Learning Techniques	Automated agriculture based on ML algorithms.

Pros	Cons
The above systems have proven success.	Even if it is having proven success it is not reliable in long run.
The above systems are straightforward.	Being straightforward is necessary but precise agriculture is not possible in just one module.
The systems are simple.	Is one dimensional in either disease prediction or fertiliser spraying.

Problem Formulation/Objectives:

Problem:

Crops these days are prone to various diseases and this diseases can sometimes be fatal for the crops and also the climatic conditions plays a major role in the well-being of the crops.

Solution:

Develop an AI based system to decode the diseases the crops are affected with based on scanning the leaves and analyse what could be the possible fertiliser that could be given to the crop in order to cure the crop from the disease.

Objectives:

- To increase the yields.
- To provide precise amount of fertigation to the crops.
- To analyse the disease prone crops and treat it with the precise fertilisers and pesticides.

- To have quality produce from the crops.

Methodology:

Develop two module namely:

1. AI module:

This module is responsible for the disease prediction in the crops by scanning the leaves.

2. IoT Module:

This module is responsible for the fertigation of the crops based on the data provided by the AI module.

These two modules must be integrated and coordinated to be used.

AI Module follows any one of the below methods to predict the diseases in crops:

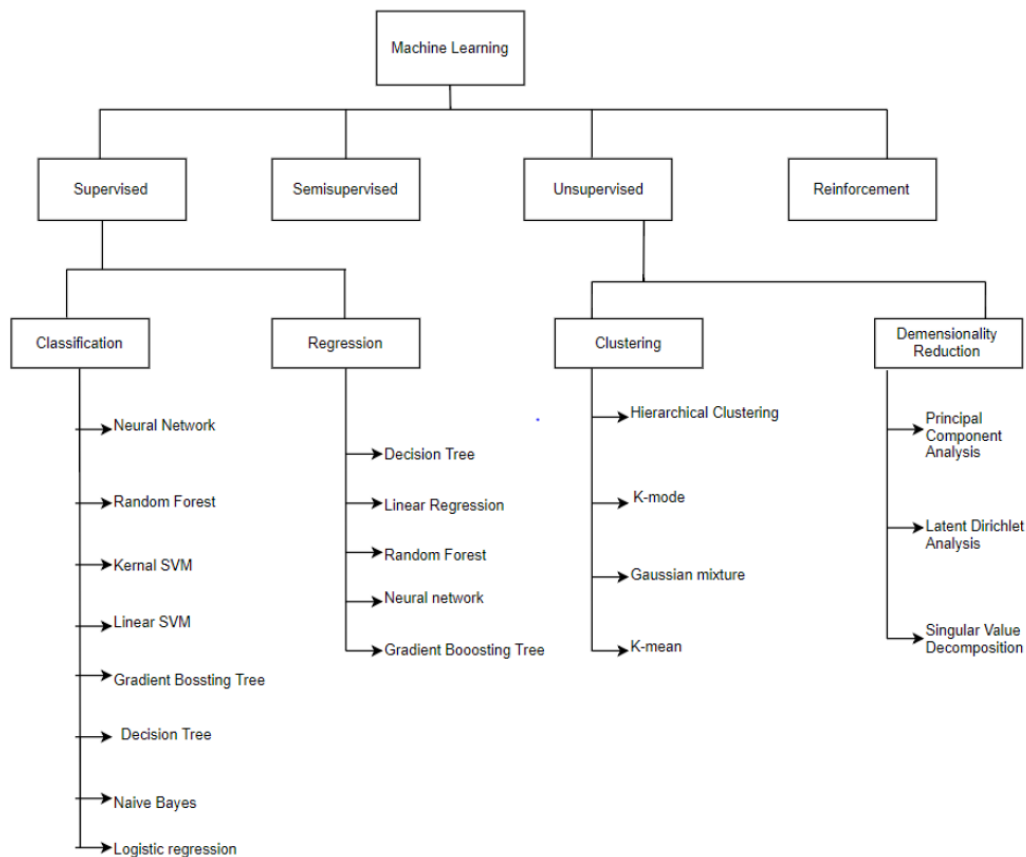
Supervised learning method.

Unsupervised learning method.

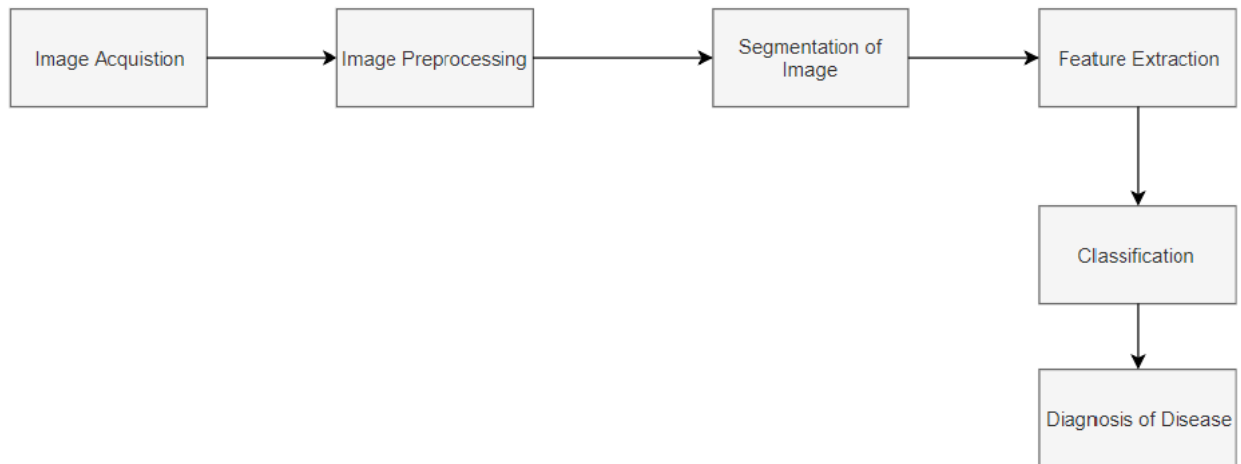
Semi-supervised learning method.

Reinforcement learning method.

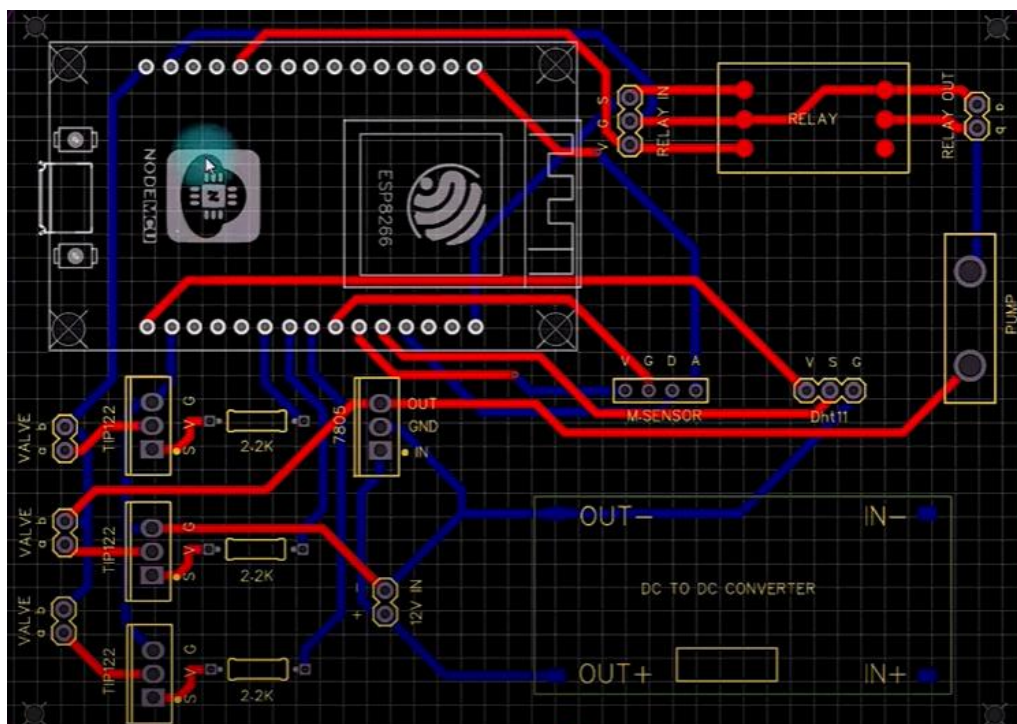
The following figure illustrates the types of machine learning algorithms:



The General Workflow of the AI Module is given in the following Flowchart:



The IoT module's simulated circuit diagram/block diagram is given below:



Facilities/Equipments Required:

- Node MCU aka ESP8266 Board
- BC 547
- TP 7805 Transistor
- Solenoid valve for flow control
- DC voltage Booster
- zero PCB
- Resistors
- Soldering station
- 3D Printer
- Miscellaneous Items
- Soil Humidity and moisture sensor

Expected Outcomes:

- Provide proper treatments for the unhealthy crops.
- Maximise yields.
- Improve the quality in production.
- Reduce the unwanted surplus use of fertilisers and pesticides.
- Reduce the soil pollution.

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Proposed work broader area mapping with PO's and PSO's:

- There is a huge increase in the yields and this benefits the overall growth in the GDP contributed by the agricultural share in the country.
- There is quality produce which means there is very less wastage due to bad goods and this can support the surplus needs of the population.
- Precise amounts of fertilisers when given to the crops there is no chances of soil pollution due to the excessive amounts of use of fertilisers.