Institute of Technology, Carlow

<u>Computing</u>

Course: BSc (Hons) Software Development Year 4

Author: Eamonn Gaynor

Student ID: C00197458

Tutor: Mr. Nigel Whyte

Document: User Manual

Plant Disease Identification Application

Contents

1. Installation Guidelines

1. To install the mobile application, please visit the link below on an **Android** device:
   http://glasnost.itcarlow.ie/~softeng4/C00197458/index.html
   a. Scroll to 'Documents'.
   b. Select 'APK Download'.
   c. Once downloaded on the device, please allow your mobile to install third party applications. **NOTE:** This can be done by visiting the settings on your mobile device, please refer to manual of your device as they all differ.
   d. Upon launch of the application, please select 'Get Started'. Please select 'Allow' on the alert box for the mobile device to access your location information.
   e. To use the application, you must register an account with the system. To do so, please select the 'Register here' link. Enter the appropriate details and select 'Register'.
   f. Once registered, please use the details provided previous to login to the system.

2. In order to the web application, please visit the link below on your web browser:
   http://www.c00197458.candept.com/PlantVision/login.php
   a. To use the application, you must register an account with the system. To do so, please select the 'Create an account' link. Enter the appropriate details and select 'Register'.
   b. Once registered, please use the details provided previous to login to the system.

2. Introduction

The application allows a client to first register with the system, either by the mobile application or by the web application. They may then log in through the mobile app, from where they can then upload an image of a leaf to the system. By choosing a photo which they wish to upload, they give the leaf a name, and assign it to a group e.g. Group A, Group B etc. Once uploaded, they may log into the web application, choose the leaf they have just uploaded and view key information. Information provided by the system includes the GPS coordinates of where the image was taken, important from a user's perspective as there may several scientists using the one account, this allows the user to identify exactly where the plant was taken. e.g. laboratory, farm etc. Other information included is weather details at the time the image was taken, values such as temperate, humidity, wind speed, pressure, and the description of the day are outlined.

As well as the above, the key feature is where by the user can access the results of leaf with regards to the disease. The leaf is broken down into twelve of the most common colours associated within the image. These colours are presented to the user in a percentage format, from there they can identify to which colour is the disease, and also remove and unwanted information from the analysis e.g. background colours. By doing so, they are teaching the system to remember their selection for results down the line. The user has only to do this once for every group, and it allows the system to learn from previous analysis. The next time the user uploads an image on the mobile app to the same group as previous, they have an option to automatically diagnose the disease. It can therefore identify the part of the leaf which is diseased and from the mobile app it presents the user with the updated percentage of disease coverage. Once the user has uploaded more than one leaf, they may then access the reporting too. The reporting tool uses graphs and charts to present the information of the plant group over time in a useful manner, they may also download a CSV file associated to this information.

3. How To Use

The project is comprised of two applications both mobile and web. This section will outline per each particular screen, for each application its purpose description of how it works.

2.1 Mobile Application

The mobile application is designed to allow the user to upload an image to the system. The uploaded images can then therefore be accessed by the web application, please see 2.2 Web Application. When using the mobile application will log in, and choose to upload an image filling in details such as the name of the leaf and the group to which it belongs.

2.1.1 Splash Screen

fig 2.1 Splash screen

Upon launch of the application, this is the first screen (fig 2.1) the user is presented with on the Plant Vision app. This screen is a simple splash screen, select the get started button to move the user to the login screen where you may log into your account. Please select 'Allow' on the alert to access your location details.
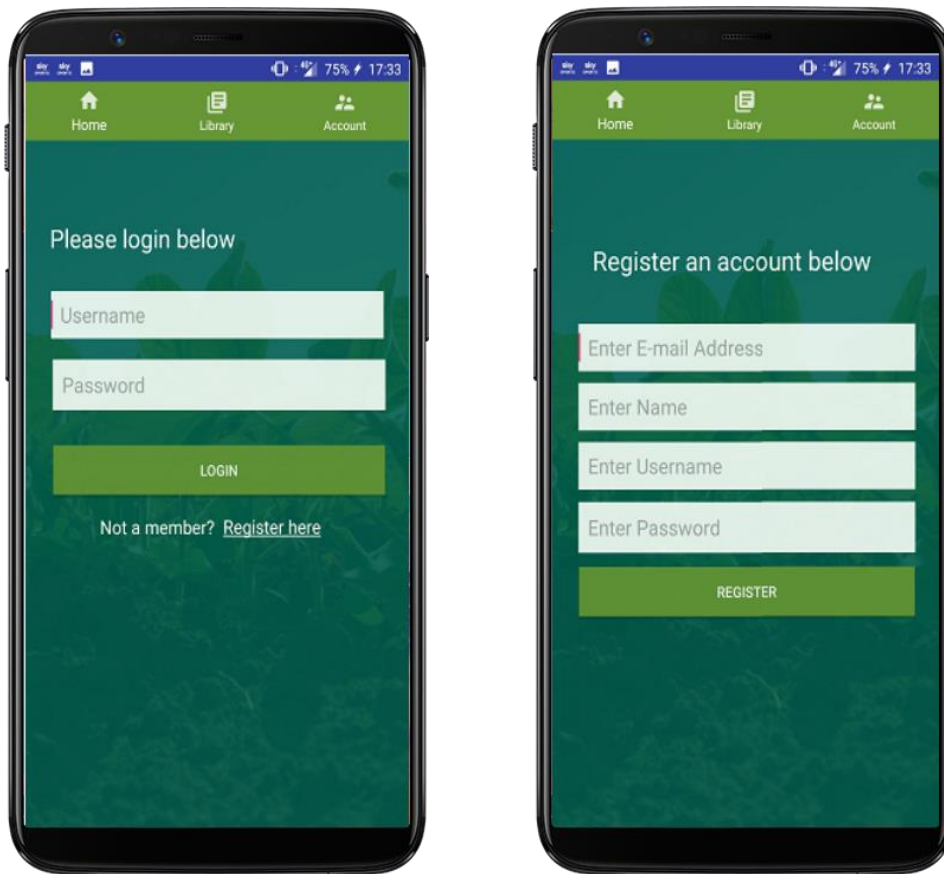
2.1.2 Login & Register Screen

fig 2.2 Login and register screen

Once the user has passed the splash screen, they are presented with the login page as seen in fig 2.2. This login feature when populated with the correct credentials, allows the user to access the home screen of the application and use the core features of the application. They must login with their username and password provided upon registration to the system. By clicking 'Register here', they are presented with a register form, as seen also in fig 6.2. By registering their email, name, username and password, they may then log in with those details in the previous screen.
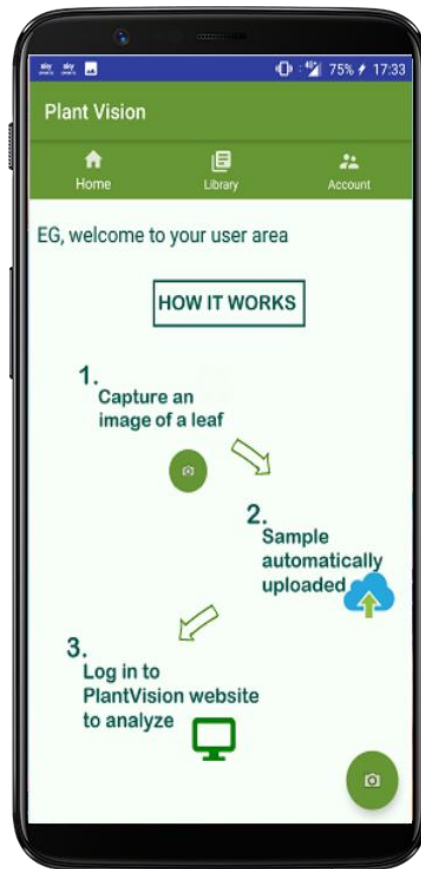
2.1.3 Home Screen

Fig2.3 Home screen

Once the user has successfully logged in, they are presented with the home screen as seen in fig 2.3. The home screen provides a quick tutorial on how to use the application, explaining how to capture an image, to upload the sample chosen, and to log in to the web application to analyse. The option to choose an image and ultimately upload an image is found as a floating button at the bottom right of the screen. By clicking this button, they can then choose an image from their device and select it to upload. As can be seen from this screen, a navigation bar is also available at the top, options included here are to return to the home screen, visit the library of previously uploaded images and to change the account.

2.1.4 Upload & Result Screen
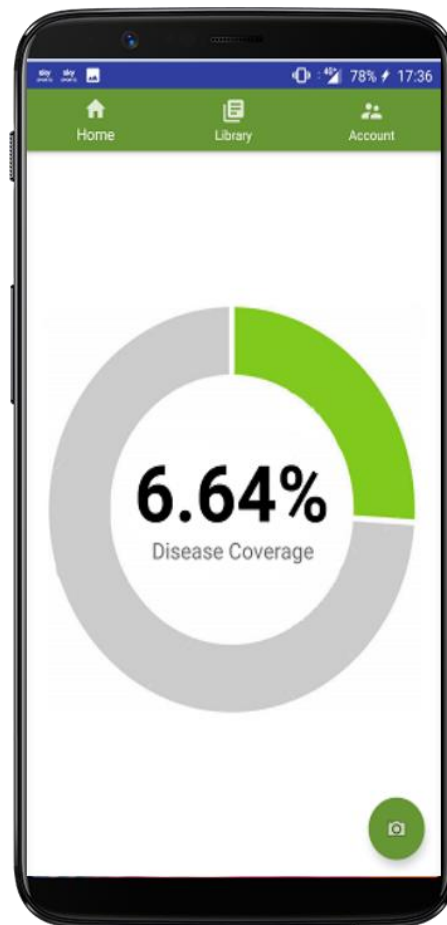

fig 2.4 Upload screen   fig 2.5 Result screen

From successfully choosing a photo from the previous home screen, the user can then view their selected image on the upload screen as seen here fig 2.4. From here, the user can type the name of the leaf, and create a group name for the plant, as to categorize them for later analysis. As seen beside the text fields, the user is also presented with list of active groups to which they have already entered previous. The switch titled 'Automatic Disease Detection' is also provided to the user to allow them to view the percentage of disease coverage after the image has been upload. This option is available provided the user has previously analysed the original upload to that group chosen.

Upon successfully selecting the automatic disease detection option from the previous upload screen, the user is presented with a percentage of disease coverage (fig 2.5) relating to the image they had just uploaded.

2.2 Web Application

The web application can access by the following link:

http://www.c00197458.candept.com/PlantVision/login.php

The web application allows the user to analyse the plants they have uploaded to the system, within the web app they may also view information such as weather and GPS coordinates, as well as view reports.
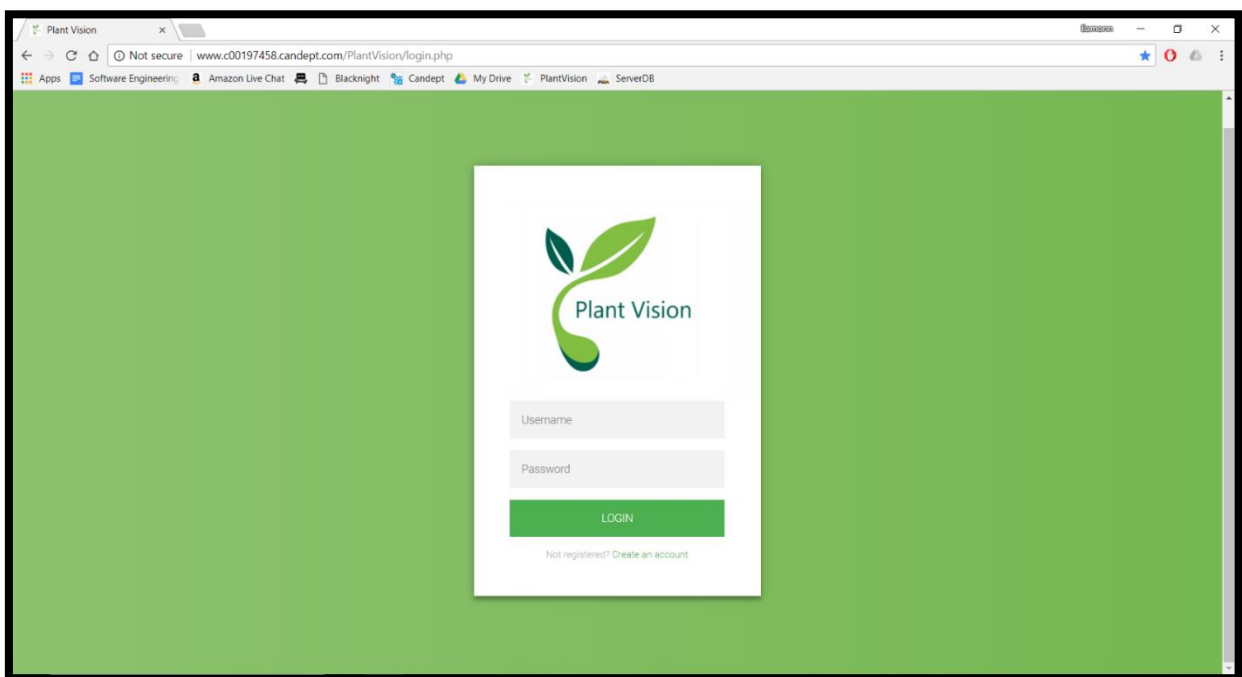
2.2.2 Login & Register Screen

fig 2.6 Login and register screen

Upon launching the web application through the URL provided, the user is presented with a login screen as seen in fig 2.6. The user may log in with the details they had previously registered with on the mobile application, or if they have not already created an account they may do so by clicking on the 'Create an account' option seen below at bottom of this screen. Once successfully logged in the user will be presented with their home screen.
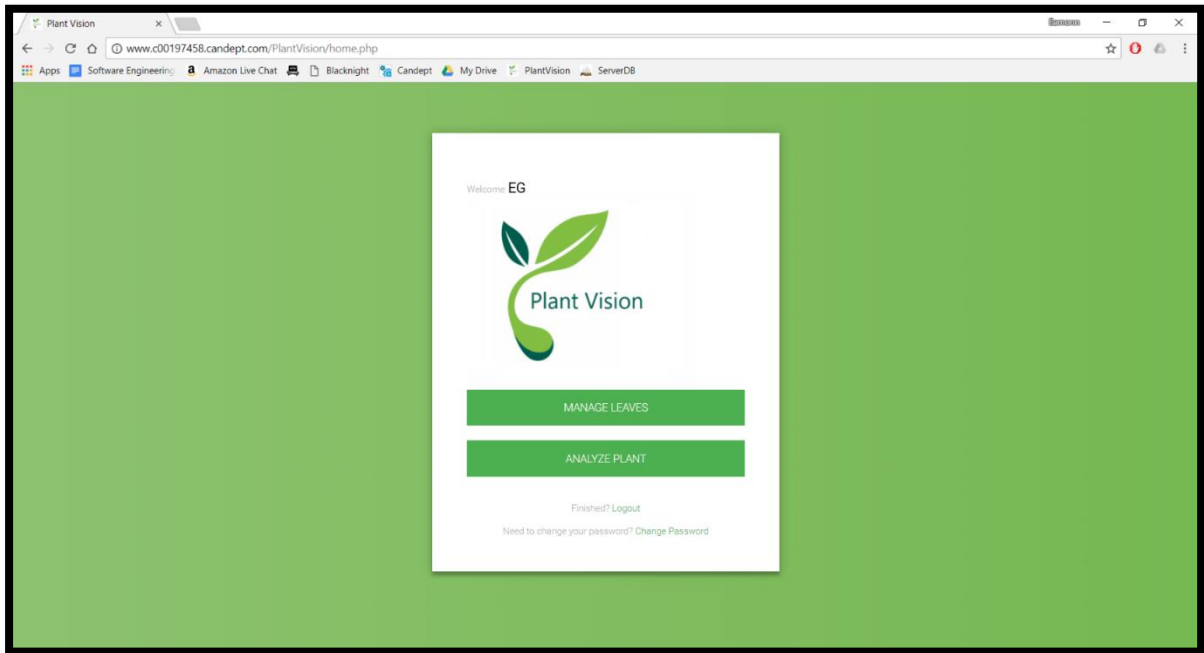
2.2.3 Home Screen

fig 2.7 Home screen

Once the user has successfully logged into the web application, they are presented with their home screen as seen above in fig 2.7. The user is given four options upon reaching this screen, 'Manage Leaves', 'Analyse Plant', 'Logout' and 'Change Password'. If the user selects the manage leaves option, they will be taken to analyse section where they may view further details about the images they have uploaded. The analyse plant option allows the user to view reports drawn from the plant groups they have uploaded, this includes charts, graphs and CSV downloads. The 'Logout' function will log the user out of the application and end their session. If they wish to change their password, they may select the 'Change Password' function and re-enter their password details.
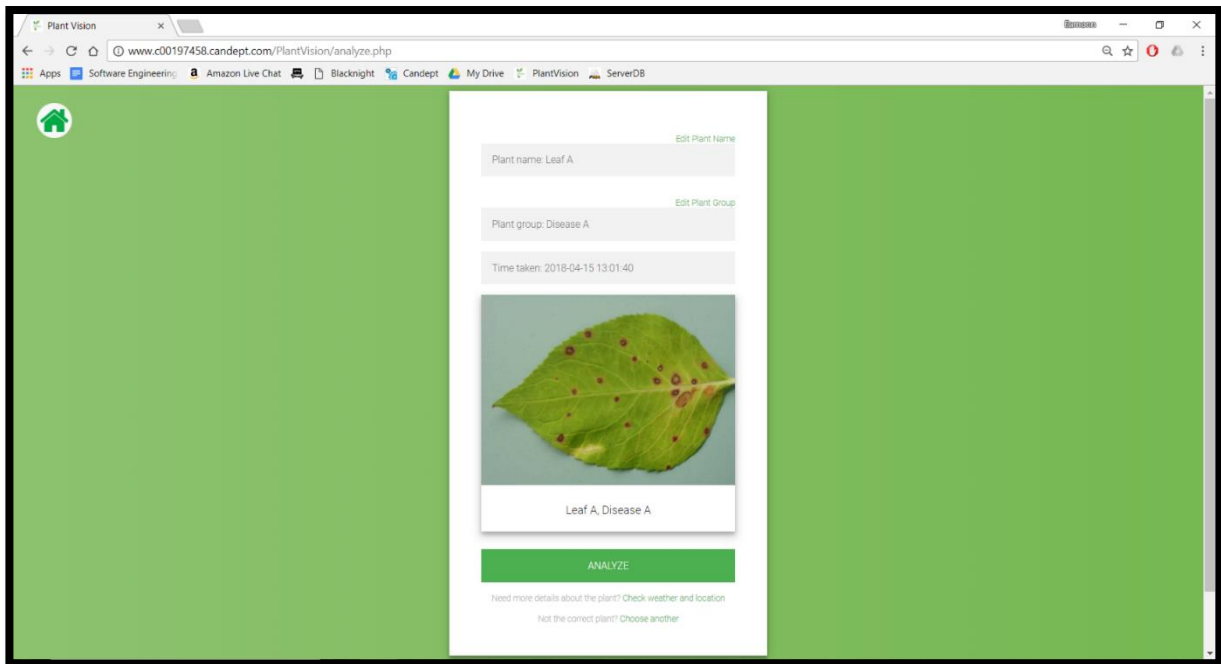
2.2.4 Chosen Image Screen

fig 2.8 Choose image screen

Upon selecting the analyse option from the home screen, the user is then presented with the details of the chosen image, as seen in fig 2.8. The user is given details such as the name on the image, the group to which it belongs and the time of which the image was taken. Both the name and group of the plant are editable options where the user can change the values by selecting the 'edit' option at top of the input boxes. Below are options for the user to view more detailed information about the plant such as weather and the location, or the option to select another plant.
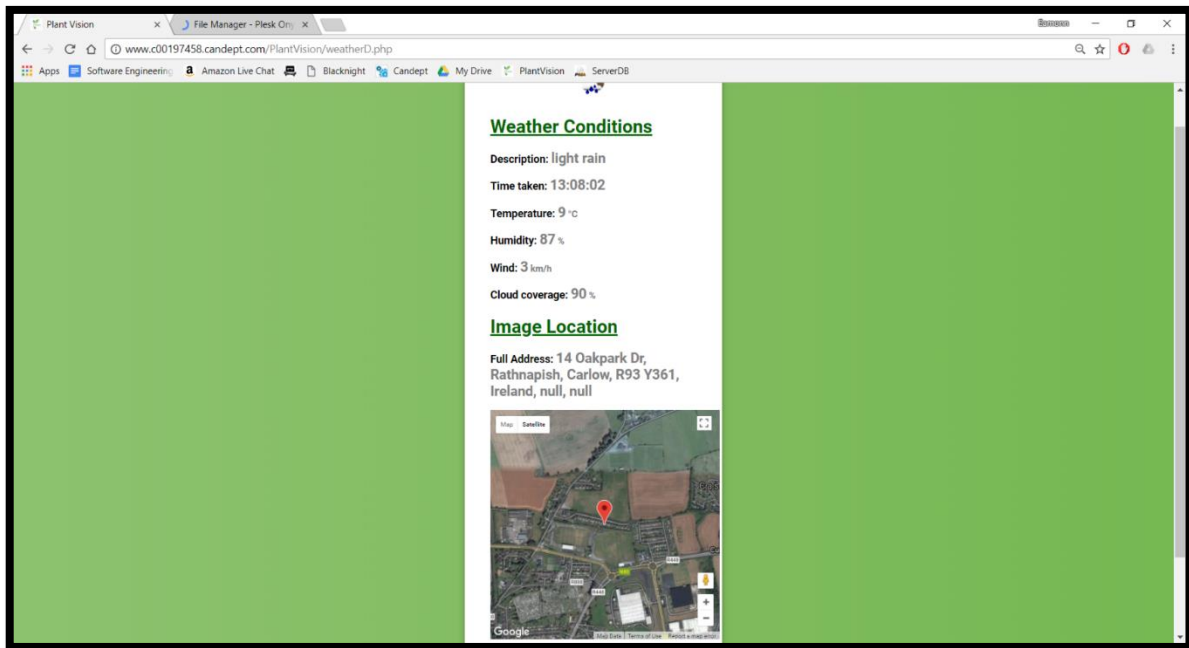
2.2.5 Extra details Screen

fig 2.9 Extra details screen

If the user has selected from the previous screen to view more detailed information regarding the image, they are then therefore presented with the screen as seen above in fig 2.9. This screen provides the user with both weather and location details associated with the image selected. From the image above, you can see weather conditions displayed such as humidity, temperature, wind, and cloud coverage. Below the weather details, a google map can be viewed with a coordinates marker set at the longitude and latitude of the time the image was taken.
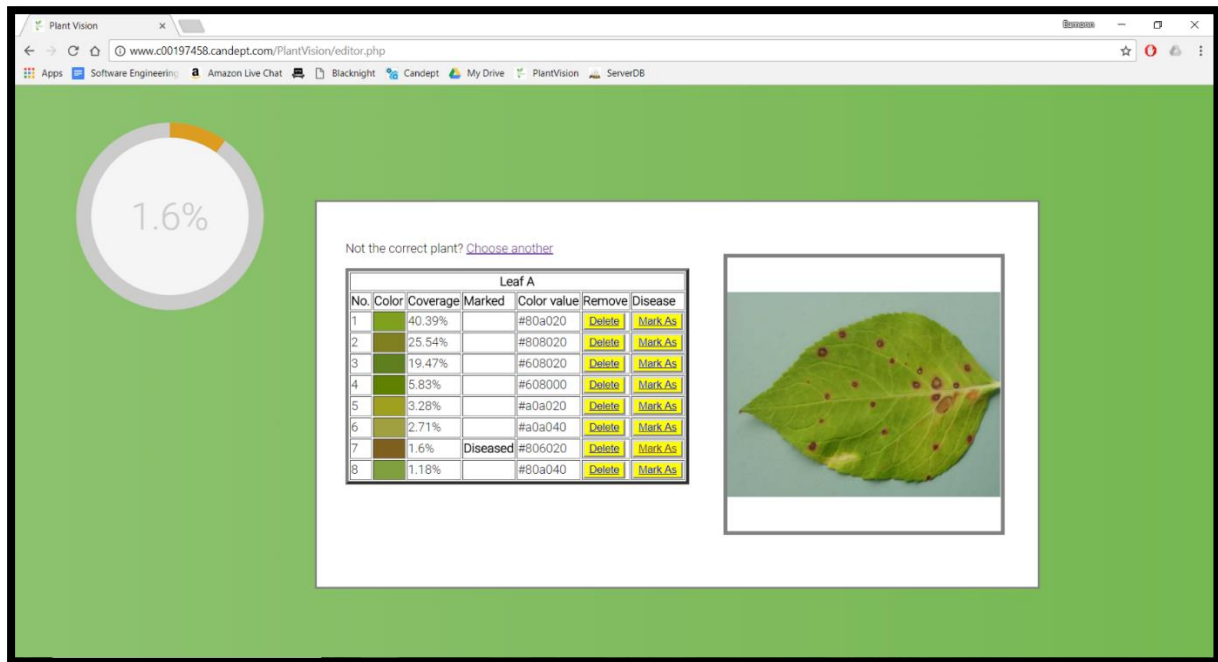
2.2.6 Analyse Screen

fig 2.10 Analyse Screen

After successfully choosing the image they wish to view from analyse option, they are then presented with the analyzation screen as picture above in fig 2.10. From here they can choose to remove values that they do not wish to include by clicking 'Delete' e.g. background colour and to mark the value to which the disease belongs by clicking 'Mark As'. The disease is therefore marked as 'Diseased' and a visual representation of the percentage is shown the top as seen in the sample above. Once this is completed by the user, the following time they proceed to upload an image to the same group as previously analysed, it will allow the mobile application to automatically determine to which part of the leaf is diseased based on prior selections.
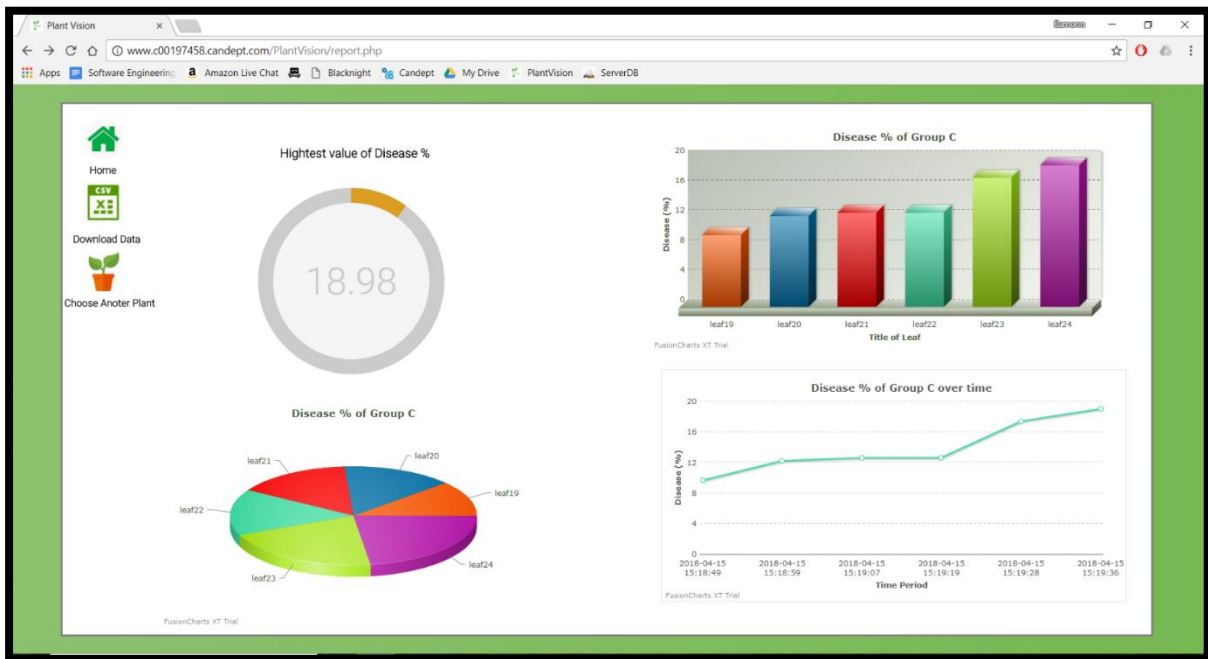
1.2.7 Report Screen

fig 2.11 Report screen

The following image (fig 2.11) is the report screen, this appears once the user has selected the reporting option from the home screen and has successfully selected a plant group to which they wish to view reports. As seen in the above sample, the user is presented with a bar chart displaying information regarding the disease percentage based on the different leaves uploaded. Below the bar chart, a line graph was drawn to demonstrate the rejuvenation or deterioration of the plant based over time. At the bottom left of the screen a pie chart was drawn to give a visual representation of the volume of leaves within that particular plant group. The user is also given the accessibility to download this data in CSV format for their own data analyzation.