Farming Techniques of Leaf Growth

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Abstract

Various aspects of the experimental style and machine ways employed in leaf growth analysis was investigated. In plants, investment in height improves access to lightweight, but incurs prices in construction and maintenance of the stem. As a result of the advantages of leaf height rely upon that different height ways are gift, competition for lightweight will usefully be framed as a game-theoretic downside. The vertical structure of the world's vegetation, that is inefficient for plant growth, will then be understood because the outcome of organic process and ecological arms races. Additionally, game-theoretic models predict taller vegetation on sites of upper leaf space index, associated allocation to copy only when an initial amount of height growth. However, of fourteen game-theoretic models for height reviewed here, only one predicts existence of a combination of height ways, a conspicuous feature of most vegetation. We recommend that game-theoretic models might facilitate account for ascertained mixtures of height ways if they incorporated processes for existence on spectra of light income and time since disturbance. We propose a replacement image process technique which can resolve the proportion of inexperienced pigmentation in plant and changes occurred in plant together with day to day basis. We have design the technique we first convert an image into Gray shade so that it will easy to identify the Chlorophyll Percentage. This technique also finds whether the leaf grows properly or not. If it does not grow properly then it will also suggest some fertilizers for the plant.

Keywords: *Chlorophyll, phytoplankton, spectrophotometric, phaeopigments*

INTRODUCTION

Plant roots are systems whose growth is sometimes treated as one-dimensional. The mathematical technique used in the literature is due primarily to Richards and Karanaugh.[2] Their model enables the experimenter to notice and to focus his attention on regional differences in growth rate.hey measured the extent to which different regions contributed to the growth process and how this might have accounted for the final shape of the leaf. More recently, Erickson (1) has done a detailed study of the Xanthium leaf using improved experimental and data retrieval techniques, coupled with numerical techniques and computer processing. A major step toward understanding the growth process would be to explain the observed growth distribution.[1]

In plants, investment in height improves access to light, but incurs costs in construction and maintenance of the stem. Because the benefits of plant height depend on which other height strategies are present, competition for light can usefully be framed as a game-theoretic problem. The vertical structure of the world's vegetation, which is inefficient for plant growth, can then be understood as the outcome of evolutionary and ecological arms races.[6] In addition, game-theoretic models predict taller vegetation on sites of higher leaf area index, and allocation to reproduction only after an initial period of height growth.

However, of 14 game-theoretic models for height reviewed here, only one predicts coexistence of a mix of height strategies, a conspicuous feature of most vegetation. We suggest that game-theoretic. Models could help account for observed mixtures of height strategies if they incorporated processes for coexistence along spectra of light income and time since disturbance.[2]

EXISTING SYSTEM

The Kjeldahl method (Chapman and Pratt, 1961) was used for quantitative determination of nitrogen in chemical substances developed by Johan Kjeldahl. Initially a leaf sample of 0.2 g was oven dried for 72 hrs and then properly crushed. The sample was then mixed with 5 mL H2SO4 in the presence of K2SO4 and CUSO4 and then heated in the digestion flask on the heater for 4 hrs. Heating the substance with sulphuric acid decomposes the organic nitrogen to ammonium sulphate. In this step potassium sulphate was added in order to increase the boiling point of the medium (from 3376to 3737). Chemical decomposition of the sample is supposed to be completed after the medium (initially very dark) become clear and colorless. The solution was distilled with sodium hydroxide (added in small quantities approximately 10 ml) to convert the ammonium salt into ammonia. The amount of ammonia present (hence the amount of nitrogen present in the sample) was determined by back titration. The end of the condenser was dipped into a solution of hydrochloric acid or sulphuric acid of precisely known concentration (generally 0.2 to 0.4 N). The ammonia reacted with the acid and the remainder of the acid was then titrated with a sodium carbonate solution with a methyl orange pH indicator. The apparatus used for the estimation of plant nitrogen content is shown in Figure.

Fig: *Kjeldahl apparatus for plant nitrogen estimation*

PROPOSED SYSTEM

Operation:	**Matlab command**
Convert between intensity/indexed/RGB format to binary format.	dither()
Convert between intensity format to indexed format.	gray2ind()
Convert between indexed format to intensity format.	ind2gray()
Convert between indexed format to RGB format.	ind2rgb()
Convert a regular matrix to intensity format by scaling.	mat2gray()
Convert between RGB format to intensity format.	rgb2gray()
Convert between RGB format to indexed format.	rgb2ind()

We have processed an image and found the green pigmentation of various leaf on the basis of digital image processing using MATLAB . This is helpful in the farming to check whether the plant grows properly or not.Digital image processing is a technique to process on image without any difficulty.It shows 90% accuracy of the image processing technique and the greenery of the leaf.[2]

Ratios between various plant pigments possibly indicate the taxonomic composition or the physiological state of that community. The most widely used methods in either fresh or marine waters are based on spectrophotometric techniques1 after plant pigment extraction in acetone, methanol or ethanol.[2]

It is known that no one solvent or mixture of solvents extracts with 100% efficiency from all algal and phytoplankton groups2,3,4. There is conflicting evidence as to the efficiency of each solvent and the stability of the pigments in them. However, it is now generally accepted that extraction by alcohol is superior to acetone for some green and blue algae 5,6. On the other hand, pigments may easily be extracted from diatoms with either acetone or alcohol7 and in fact slightly higher figures were obtained for acetone than methanol 2,3,8,11. Many support the use of acetone for several reasons, e.g. pure chlorophyll is more stable in it, the extinction coefficient is higher in it, the chlorophyll absorption band in the red is sharper in it, the straight forward acidification procedures for estimating chlorophylla and phaeopigments etc.[3]

SYSTEM REQUIREMENTS

1) Software Requirements Specifications:-

1) MATLAB
2) Notepad as database
3) Windows XP
4) Excel Sheet

Image formats supported by MATLAB

The following image formats are supported by MATLAB:

1. BMP
2. HDF
3. JPEG
4. PCX
5. TIFF
6. XWB

Working formats in MATLAB

If an image is stored as a JPEG-image on your disc we first read it into MATLAB. However, in order to start working with an image, for example perform a wavelet transform on the image, we must convert it into a different format. This section explains four common formats.

1)Intensity image (gray scale image)
2) Binary image
3) Indexed image
4) RGB image
5) Multiframe image

How to convert between different formats

The following
table shows how to convert between the different formats given above. *All these commands require the Image processing tool box!*

Image format conversion

The command mat2gray is useful if you have a matrix representing an image but the values representing the gray scale range between, let's say, 0 and 1000. The command mat2gray automatically re scales all entries so that they fall within 0 and 255 (if you use the uint8 class) or 0 and 1 (if you use the double class).

How to convert between double and uint8

When you store an image, you should store it as a uint8 image since this requires far less memory than double. When you are processing an image (that is performing mathematical operations on an image) you should convert it into a double. Converting back and forth between these classes is easy.[2]

I=im2double(I);converts an image named I from uint8 to double.

I=im2uint8(I);converts an image named I from double to uint8.

How to read files

When you encounter an image you want to work with, it is usually in form of a file (for example, if you down load an image from the web, it is usually stored as a JPEG-file). Once we are done processing an image, we may want to write it back to a JPEG-file so that we can, for example, post the processed image on the web. This is done using the imread and imwrite commands. *These commands require the Image processing tool box!* Make sure to use semi-colon ; after these commands, otherwise you will get LOTS OF number scrolling on you screen.

Loading and saving variables in MATLAB

This section explains how to load and save variables in MATLAB. Once you have read a file, you probably convert it into an intensity image (a matrix) and work with this matrix. Once you are done you may want to save the matrix representing the image in order to continue to work with this matrix at another time. This is easily done using the commands save and load. [1]

DATA FLOW DIAGRAM

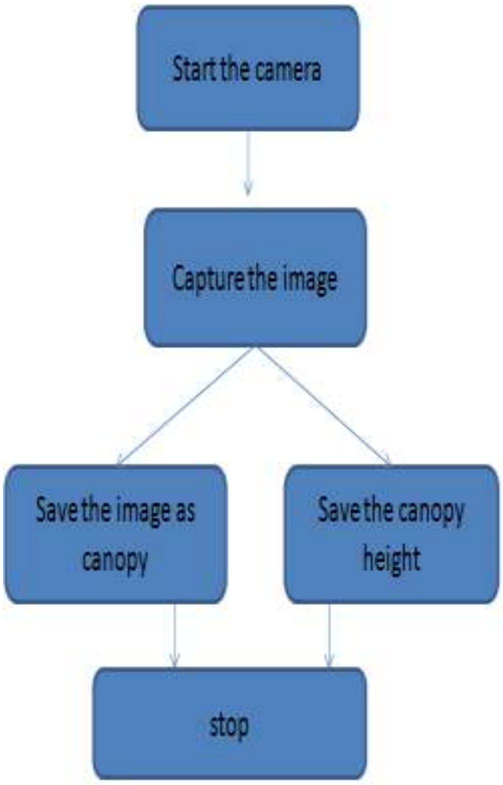
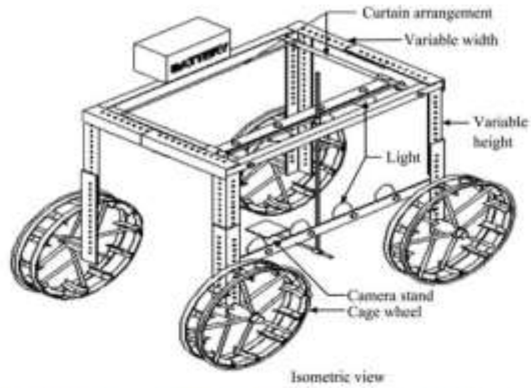


Fig: *Data Flow diagram of Plant Growth Analysis System*

DESIGN AND IMPLEMENTATION:



Trolly for plants

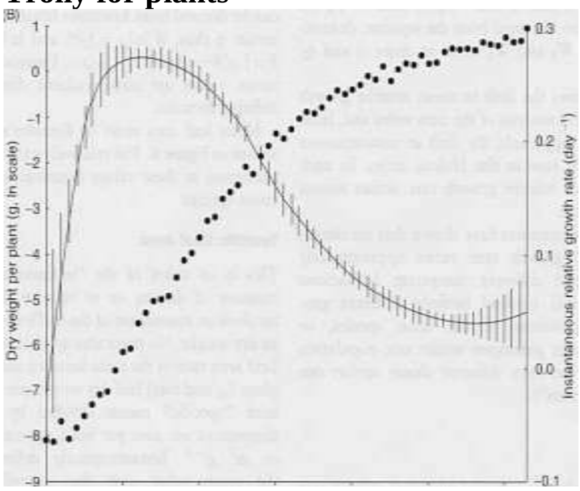


Fig: *Graph of plant analysis*

A manually operated four wheel test trolley was designed and developed for acquiring outdoor color images of plant under controlled illumination to predict crop nitrogen content in field. This set up consists of a camera to capture the plant image, four lights to control illumination and a laptop for processing the signal. The developed unit was evaluated rigorously for paddy crop for four observations at fifteen days interval after transplantation. The results were compared with the chlorophyll content of the crop measured by SPAD meter and the chemical analysis of plant leaf. The processing of the color plant image was done in MATLAB 7.0 program. Various features such as R, G, B, normalized ‘r’ and normalized ‘g’ were analyzed for both the processes. Regression models were developed and evaluated between various image feature and the plant nitrogen content and observed that, the minimum accuracy was found to be 65% with an average accuracy of 75% (Standard Deviation ±1.9), actual and predicted values of nitrogen percent were linearly correlated with $R2$ value (0.948), this showed that the plant nitrogen content can be successfully estimated by its color image feature.

Fig : *Plant Canopy & Growth Analysis Image Capture Tool*

Fig : *Leaf Growth Analysis Image*

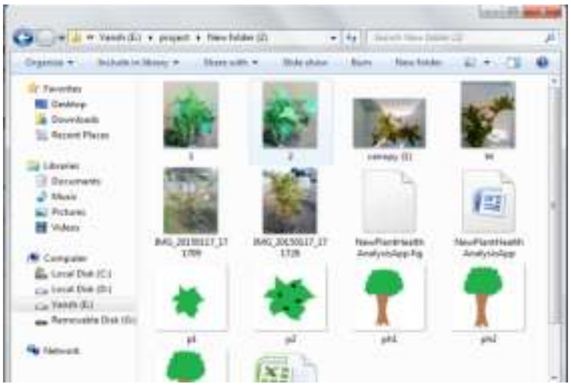


Fig: *Plant growth analyzer application Capture Tool*

The success of farming depends largely on the growth of crops. Crop growth is influenced by a number of factors of which plant nutrients are an important group. There are 16 nutrient elements considered essential for Leaf growth.

An essential plant nutrient element has the following characteristics

1) The completion of the life cycle of the plant cannot be achieved in the absence of such an element.

2) Plays a specific role in the plant.

3) Causes set back to growth of the plant showing visual symptoms when the plant is deficient in it.

4) Essential elements are inorganic in nature and they are grouped into

i. Primary nutrients – Required in larger quantities

ii. Secondary nutrients – Needed in lesser amounts than primary nutrients

iii. Micronutrients – Required in small quantities

These sixteen elements are listed in Table shows Carbon, hydrogen and oxygen are obtained from air & water. The other thirteen elements are referred to as fertilizer elements and have to be obtained from the soil. Their addition in quantities necessary for plant growth will increase the growth rate, dry matter content and yield of the crop. Plant nutrients are usually absorbed through roots. Roots have the ability to absorb nutrients selectively. Water and some dissolved solutes are absorbed by this process.

Carbon dioxide required for photosynthesis and oxygen required for plant respiration are exchanged through the leaves. The supply of an adequate quantity of a particular nutrient for crop growth depends on both the behavior of that nutrient in the soil and the ability of the crop root system to utilize it.

OUTPUT AND RESULTS

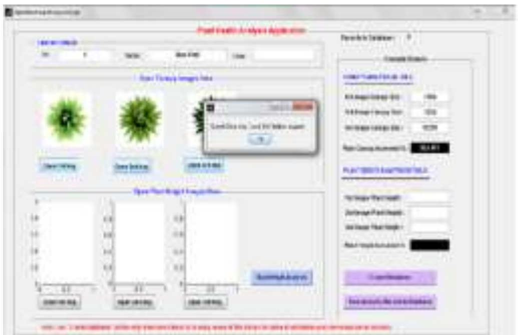


Fig: *Output 1*

Fig: *Output 2*

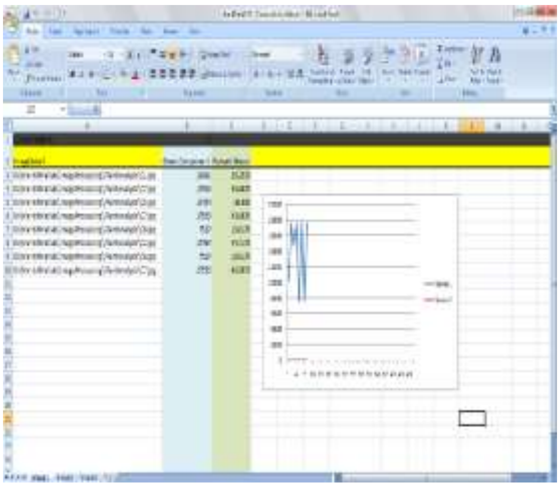


Fig: *Output 3*

CONCLUSION

The main aim of this technique is to have process on image and found the chlorophyll Percentage of leaf we also concluded that whether leaf grows properly or not.This techniques also shows that the leaf needs which type of Fertilizer from our conclusion of image we suggested that the leaf needs the nitrate and the urea. So it grows properly from this techniques are found the 90% accuracy of the leaf.

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