

Omdena (Algeria Chapter)
Green Algeria Project

Task - 1

Research and Problem Study



Task - 1 Overview

This task is divided into 3 subtasks:

- 1) **Time series problem** (by Djazila Souhila Korti)
- 2) **Computer Vision problem** (by Argish Abhangi)
- 3) **Recommendation system** (by Hamza Riabi)

Time series problem (Sub-task 1)

dataset	Year/ location	Crop/ Vegetable	Variables measured	Frequency of measurements	Number of samples	Other remarks
Autonomous Greenhouse Challenge(AGC) - 2nd Edition	2019-2020 Wageningen University & Research in Bleiswijk, The Netherlands	Cherry tomato (5 compartments of 96 m ²)	<ul style="list-style-type: none"> • Weather(outside) • Greenhouse climate(inside) • Production • Crop parameters • Ressources • Tomato quality • Lab analysis 	<p>The frequency of measurement varies according to the parameters</p> <p>Interval : 6 months of the first half year of 2020</p>		<ul style="list-style-type: none"> • No water, soil, air pressure measurement, • Missing data from 28/02->03/03
Agricultural dataset	2017-2018 China	<ul style="list-style-type: none"> • Tomato • Pepper • Cucumber 	<ul style="list-style-type: none"> • Indoor temperature (°C) • Indoor humidity(%) • Indoor light(umol/m²/s) • Indoor Co2(ppm) • Soil temperature(°C) • Soil moisture(%) 	<p>Every minute</p> <ul style="list-style-type: none"> • Tomato: 05-14-2017->02-05-2018 • Pepper: 05-14-2017->07-10-2017 • Cucumber : 05-14-2017->07-31-2017 	<ul style="list-style-type: none"> • Tomato : 319130 • Pepper : 88312 • Cucumber : 69438 	No water, air pressure and outdoor measurment
Data stations	2022 Greenhouse in the University of Patras, Greece	Not mentioned	<ul style="list-style-type: none"> • Indoor temperature • Relative humidity • Wind speed • Solar radiation • photosynthetically active radiation 	<p>Every 10 minutes</p> <p>Interval 14-02-2022 ->05-09-2022</p>	29196	<ul style="list-style-type: none"> • No water, soil, air pressure measurement, • Missing data from 28/02->03/03

Time series problem (Sub-task 1)

dataset	Year/ location	Crop/ Vegetable	Variables measured	Frequency of measurements	Number of samples	Other remarks
Greenhouse Sensor Data - 10 minute interval	2021	Not mentioned	<ul style="list-style-type: none"> Indoor temperature (°C) Indoor humidity(%) Indoor light(umol/m²/s) Indoor Co₂(ppm) Total volatile organic compounds (ppb) 	Every 10 minutes interval : 03-03-2016 -> 03-07-2016	17562	<ul style="list-style-type: none"> No water, soil and outdoor data
Crop recommendation	India	22: rice,maize,chickpea,kidney beans,pigeonpeas,mothbeans,mungbean,blackgram,lentil,pomegranate,banana, mango,grapes,watermelon ,muskmelon,apple,orange, papaya,coconut,cotton,jute,coffee	<ul style="list-style-type: none"> Global radiation Temperature in greenhouse Relative humidity Irrigation Irrigation time Rain water Drain 		2200	<ul style="list-style-type: none"> The dataset is already augmented Only 100 samples per crop/vegetable
Greenhouse data experiment drip irrigation	2016 The Netherlands	Sweet pepper(1 compartment of 120 m ²)	<ul style="list-style-type: none"> Indoor temperature Relative humidity Wind speed Solar radiation photosynthetically active radiation 	Every 5 minutes interval : 30-05-2016 -> 07-06-2016	2510	<ul style="list-style-type: none"> Small dataset

Selection criteria

- Number of features
- Time step measurement
- Number of crops
- Interval of measurement
- Availability of articles and notebooks for reference

Selected Datasets

-> Autonomous Greenhouse Challenge(AGC) - 2nd Edition

- > Provides in details indoor and outdoor features
- > A large dataset
- > Raw data
- > Related PDF with detailed description

-> Agricultural dataset

- > Consists of 3 data sets of 3 vegetables
- > More features
- > Large number of samples

Computer Vision problem (Sub-task 2)

Dataset	No. of Species/ Diseases/ Pests/ Weeds	No. of Images
<u>spMohanty/PlantVillage-Dataset</u>	12 (Species + Diseases)	-
<u>/emmarex/plantdisease</u>	3 Species	20k images
<u>digipathos-rep.cnptia.embrapa.br</u>	21 (Species + Diseases)	-
<u>vipooooool/new-plant-diseases-dataset</u>	14 (Species + Diseases)	87.9k images
<u>icgroupcas.cn</u>	14 (Species + Diseases)	-
<u>PlantDoc-Object-Detection-Dataset</u>	30 (Species + Diseases)	2.5k images
<u>bisque.cyverse.org/</u>	102 (Insects/ Pests)	75k images
<u>/ravirajsinh45/crop-and-weed-detection-data</u>	-	66.5k images
<u>datasets.activeloop.ai/plantvillage-dataset/</u>	39 (Species + Diseases)	61k images

Datasets with singular plant species

Dataset	Plant Species	No. Of Images
<u>3rd Autonomous Greenhouse Challenge Online Challenge Lettuce Images</u>	Lettuce	-
<u>noulam/tomato</u>	Tomato	22.9k images
<u>wheat-leaf-dataset</u>	Wheat	407 images
<u>Rice+Leaf+Diseases</u>	Rice	-
<u>https://osf.io/p67rz/</u>	maize (corn)	18k images
<u>crop-and-weed-detection-data-with-bounding-boxes</u>	sesame	1.3k images

Selection criteria

- Number of Plant Species and Diseases
- Number of Images
- Available guides/ related works/ models

Selected Datasets

Plant Village (Full) dataset [\(Link\)](#)

- > Provides most plant species + disease classes
- > Large amount of Images per class
- > Related website with detailed description

Alternatively,

- > We can combine multiple datasets to increase the plant species and diseases.

Problem Statement

- The choices of crops and soil types
- High water consumption
- High quality of products
- Productivity
- Preparation, planting, nurturing, and harvesting.

Proposition :

Recommender system for decision-making

Contributors (sub-task 3)

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