SMART AGRICULTURE SYSTEM

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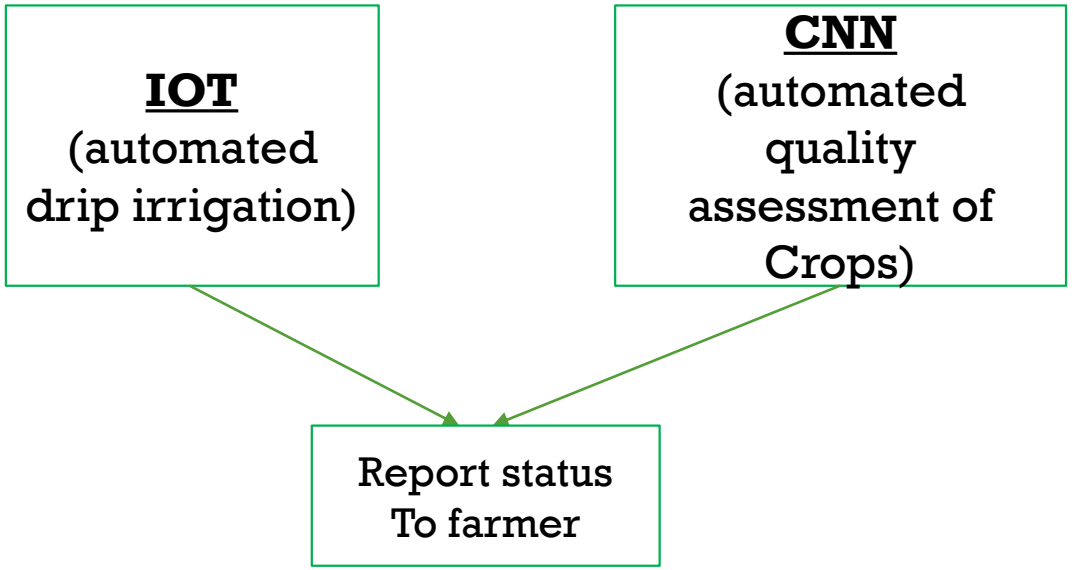
FLOW OF MODULES



INTRODUCTION

- Drip irrigation is also known as micro irrigation.
- Because in this , water is directly supplied to the root zone through pressurized pipes in drop by drop manner.
- Automated smart system does the same work but eases the work of the farmers.
- In this the amount of water required for the crop is predicted by the device.

OBJECTIVES

- Not more not less
- Will greatly help in saving the water resources.
- Moisture content of the soil can be controlled.
- Monitoring of the water flow.
- Crop requirement is properly analyzed

LITERATURE REVIEW

- **IEEE Paper 1**

Smart Drip Irrigation System for sustainable Agriculture By Kavianand

DOI: 10.1109/TIAR.2016.7801206

Proposed System by the authors: ?

Proposed System by our team: ?

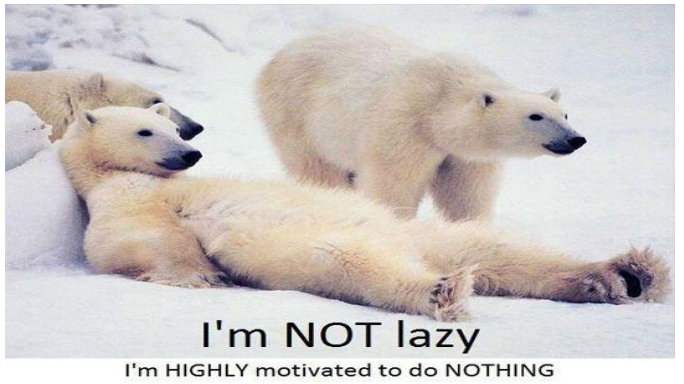
PROBLEM DEFINITION

- BUILD A DSS
- Machine to Machine (M2M) INTERACTION
- ANALYSIS AND INTELLIGENT PREDICTION

SCOPE

- WHAT WE PLAN TO DO? { ML and IOT }
- Which ML Algorithm? (KNN)
- Target Value? (4 target values)
- Output- flow of water through DC water pump

KNN



- **Lazy Learning**:

No learning of the model is required and all of the work happens at the time a prediction is requested. As such, KNN is often referred to as a lazy learning algorithm.

- The model representation for KNN is the entire training dataset.
- Predictions are made for a new instance (x) by searching through the entire training set for the K most similar instances (the neighbours) and summarizing the output variable for those K instances.

- Euclidean distance is calculated as the square root of the sum of the squared differences between a new point (x) and an existing point (xi) across all input attributes j.
  - **Euclidean Distance (x , xi) = sqrt(sum((x j – x i j)^2))**

Hamming distance, Jaccard, Mahalanobis and cosine distance

(Euclidean best when ?) (Manhattan best when ?) (if Unsure which to use then?)

KNN FOR CLASSIFICATION

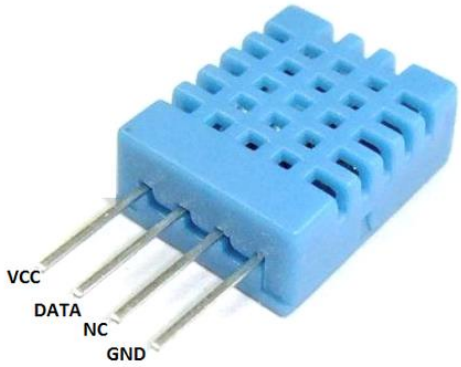
- When KNN is used for classification, the output can be calculated as the class with the highest frequency from the K-most similar instances. Each instance in essence votes for their class and the class with the most votes is taken as the prediction.
- NOTE
  1) We have 4 target classes so it's a good idea to keep K as odd.

  But why?

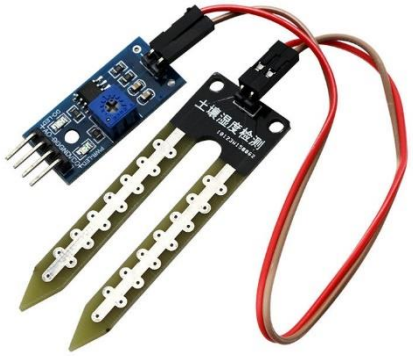
  KNN works well with a small number of input variables (p), but struggles when the number of inputs is very large.

IOT

RASPBERRY PI3 IS USED TO INTEGRATE THE SENSORS AND ML MODULES

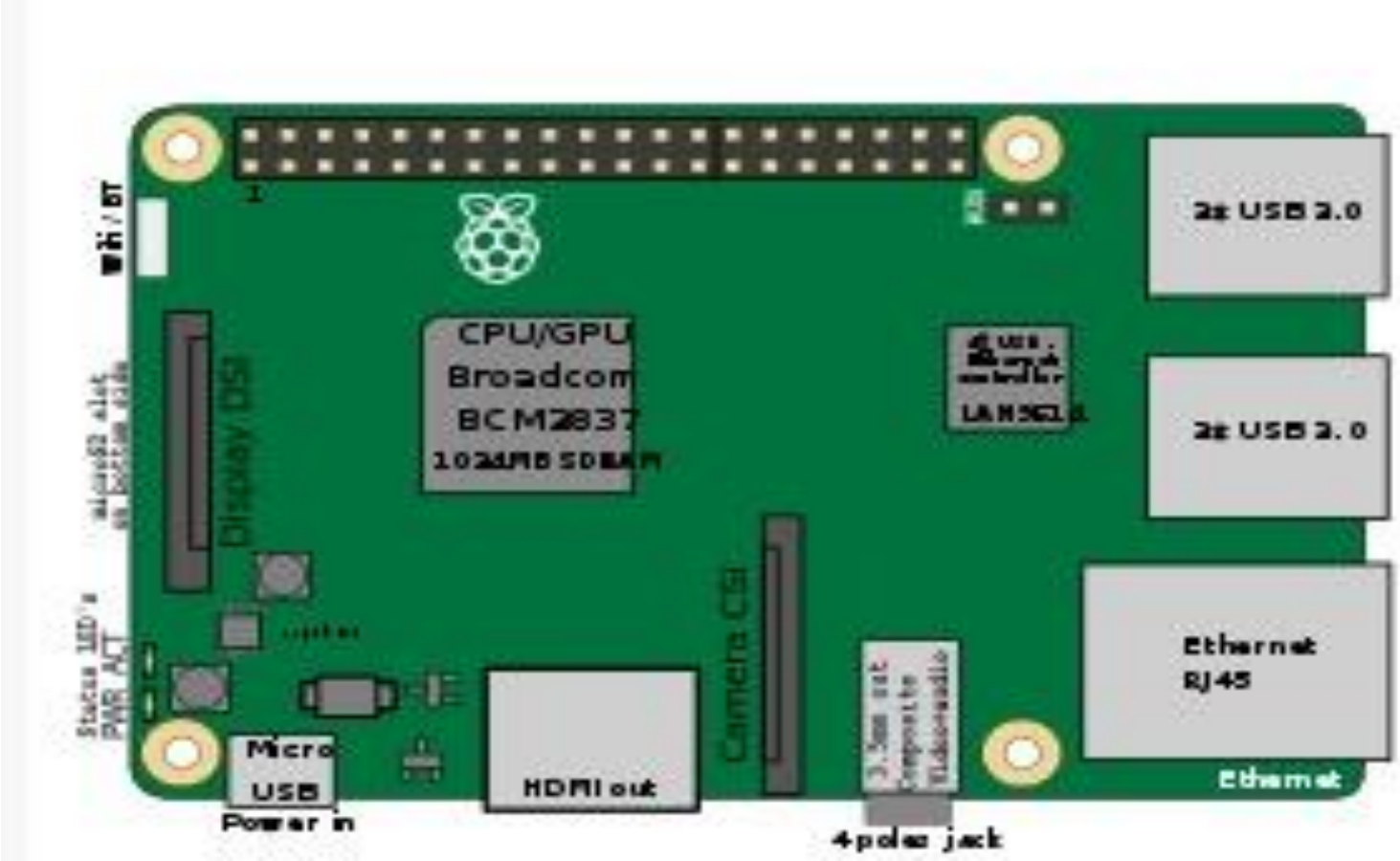


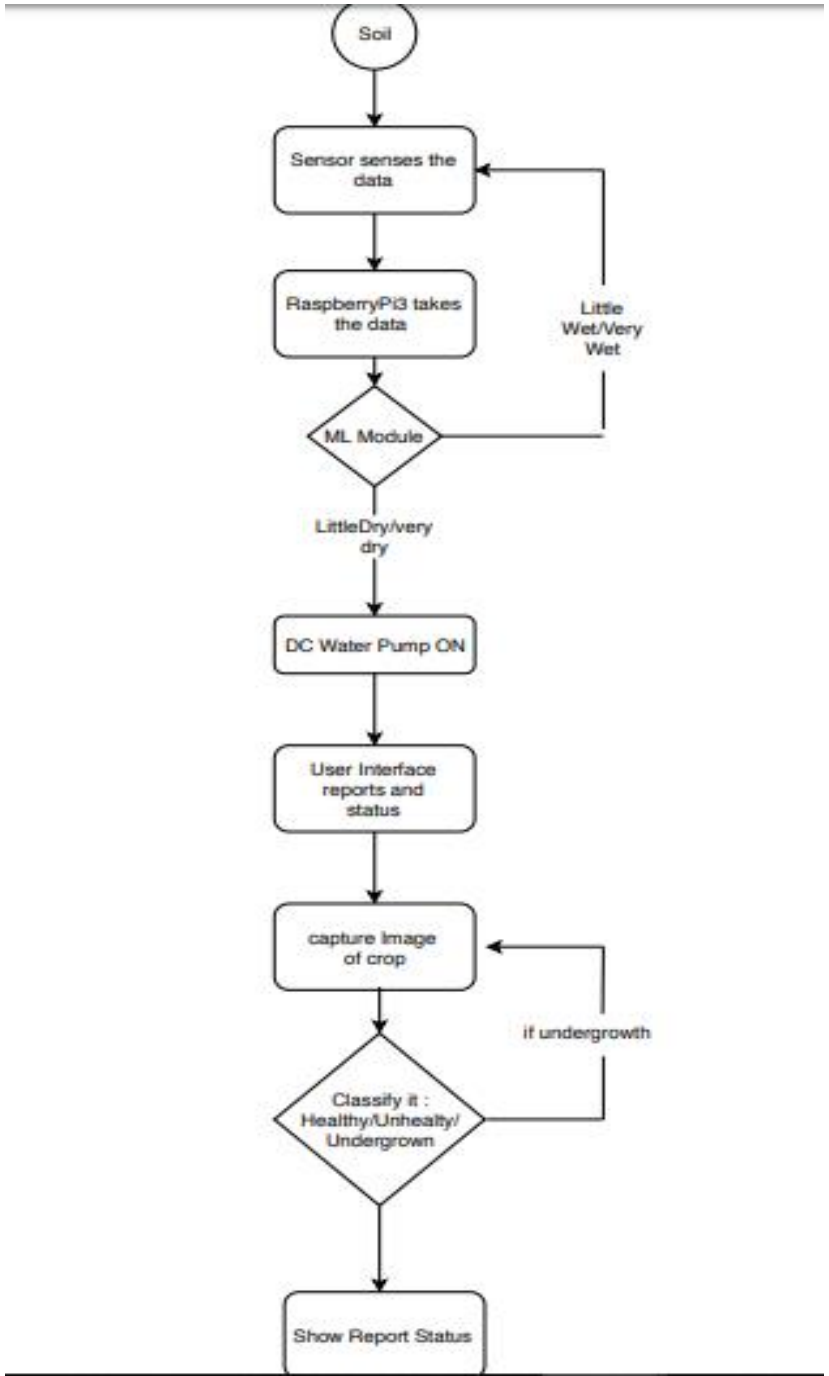
DHT11 Temperature and Humidity Sensor



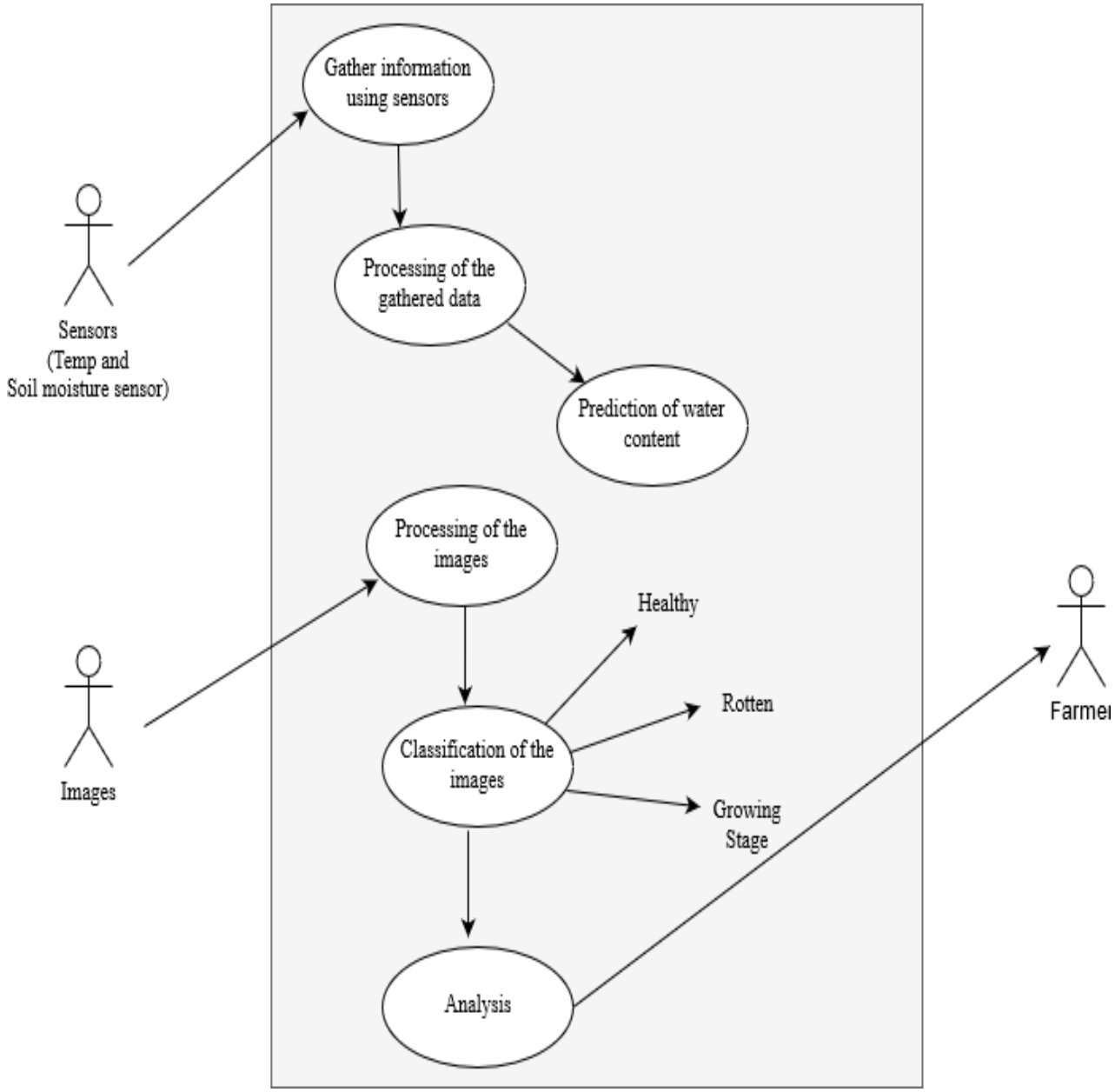
FC 28 Soil Moisture Sensor

RASPBERRY PI 3





ACTIVITY DIAGRAM



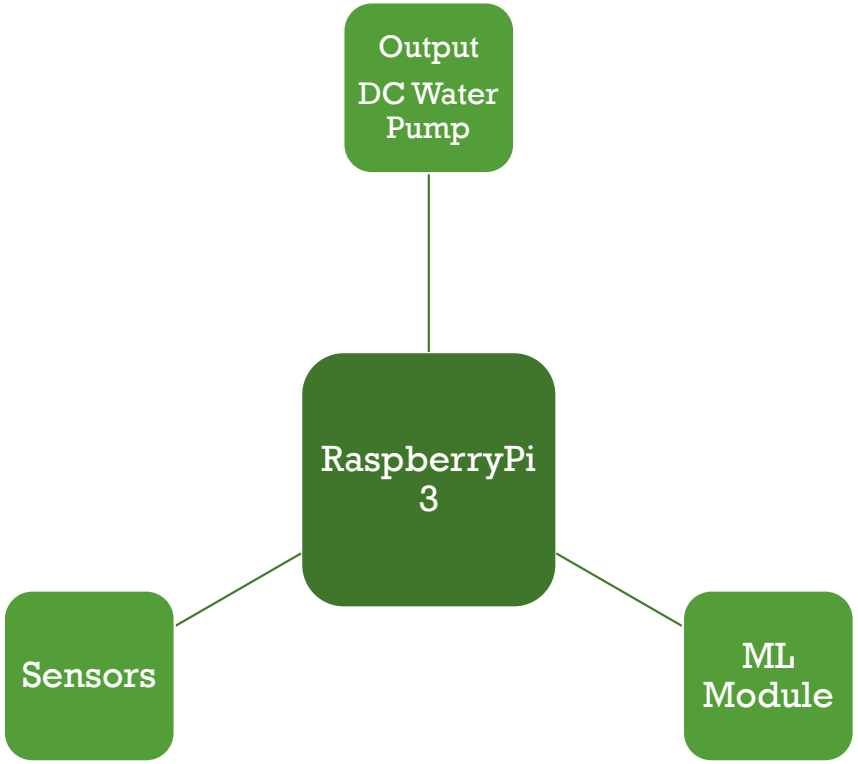
USE CASE DIAGRAM

TECHNOLOGY STACK

Programming languages Used:

- Machine Learning : Python and it's libraries
- Raspberry Pi3 : GPIO (general-purpose input/output) with Python
- GUI : HTML/PHP

WORKING



BENEFITS FOR ENVIRONMENT & SOCIETY?

- Effective use of water is the mantra of our project.
- Some crop requires more water than others.
- Water requirements will automatically be detected depending upon on the moisture content of soil, temperature, humidity and climate and also depending upon on the water requirements for the particular crops

WIRED STAFF BUSINESS 03.19.06 12:00 PM

Farms Waste Much of World's Water

MEXICO CITY – Farms and their wasteful irrigation systems are major contributors to water scarcity on the globe, nations at a world water summit said Saturday.

Farming accounts for 70 percent of the water consumed and most of its wasteful use, said representatives of 130 nations at the World Water Forum discussing water management.

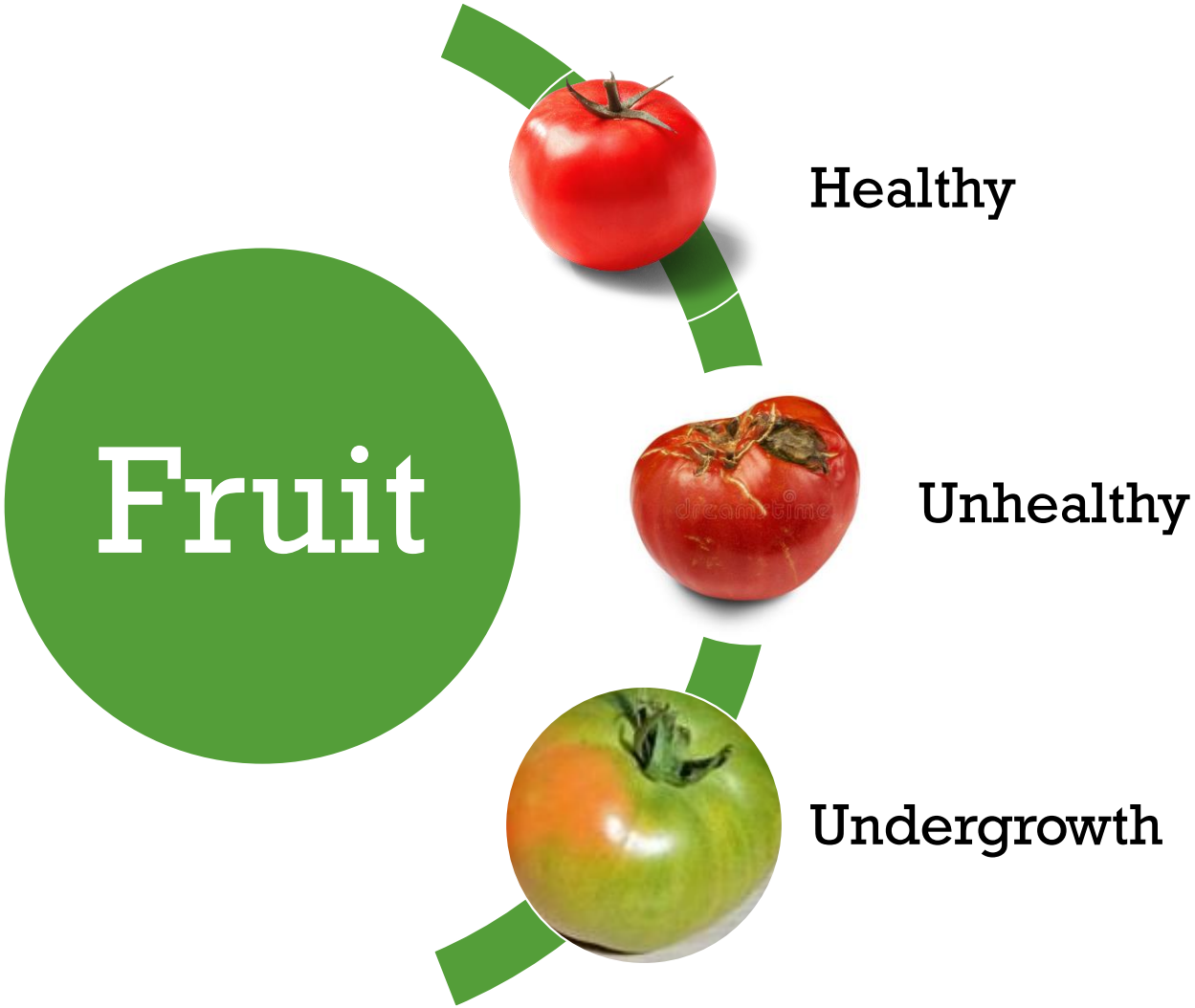
One-fifth of the world's population lacks safe drinking water, the United Nations said in a report last week that laid much of the blame on mismanagement of resources.

No water-shortage in India, but huge water-waste

By: The Financial Express | Published: April 21, 2018 4:16:28 AM

A fourth of land produces rice/sugarcane but uses 60% of water, flood irrigation means an extra water loss of 35%

QUALITY ASSESSMENT(THROUGH CNN)



APPLICATION ?