

## **Group Details**

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## **Research Area**

Image Processing and Machine Learning

## **Research Topic**

“Identifying Diseases and Pests that harm Rice crops as well as the classification of Rice seeds with the inclusion of Soil Quality in paddy fields”

## **Research Problem**

In today's world when we talk about rice, it has become one of the most crucial energy sources for most of humanity and even more so to people from Asia and Africa who consume it on a daily basis. It is currently the world's third highest production after sugarcane and maize. Since those two aren't only for human consumption, it is safe to say that Rice is the most important due to the factors of human nutrition and caloric intake. These Rice can fall prey to multitude of diseases and pests with it being found that 37% of rice crops are lost to them. This in turn has major ramifications for the economy.

The first major issue when it comes to rice is something that all agricultural crops tend to have, which is the prevalence of Diseases that are native to Rice as well as ones that are not. With new diseases and sicknesses being found each passing day adding to the staggering number of them already found, it becomes difficult for the common farmer to identify and treat them on their own. If these are not found early, it might become difficult to treat them or save the ones that are healthy.

The second major issue is the fact that Pests and other unwanted insects being attracted to the crops. These pests might be the reason that diseases are created from the plant as well as the reason to those who distribute them. They themselves, even while not spreading disease, might affect the crops in a negative way such as consuming them and making the crops unsanitary for human use. These pests can be difficult to be found without expert eyes and most of the time found after the damage has already been done so it is necessary to find them as soon as possible.

The third issue we found is that the classification of seeds belonging to rice crops. It has been apparent that manual classification methods are time consuming, costly as well as unreliable. Some alternative method must be found that could increase productivity taking into account speed, accuracy and sustainability.

The final and forth issue that has come to our attention is the quality of soil that the paddy fields are located in. Some of these soils might be polluted with toxins and heavy metals that could hinder the growth of crops as well as contaminating them. A solution to this should be found so that land could be efficiently and effectively be used to bring the highest quality yield possible.

## **Soultion**

We have primarily decided to create a mobile application that uses image processing so that the Crops can be analyzed using an image taken from the mobile camera and then discover the most appropriate solution for the said crops, let it be either for diseases, Pests, Identification of seeds or the quality of the Soil.

For,

- Diseases - Identification, Treatment and Prevention methods
- Pests – Identification and Removal
- Seeds - Identification and Classification
- Soil - Identification and Analysis

## **Components**

- Disease detection
- Pest detection
- Seed Classification
- Soil Quality Measurement

These below-mentioned Research Papers were used as the basis for our Research:

<https://www.sciencedirect.com/science/article/pii/S1877050920307742>

<https://www.hindawi.com/journals/js/2020/7041310/>

<https://www.sciencedirect.com/science/article/abs/pii/S1537511020300830>

<https://ieeexplore.ieee.org/abstract/document/9076527>