FReD Web Application

The Floral Reflectance Database online web application

User Manual

Content

1. Introduction

About
How to use the user manual

2. Search Tools

Simple Search
Advanced Search
hexSearch
sorting records

3. Record Features

viewing full record details
Individual Colour Hexagon
Reflectance graphs
Spectral reflectance

4. Formulating user queries

What are user queries
Syntax for simple search
Formulating a Boolean expression

About

This user manual is for users who want to know the features that are available in the FReD Web application and how to use them. The site is currently online at http://saf1.web-stu.dcs.qmul.ac.uk, currently hosted by the Department Of Computer Science at Queen Mary University Of London, but will be moved to www.reflectance.co.uk. The user manual will be updated when this occurs.

The Main Functions in the FReD Web application

The following list shows the main functions and features that are included in the ULTIMATE Currency Converter:

The site provides the following features:

- **Simple Search** – with the use of boolean expressions

- **Advanced Search** – carry out a more defined search

- **hexSearch** – select a region on the Colour Hexagon for which you want records returned at

- view reflectance graph for each flower record, view raw spectral reflectance records and save CSV formats of the record.

- view an individual Colour Hexagon graph for each flower record and its excitation values

- combine any search method and view the results on one Colour Hexagon along with statistics of highest frequency of keywords returned from the search

The user manual shows how to use the search tools, how to view records and details of how to formulate the user queries using boolean expressions. The method of how boolean expressions are used in the search are demonstrated, as well as how this can improve correlation of data on the Colour Hexagon.

How to use the User Manual

Before you start reading the user manual, you may find it useful to find out what the following symbols mean. This will help you to focus on the important aspect of a certain function. All these tips and warnings are highlighted in the right margin as symbol, so you won't miss it.

TIPS

You may want to read these in order to simplify a task or to tell you about a different way you can get a job done

CORRECT

You will see this symbol which will tell you if the task being shown is the correct way, or the best way of doing it

WARNING!

If you see this symbol do not ignore it, it may be warning you of something in the program which may not seem obvious enough or something that may cause an error in the program.

DATA ENTRY

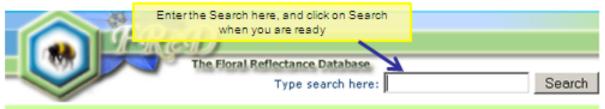This symbol means you will be required to enter data using the keyboard

Simple Search

The simple search is one of the search features that provides the use of Boolean expressions. Otherwise, you can just type in a keyword, and the search locates all records that have the keyword. There are ways to refine or expand your search in the simple search that are discussed further in chapter 4. In this section, we look at where the simple search is located and how you conduct a search using this feature.

All pages available have a textbox and a button located at the top. The following shows an example of this:

Enter the Search here, and click on Search when you are ready

The Floral Reflectance Database

Type search here: [   ] Search

You can click on the textbox to start typing a search query. This can range from a single keyword to anything to a complicated boolean search query. Once you have typed the search query, click on "Search" as shown above

If your query returned results, you can scroll down to view the results. Chapter 3 goes in further details on how you can view details about all the records or an individual record.
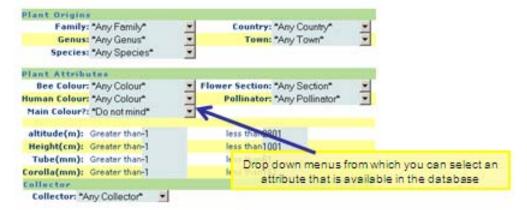
Advanced Search

The advanced search provides you with the opportunity to refine your search further. The record features can be used to define specific keywords that you want appearing from he records available in the search results. There are many options available in the advanced search, the categories for selection are:

- Plant Origin – such as Taxonomy of the flower species, country and town

- Plant attributes – colour as perceived by humans or bees, pollinators of the flower, flower parts, and details of alititude, corolla, height and tube.

- Collector – collectors of the flower

The following image shows the available features that can be searched using the advanced search:

Most attributes have a list of pre-defined keywords. You can select one from a list, these are the one that are available in the database.
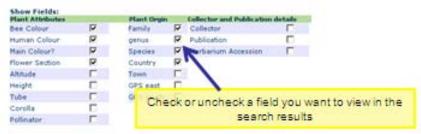
Attributes such as altitude, height, tube and corolla allow you to enter a numeric value. When you refresh the page, the default values set are the minimum and maximum range available currently in the database. You can set your own range.

If you type in a non-numerical value, the search will return the following error message:

You can also set the fields you wish to appear in your search, the default are already selected, however you may select as deselect fields which will then be shown as selected in your search:

If you want to have the entries as they were when you started the page, just click on the "reset" button.

Once you are ready, you can click on the Search button to proceed with the Advanced search
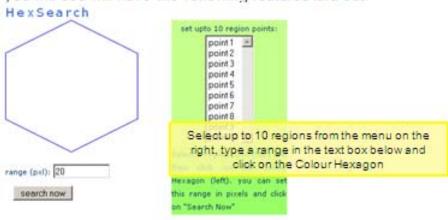
HexSearch

The hexSearch is a name given to a search function available in the web application. It is used to search for records that appear at a specific region on the Colour Hexagon. you can set up to 10 different regions with various ranges on a colour hexagon, and the hexSearch will return those records that appear at the selected regions.

NOTE – this function works only in Mozilla Firefox, Netscape and Microsoft Internet Explorer. As tested, it does not work in browsers such as Opera or Safari.

To start the search, click on "hexSearch" on the menus on any of the pages. The page that you will see will have the following features laid out:

HexSearch

set upto 10 region points:

point 1
point 2
point 3
point 4
point 5
point 6
point 7
point 8

Select up to 10 regions from the menu on the right, type a range in the text box below and click on the Colour Hexagon

range (pxl): 20

search now

Hexagon (left), you can set this range in pixels and click on "Search Now"

In order to begin selecting regions:

1. first select a point from the right

2. Type a range in pixels for the region to cover

3. select on the Colour Hexagon the point at which you want the results to be retrieved at

HexSearch

set upto 10 region points:
- point 1
- point 2
- point 3
- point 4
- point 5
- point 6
- point 7
- point 8
- point 9
- point 10

Select a region point (top) and then click on the Colour Hexagon (left), you can set

range (pxl): 15

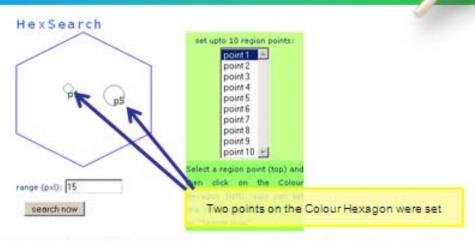search now

Two points on the Colour Hexagon were set

If you change your mind, just click somewhere else and you can set the range before this too to change the point range.

If you want to add more, click the next point on the list and add it to the Colour Hexagon. like you did before. Once you are done, click on the "Search" button, You will get those results set at the points you selected:

134 records have been found

Click here to get a summary of the search

Summary of Search Results

The Collector Chitika Occured 17% times
The Bee Colour _____ Occured 17% times
The _____ Occured 30% times
Flower Section radially symmetric, whole flower upper side Occured 31% times
The _____ Colour violet Occured 30% times
The Country Germany Occured 25% times
The Bee Colour blue-green Occured 23% times
The Collector Mencel Occured 23% times
The Country Brazil Occured 19% times
The Town Strausberg Occured 17% times

Records at the regions that were selected are retrieved

click below if the image of the Colour Hexagon summary is NOT visible or if you want to view the Colour Hexagon Summary Image seperately

Show Colour Hexagon Summary

Sorting records

Regardless of what search you carried out, as long as some records are returned, you can sort these records typically in alphabetical ordering. This is a simple feature, whereby you just click on the field that you wish to sort the records by.

For example, we have the following results and we wish to sort them by genus:

ID	Genus	Species	Country	Nearest Town	Flower Section	Bee Colour	Num Colo
3500	Layia	platyglossa	America		radially symmetric, flower tip upper side	blue-green	yellow
3544	Coreopsis	lanceolata	America				
1839	Hieracium	villosum	Austria				

Click on the field headings

We click on the field which we wish to sort the records by, as shown in the image above.

Introduction

in this chapter, we look at the functions available to show details of individual records in the database. Once you have carried out a search you may receive a list of records that match your criteria. We go into detail here what you can do with the results of your search.

Viewing full record details

When you get a list of records matching your search criteria, you can select a record from the list and find out more about it. Move your mouse over the records and the record will be highlighted. If you click on it, the record expands as shown below:

Click anywhere on the record to expand and show full records, click on it again to close it

ID	Genus	Species	Country	Nearest Town	Flower Secti...				
3500	Layia	platyglossa	America		radially symmetric, flower tip upper side	blue-green	yellow	unknown,	Rosen
3544	Coreopsis	lanceolata	America		radially symmetric, whole flower upper side	green	yellow	unknown,	Rosen
1839	Hieracium	villosum	Austria		leaf upper side	UV	green	unknown,	Chittka
3656	Frenanthes	purpurea	Austria		radially symmetric, whole flower upper side	blue	violet	unknown,	Chittka

Prenanthes purpurea

view raw reflectance values | view this on a full page

PLANT DETAIL

ID	Plant Section		Bee Colour	Human Colour	Main Colour
3656	radially symmetric, whole flower upper side		blue	violet	

ORIGIN OF SAMPLES

Country	Town Area	GPS East	GPS South	COLOUR HEXAGON	
Austria		0	0	X Value	-0.0458813

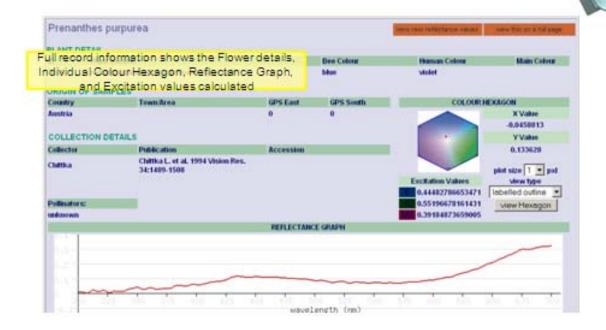| 1317	Matricaria	discoides	Austria	Lech	leaf upper side	blue-green	green	unknown,	Chittka
3279	Taraxacum	officinale	Austria	Innsbruck	radially symmetric, calyx upper side	green	yellow	unknown,	Chittka
			Austria	St Anton	leaf upper side	UV blue	green	unknown,	Chittka

You can view records like this simultaneously by selecting other records in the list.

To close a view, simply click on it again.

You can view the full page and record by selecting the "view this on a full page". By doing so, a new window will open and the record that you selected will be viewed in a full page as shown in the image on the next page

Full record information shows the Flower details, Individual Colour Hexagon, Reflectance Graph, and Excitation values calculated

Select options from here

Individual Colour Hexagon

Each record has its individual Colour Hexagon Graph plotted and shown when the full record is shown. There are some simple changes you can apply to this graph. The first one is the view type. There are three types of views:

- Labeled outline – the Colour Hexagon has an outline and the labels of the colours

- Plain outline – has just the Colour Hexagon outline

- Coloured outline – uses colour to show the regions on the colour hexagon
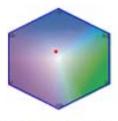
The default view is Coloured outline, however you can change it by selecting any of the options as shown:
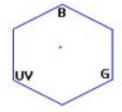
When you have selected an option you can click on the "view Hexagon" button and it will view you the same record plotted on your selected view. Below is an output of the type of views available:

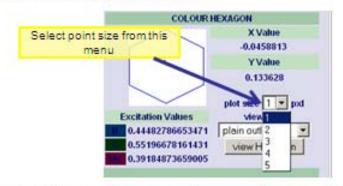**Coloured Outline**   **labelled Outline**   **Plain Outline**

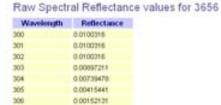You can change the size of the plot by upto 5 points (pixels), you can select this from the same page as shown:

Click on "view Hexagon" once you have made your selections.:

Spectral Reflectance

For each flower record available, a reflectance graph is formed. This is available to view in the individual records page.

If you want to view the raw spectral reflectance values, click on "view raw reflectance values", this will provide you with the list of spectral reflectance values for the flower:

Raw Spectral Reflectance values for 3656

Wavelength	Reflectance
300	0.0100316
301	0.0100316
302	0.0100316
303	0.00897211
304	0.00739478
305	0.00415441
306	0.00152131
307	0.00332476
308	0.00541871
309	0.0091919
310	0.0152732
311	0.0213332

In order to export as CSV format, you can click on "convert to CSV file" which will output the reflectance data in a CSV format.

You will need to save the file from your browser.

4.Search Queries

Formulating User Queries

In this chapter we focus on formulating queries which would improve the results of the records retrieved. First, we introduce you to user queries, the syntax used in the simple search and how to formulate the boolean expressions.

You have seen how you can enter a keyword and click on search to retrieve all results that match the keyword. You can combine your keywords with other keywords in different ways to form different results. before we go on any further, we will first talk about the syntax used in the simple search available in the web application, then later on we'll look at what combinations can be used to formulate search queries to produce various results.

Exact and matching words

Sometimes you want to search for words that match partially to a record, or a word that matches exactly as you specify. Lets first look at partial matches: If you wish to find all records that have the words *whole flower* it may return back records with *whole flower from side* and *whole flower from upper side* even flower records with attributes where the *whole* is in a different attribute and the *flower* word exists in a different attribute in the same flower record. For this type of result, you just type the word as is in the search:

> *whole flower*

however if you want to return records with only the exact words that are in a single attribute you should put these words in quotes as follows:

> *"whole flower"*

Excluding keywords

To exclude keywords from your search, you will ensure they do not exist in any part of the attributes of the records retrieved. To exclude any keyword from a search, insert the – symbol in front of the keyword. For example, lets say we want to return all results with the exception of the colour *blue*. We would add the symbol in front of the keyword we wish to exclude:

```
-blue
```

This would exclude all records with the keyword **blue,** again this includes and partial entry of this word. to ensure only the exact word **blue** is excluded, we should put it in quotes and add the exclusion symbol to it:

```
-"blue"
```

Alternative Optional Keywords

Sometimes, you wish to search for alternative words alongside other words. A search that says "search for A or B" where A, B are the keywords. If A does not exist and B does, at least B will be returned. If B does not exist and A does, at least A will be returned. If both exist, both will return. This means that both A and B do not have to be keywords in the same record at the same time. Such a search improves the number of records returned. Lets say we wish to find records with either the keyword **Anchusa** or the keyword **Trifolium** :

```
Anchusa or trifolium
```

Again, this would return any record with keywords that are a combination matching the keyword **Anchusa** or matching **trifolium**. To ensure the matching is exact, we would enclose the keywords in quotes:

```
"Anchusa" or "trifolium"
```

Summary of formulating search queries

You can combine your search expressions with others and form generally quite large complex queries. some examples of these are shown below which make use of the search notation that have been looked at:

```
-asteraceae blue or -"whole flower from side" –purple or green "whole flower"
```

Wherever you place the **or**, you are providing alternatives of both A and B. in this case the alternative is any of the following queries that satisfy:
-asteraceae blue
-"whole flower from side" –purple
green "whole flower"