Project Design Phase 1

Solution Architecture

Date	19th September 2022
Team ID	PNT2022TMID08179
Project Name	Estimate crop yield using data analytics
Maximum Marks	4 marks

1. Introduction

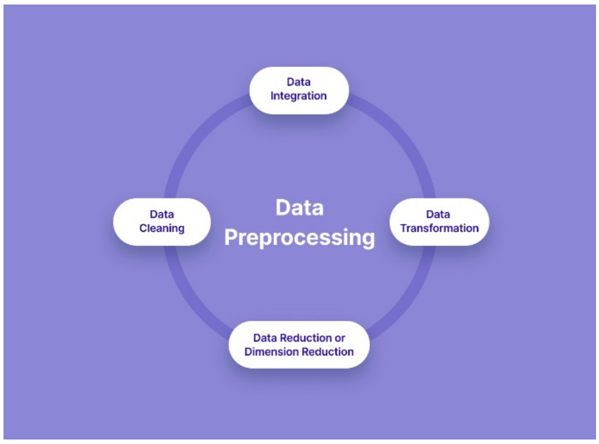
Precision agriculture is defined as the integration of technology in different facets of agriculture. Many aspects of agriculture benefit significantly from automation; from monitoring soil and crop conditions, to assisting in irrigation, plant treatment and harvest. One of the earliest successful works in precision agriculture is the use of wireless sensing to monitor soil conditions. For example, Corwin et al. found that the electrical conductivity of the soil highly affects its productivity through measuring it via soil sensors.

There are other works that utilize sensing for detecting abnormalities within the crop. Tian et all.aimed to focus on weed detection as it is a common problem with any field of crops. They introduce a sensor capable of detecting weed fields, so that once a farmer sees areas that are affected by weed infestations, they can more swiftly and precisely treat it before it spreads to other patches. In general, understanding conditions of the crop and soil aids the farmer in making informed decisions, directly affecting farming efficiency and profitability. In this paper, we specifically target crop yield estimation, and the use of spatial data to visualize the acquired yield.

Crop yield estimation, which we also refer to as fruit counting in our work, is the process of producing an estimated count of fruit or vegetables within their respective field. The farmer can then use the count to decide on what to do for harvest. Specifically, resources such as man power, trucks and other vehicles, storage and packaging. For our paper, we develop a fully DL-based framework to perform yield estimation and support harvest decision making. We divide our framework into two main components: yield estimation and yield mapping. We perform yield estimation by counting fruit yield through videos.That way, our solution is robust enough to work on any type of fruit from video feeds as opposed to limited static images. This is quite efficient and scalable with the integration of mobile sensors (e.g., robots and drones) that would autonomously navigate through crop fields and capture video footage. We then incorporate spatial information about the yield to recommend optimal placement of harvest containers to reduce the number of required bushels and save their collection efforts, enabling farmers to make better use of their resources while optimizing the harvesting process.

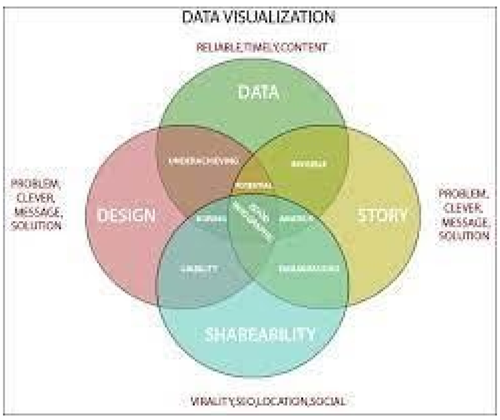
1. Collecting Estimate crop yield

Dataset



2. Pre-processing the data

3. Applying machine learning algorithm to test and train the data.



4. Visualizing the Data