**“E-KETHA” : ENRICHING RICE FARMER’S QUALITY OF LIFE THROUGH A MOBILE APPLICCATION.**

Project Id

Project Proposal Report

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**Declaration, Copyright Statement and The Statement Of The Supervisor**

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The supervisor/s should certify the proposal report with the following declaration.

The above candidates are carrying out research for the undergraduate Dissertation

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Signature of the supervisor: Date:

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# ABSTRACT

In our country of Sri Lanka, rice is the most common type of food that is consumed in a daily basis. Due to that rice farmers face a huge amount of stress to supply according to the massive demand. Identifying the growth of the paddy plant in the field of paddy cultivation is one of the most important roles in the field of paddy cultivation. The growth of paddy seedlings is a natural process and if proper care is not taken in this area it can cause severe growth retardation of paddy plants. Therefore it affects the productivity, quantity, and quality of paddy products. Some other reasons for paddy retardation are diseases, lack of water, and fertilizer not only limiting the growth of the plant but also reducing the yield of paddy and destroying it. Therefor it is necessary to identify the cause of growth reduction. Image processing is used to measure the growth of the paddy plant and the reason for the defect while machine learning will give the most suitable solution.

 Keywords :- machine learning, image processing, deep learning, rice crop, height, paddy plant

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# INTRODUCTION

## **Background**

One of the staple food in Sri Lanka is the common rice that can be farmed in paddy fields. Due to various reasons farmers find it difficult to reach the demand quota. One particular reason for this is the issues when it comes to the growth of rice plants.

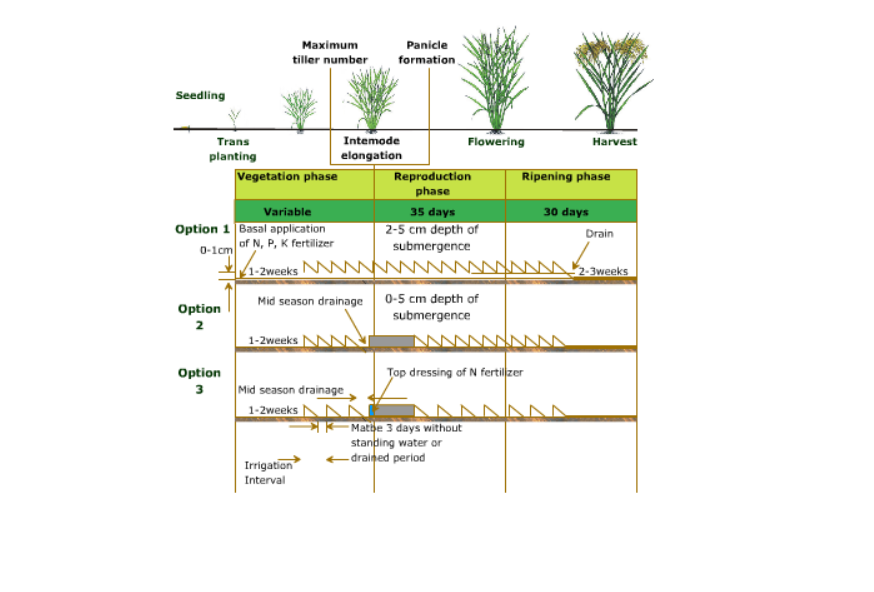


Figure :Rice plant growth lifecycle

As it is shown in the above diagram there are many different lifecycle stages when it comes to rice plant. These phases can vary according to the rice plant. Since the proper treatment and needs of the rice plant changes frequently it could be difficult to properly treat them. Due to this, farmers lose much produce and profit.

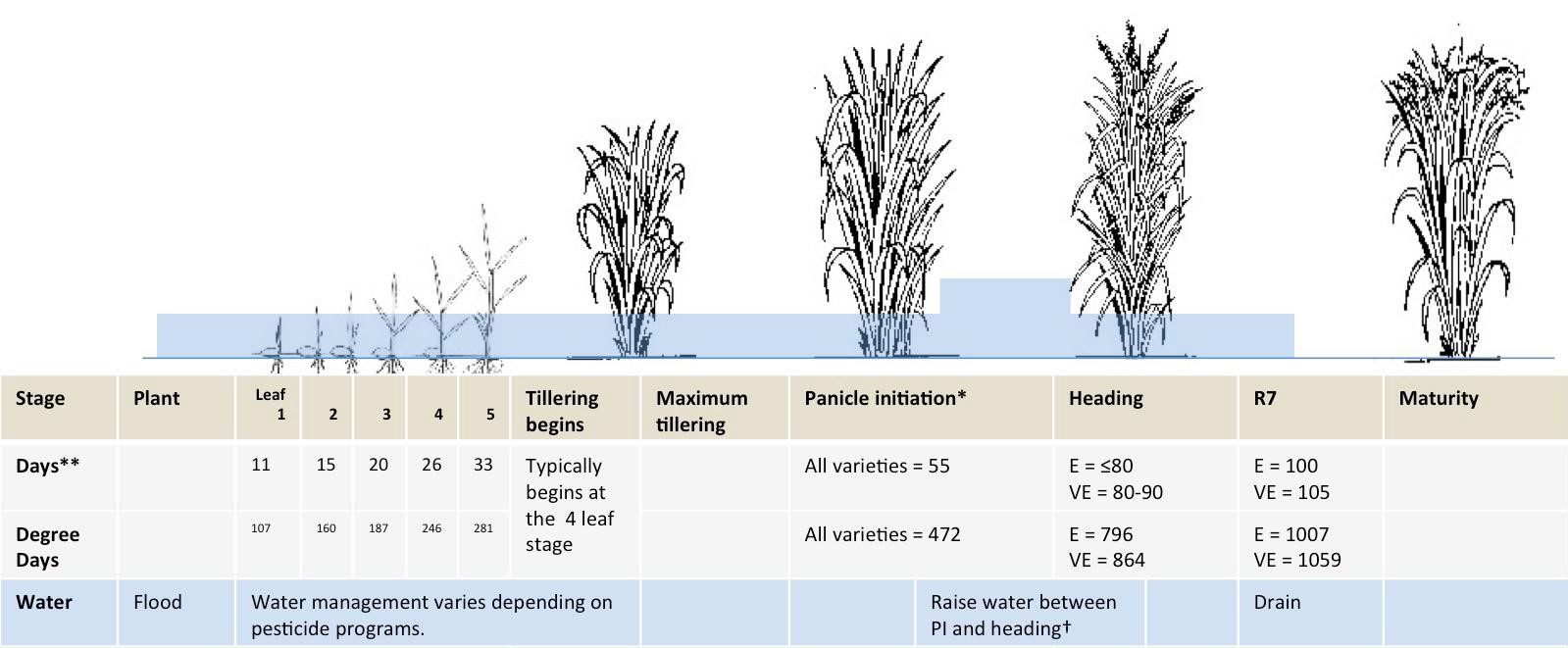


Figure :Rice age and growth

As it shown in the about diagram [6] it is clearly evident that to get maximum harvest out of the crop proper growth necessary. To identify the best harvesting we need to identify the stage that the plant is in. In order to know the stage the no of days are also a necessity.

## **1.2 Literature Survey**

### **1.2.1 Rice Crop Height Measurement Using a Digital Image Processing**

This is a plant height identification method currently in operation in Thailand. It detects the height of the plant and shows the height of the plant to the user. But it does not use a mobile app.

Here is an automatic image processing method to identify the user based on the photos taken by a digital camera mounted on a field server, including a marker bar used to describe the height of the rice plant. Height can be assessed by analyzing the uploaded image obtained by the user. Digital image processing for analysis uses four steps to automatically measure rice crop height. Therefore, it is possible to get the height of the rice tree [3].

### **1.2.2 Measurement of crop height using UAV-Based Lidar**

This is an application based on finding height measurements. It is considered by many plants, but not so for paddy plants. You are a farmer and it is important to conceptualize crops because of the increasing pressure on food production. Therefore, an accurate assessment of biomass during the growing season is important to optimize yield.

Therefore, UAV-LiDAR examined data availability for estimating fresh biomass and crop height for three different cultivars (potatoes, sugar beets, and winter wheat). This was done using the algorithm 3DPI to estimate the crop height using the mean height of the highest point variable number of the plant.

It does not use a mobile application for height measurement, and for maximum efficiency, it uses RGB cameras mounted on a vehicle's LiDAR-based system or UAV (unmanned aerial vehicle), plant height, LAI, and leaf cover section. Such characteristics are determined directly in the field [1,2].

### **1.2.3 Measurement of plant heights in an agricultural field using a time-lapse camera**

This is an application used to measure plant height with adequate temporal and spatial resolution. This is a low cost and easy to use method for height search. Here the use of a camera is to capture seasonal and year-to-year variations in plant height that represent plant height on a site scale. This method was used to determine the height of the plant up to the nearest 1 cm from the camera images by pointing a certain scale strip at a particular field.

The obtained plant heights were corrected for vertical distortions and a good agreement on plant height was obtained by comparing them with direct height measurements for each of the target plants and site-scale plant heights averaged from the 10 samples. It does not use a mobile application and image processing but uses a sensor and a digital camera [4].

### **1.2.4 Measurement of heights of rice and tiller fragmentation of rice crops**

This research is done by accessing the height and tiller count which is necessary for accessing a plant’s phenotype. The automation of phenotyping recommended here makes it so that manual visual assessment it not needed due to the highly accurate, reproductive, and traceable image processing.

By applying HSV and thresholding for processing, Canny Edge Detection (tiller) and Zhang-Suen Thinning Algorithm (height) for the plant structure and the Euclidean Distance for measuring the height, tiller counting is done. 17.25% for height and 34.02% for tiller count were found during the testing and this may be cause of plant not able to fit the frame. This may be also cause of yellow leaves remove done during processing [5].

## **1.3 Research Gap**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Features** | 1 | 2 | 3 | 4 |
| Height measurement | Yes | Yes | Yes | Yes |
| Growth phase deduction | Yes | No | No | No |
| Aerial Imagery Used | No | Yes | No | No |
| classify rice plant height | No | No | Yes | No |
| Propose Solution on how to growth of the plant | Yes | No | Yes | No |

Table :Comparing existing application and our application features

## **Research Problem**

Rice productivity is highly dependent on the Sri Lankan economy. Now a days paddy growers are moving away from paddy cultivation. The main reason for this is that they are not able to earn a fair income. This is a major problem in paddy cultivation.

The growth that affected rice plants is one of the major problems in paddy cultivation. Paddy growers lose a large percentage of their annual paddy harvest due to a lack of knowledge about the growth of paddy cultivation. Farmers are not aware of the process of increasing the growth of paddy. Also, due to the lack of support from technology, the younger generation is moving away from paddy cultivation.

So the solution is to create a mobile application that works in parallel to these major problems in paddy cultivation. Using this application, paddy growers can gain knowledge about their growth of paddy cultivation and how to uplift profits

## **OBJECTIVES**

### **2.1 Main Objectives**

The main objective of identifying the growth of paddy plants is to create an Android-based mobile application that analyzes the changes in the paddy tree using image processing technology and tracks the height of the paddy tree. The Mobile-based application is used to identify the height of a paddy tree with the help of an automated algorithm. The algorithm uses the database to identify the most vulnerable and predict the most accurate outcome. In addition, the application provides treatment to a paddy grower to increase the growth of paddy cultivation.

### **2.2 Specific Objectives**

01 The application identifies the growing height of the rice plant by analyzing the changes in the growth of the paddy plant.

The paddy grower uses a mobile phone at a specified distance from a rice plant to take an image and upload it through the application using image processing technology. The application compares the height changes of a paddy plant with the data uploaded in the database and identifies whether the paddy plant has grown or not.

02 Application Rice plants are classified according to their height.

Once the height scale is successfully identified, the rice plant is classified according to its growing size. There are stages of good, normal, low and so on.

03. The application will treat according to height type and the current status of height.

The application will suggest treatments to enhance the growth of the paddy plant to the identified heights

# METHODOLOGY

This section will entail the details on the techniques and mechanisms that are employed to create the Growth Detection component, belonging to the “e-ketha” application from the data gathering stage all the way to implementation. Details include how the software will be used in our project what materials and data will be required, and how they will be collected.

## **3.1 Height Identification Of The Rice Plants**

Height affects the growth of paddy. Growth for height has a life cycle of several different loves. These include seeding, transplanting, maximum tillering, panicle formation, flowering, and harvesting. Many farmers have no knowledge of growth.

Therefore create a database on paddy cultivation using data excavation techniques and model analysis. The training database is retrieved with the information provided by the user. The user uploads the tall image of the paddy plant to the mobile application system and at the same time takes the date and time as user input. The image is then analyzed and the result obtained with the date and time obtained from the user identifies how much the rice tree height has increased with the database. If it is identified as low growth, it will show the treatment methods required for paddy cultivation. The height of the paddy tree must be accurately identified for this process. The height of the paddy tree should be taken at a specific distance. Image processing and machine learning techniques are used for this process to give the correct result.

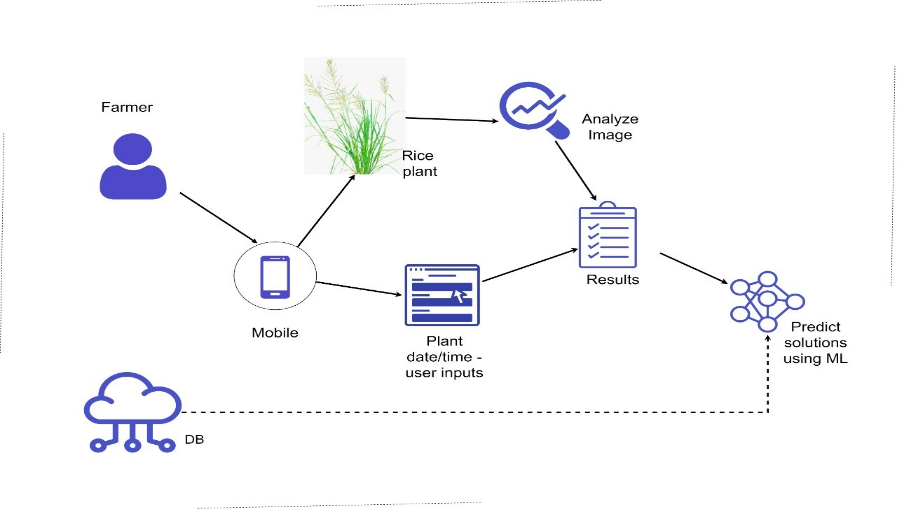


Figure :Growth tracker overview

## **3.2 Research Area**

Our research area comes up with four features. There are Image processing activities, Prediction activities and analyzing. In order to conduct my research, I have to need to follow some data mining technology and image processing technology.

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