

SampleFreq

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Description of the SampleFreq Form Controls

Options

Change Active Frame Color This item allows the user to select alternate colors that indicate the active frame.

Frame Zoom This option, if turned on, will zoom (as much as possible) to the active frame while classifying it. It also causes the button labeled "Frame Refresh" to be displayed.

GoTo Image This item allows you to go to any existing image in the Database. You can skip forward or backward to an image.

Show Frames Defined This option displays the list of the frames in the current set.

Simple Data Editor This brings up a new form to allow simple editing of the data AFTER the classification of the image has been completed.

Database

Load This item allows the selection of the Excel Spreadsheet which contains the database of images to be measured. A Database must be opened before any measurements can be done.

Calculate GSD This item allows loading a reference image. Left click on one end the reference object, then right click on the other end to measure the number of pixels. Exit and use "Create New".

Create New This menu item allows the creation of Databases for use with SampleFreq. See the page on the Database Wizard.

Define Frame Set

This item allows user defined Frame sizes to be used during the classification of an image. The defined set MUST be used for all images in the Database.

Define Frames

This item opens the form to allow frames to be defined for the entire dataset.

Labels

Create allows the definition of a set of button labels. See the help page on Custom Labels.

Load allows a custom label set to be loaded to the database.

Create Statistics Files

This item generates the output files summarizing the data from the classification of the images.

Help

About opens the about Message Box.

Contents opens this help file.

Download Acrobat Reader goes to the web site to download the reader which is used to read the Help Files.

How to Convert Excel Numbers to Text If GSD values are manually entered into the Excel Database, it is necessary to convert them before using them to a text string. This help item summarizes how to do that.

Current Image or Database radio buttons

This allows the display of either the path of the current image or

the database.

Next Image button

This moves to the next image in the Database. Short Cut for this button is 'i'.

Comment button

This button is used to enter a comment into the comment field.

Label Set

This radio button set allows the selection of which label group of 10 is to be displayed. The first radio button shows the first ten labels, the second shows labels twenty-one through thirty, etc.

KEY label

This displays the KEY of the image currently being shown.

Zoom Field

This displays the zoom factor to be used during classification. Also note that the zoom can be increased/decreased by using the up/down arrow keys. While viewing a zoomed image during classification, each time the arrow key is depressed, the zoom changes by 1. The mouse wheel can also be used to zoom in/out. Also note that a right mouse click will zoom to the point selected by the cursor.

Frame Field

This indicates the number of the frame on the grid currently being classified.

Begin Button

This button starts the classification sequence through the frames. It causes the image to zoom to the first frame for classification. Each click of the Next Frame Button causes the screen to select the next frame. The shortcut for this button is 'b'.

Rotate Button

This button rotates the image 90 degrees. It is NOT saved to disk!

>> Contrast

This button increases the contrast. It is NOT saved to disk!

<< Contrast

This button decreases the contrast. It is NOT saved to disk!

Darken Button

This button darkens the current image. It is NOT saved to disk!

Lighten Button

This button lightens the current image. It is NOT saved to disk!

R Button

This button restores the original image from the disk. It also displays frames on the image if they have been defined.

>> Cont

This button increases the contrast of the image.

<<Cont

This button decreases the contrast of the image.

Note that all these last few image enhancement operations should be done before clicking the ‘begin button’.

Next Frame Button

This button advances to the next frame, only after all the defined label counts have been made. A short cut for this button is ‘f’.

Yes/No Buttons on Labels

These buttons are used to indicate the presence or absence of each type of defined vegetation.

Exit button

As expected, this exits the application.

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Description of the SampleFreq Program

The SampleFreq program was written to be used for determining the frequency of vegetation based on a digital image.

SampleFreq is written in C# which is currently one of the newest programming language from Microsoft® Corporation in its Visual Studio.NET suite. C# is an object oriented language with significant graphics support. The programming paradigm for creating windows programs (forms/screens) is the very best and easiest to use that the author has ever seen. It allows powerful easy rapid prototyping to be done.

A database provides for the user to input what series of images are to be counted. It also provides storage for the record of the values of the counts. An Excel Spreadsheet was chosen as the database because most people are familiar with Excel and can more easily use it to input the required data fields and to manipulate the output data. The data collected can easily be copied to any other Excel Spreadsheet for further analysis or storage. The database contains a list of the names of each image. The program provides output to the database in terms of what was counted. Up to 10 frames can be defined for each image in the Database.

The program loads each image into a ‘picturebox’ which is a C# control. The image is ‘resized’ to fit in the picturebox. The user selects the presence or absence for each type of vegetation in the active frame. Only after all the vegetation types have been selected as Y/N, can the classification be recorded by clicking on the Next Frame button..

The menu item “Create Statistics File” will generate summaries of the data into comma delimited text files which can be used for further analysis.

NOTE: SampleFreq was intended for use with large images (e.g. say 2560x1920). If used with very small images, you may get an error message and it will fail.

NOTE 2: For best results, use a screen resolution of 1280x768 or better. Smaller resolutions may give less accurate results.

NOTE 3: ZOOMING To zoom in on a point in the image; position the cursor at the point of interest and right click; the display will zoom to that point; use the thumbwheel to further zoom in/out on that point; to return to the full size image, do a second right click.

Excel Database Integrity Checks

Several checks are performed by the program to protect against user error in the Excel Database which might result in erroneous measurement data being inserted into the database. These checks should prevent that. See the Help Page on Setting up the Excel Database.

1. If the database does not conform to the instructions for setting up the Excel Database, the program shows a Message Box with the message

"This is a badly formed database!!!

See the help for setting up the database"

If this occurs, **FIX** the Excel Database then proceed.

2. When the Excel Database is first selected, the program insures that the **KEY** numbering is sequential. If not, the program shows a Message Box with the message:

"Bad KEY sequence starting at KEY = "

This indicates that the user needs to renumber the **KEY** field in the database.

The program also indicates the number of images found which is shown in a Message Box. If this is less than you expected, then perhaps a **KEY** is missing in the Excel Database.

3. When each image is loaded, it checks to make sure that the Database contains an image name in the field called "IMAGE". If not, the program shows the following message:

"Image is missing from KEY = "

The **KEY** is given, so it is easy to find and insert the filename of the

missing Image.

4. If the image type is not of the allowable image types, the program gives:

"Wrong image type or missing image from KEY = "

Allowed image types are bitmap, JPEG, TIF, GIF or PNG"

If this occurs, then you need to use your “batch processing” feature of your image processing program to change to a JPEG or related type.

How to Setup Custom Labels

In order to count frames by items other than the default labels, it is possible to customize the labels as follows:

MAKE THE CUSTOM LABEL FILES (this can be done at any time.)

- 1. Click on the Labels|| Create menu item. This brings up the form called “Define Custom Labels”.**
- 2. Fill in the desired Label names. These names will be used to label the Labels, used in the individual database cells, as well as for providing the header classification labels in the statistical report.**
- 3. Note that a blank field will cause the Label to be invisible. This is useful for eliminating unused Labels.**
- 4. When finished with making the labels, Save the Custom Label definition to a convenient location.**
- 5. You can make as many Custom Label definitions as desired. A Database MUST be loaded before Custom Labels can be loaded. None are “LOADED” into the database for use until the following procedure.**

USE A CUSTOM LABEL FILE

- 1. Load a Database, the custom Label file can only be “applied” to a loaded database.**
- 2. A new menu item appears as: Labels || Load**
- 3. Click on the Load Custom Label File menu item to bring up a screen for loading the file as previously defined.**
- 4. Select the file and load it.**
- 5. This causes the following actions: a) Button groups are labeled**

as per the file. b) The internal classification types are correspondingly labeled. c) The definitions are stored internally to the database so they can automatically be applied when the database is loaded the next time.

NOTE: It is possible to “Edit” a Custom Label Set by loading it into the form and making the desired changes, then saving the new definition. You can also do this to add definitions to an existing Label file.

NOTE: It is required that a particular database will have all of it’s images classified according to the same set of classifications. That is only a single Custom Label File will be used for classification purposes. If a mixed set is used, the statistical report will only report on the images classified with the Label set last applied. The others will be reported as error.

It is required that all images in a database be classified according to the same Label set.

How to Use SampleFreq

- 1. Start the SampleFreq Program.**
- 2. Set up the Excel Database (see the Help page on setting it up). Store the Database and the images in the same directory.**
- 3. Select the Excel Database.**
- 4. Select the desired Frame Sizes. They will be stored internally in the database.**
- 5. Create, then Select and Load the desired Custom Label Files.**
- 6. Click on Begin. The program will move to the first classification frame.**
- 7. View the zoomed image and classify the frame as per all of the classification buttons. When you are satisfied with all the button selections, then click on the 'next frame' button.**
- 8. Continue doing step 7 until done with all frames on this image, then select the next image.**
- 9. Continue steps 6 and 7 until all images are classified.**
- 10. Select "Create Statistics Files" to summarize the work done.**

Database Wizard

To use the Database Wizard:

- 1. Click on the menu item to open the Database Wizard.
(Database| Create New)**
- 2. Name the Database in the textbox control.**
- 3. Determine if all the images have the same GSD. If so, enter it on the form. Otherwise, you must enter GSD values for every image. This will be DONE AFTER the Database is made. Then, open the Excel file and enter all of the GSD values. GSD values can either be text or numeric. However, **THEY MUST ALL BE THE SAME TYPE**. GSD values are entered as millimeters.**
- 4. Click on the button to Create/Populate the Database.**
- 5. A control appears which can be used to select one or more image files to include in the database.**
- 6. To select a sequence of files, select the first one in the list, then hold down the shift key and select the last one.**
- 7. To select random files, hold down the Ctrl Key and select as many as desired.**

- 8. When done, click on OPEN, the Database file will be created and populated in a couple of seconds.**

- 9. If manually entering GSD values, do not load the database just made, instead use Excel to enter the GSD values. Save it, then load it into SampleFreq.**

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SampleFreq Files

SampleFreq includes the following Files

All files in this table must be in the same directory!

SampleFreq.exe	This is the C# executable file.
SampleFreqHelp.pdf	SampleFreq Help file in Adobe Acrobat PDF Format.
SFDB.xls	The Generic Database used by the Database Wizard to create custom databases for your project.

All files in this table can be located anywhere and are named by the user!

Label.Btn or Label.Lbl	This file is NOT required and may be located anywhere. All files with the suffixes 'Lbl' and 'Btn' are treated as Custom label definition files.

ImageDB.xls

This is an Excel file used as the image database. It is specially formatted to work with SampleFreq. It may be created with the Database Wizard. It must be in the directory with the image files.

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SampleFreq Change Log

Version 0.04 Dated April 17, 2011

A. Initial Release.

Version 0.05 Dated 6/16/11

- 1. Cleared the initial labels on opening the form. Also cleared default values in the Database wizard.**
- 2. Added “Tool Tips” for short cuts.**
- 3. Added Short Cuts “f” for next Frame and “i” for Next Image.**
- 4. Fixed Spelling error on the frame making form. “Decending” was corrected to “Descending”. Also fixed an error message on the same form to say “Descending” instead of “Ascending”.**
- 5. Removed a number of tab stops and adjusted the sequence to work more smoothly.**

Version 0.06 Dated 7/1/11

- 1. Recompiled to execute as 32 bits to be compatible with the database 32 bit DLLs. It will now work on a 64 bit operating system.**
- 2. Modified to all either text or numeric data in the GSD. However, it must only be of a single type.**

Version 0.07 Dated 7/20/11

- 1. Modified to allow the use of up to 60 Labels. A radio button field called “Label Set” allow the selection of each group of ten labels.**
- 2. Changed the Statistics Report to be a more “VERTICAL” report rather than a “HORIZONTAL” report. This was required because Excel 2003 only allows 256 columns which would have been exceeded with 60 labels and 10 Frames.**

Version 0.08 Dated 7/25/11

- 1. Added invoked “garbage collection” inside the loop to build Frames. This prevents “out-of-memory” errors.**

Version 0.09 Dated 7/26/11

1. Modified to prevent the attempt to write null comments to the database.
2. Changed the color of the NO button, when selected to red, leaving the YES button as green when selected for better human factors. It is easier to see how various species are classified.
3. Moved the "Label Set" radio buttons further down the form for less mouse movement during classification.

Version 0.10 Dated 8/28/11

1. Modified to restore the "Refresh Frame" button which got lost during the previous changes.
2. Added 'r' as a shortcut for the "Refresh Frame" button.
3. Corrected typo in an error message. Also changed the error message for better clarity.
4. Added a check to insure that all frames were completed before advancing to the next frame.
5. Added NOTE 3: ZOOMING to the help file in the page on the program description.
6. Minor modifications made to the comment form so it did not allow comments to include a " or a '. These cause errors in saving the comment in the database.
7. Error was fixed in the Statistics function. If the GSD was formatted as numeric in the database, the GSD would be shown as "UK".
8. Restored the ROTATE functions. Now after the "Begin" button has been clicked, the database will store the number of rotations made on the image prior to "begin". The next time the database is loaded, the image will automatically rotate the correct amount.
9. Added a new menu item called "Simple Data Editor". This allows one to correct small errors in classification AFTER an image has been completed.

Version 1.0 Dated August 28, 2011

1. Official 1.0 release.

Version 1.01 Dated November 27, 2011

1. In order to make the operation easier to use, a number of things were done to reduce the number of required clicks.:
 - a. A number of the most common operations were moved directly to the menu bar.
 - b. A number of common operations were changed to query to determine if

you want to do the next logical operation.

- 2. Added 'b' as shortcut for the begin button.**
- 3. When all frames are completed, the message was changed from "That is all the Frames. Click Next Image." To "Plot classification complete. Click Next Image to continue."**

Version 1.02 Dated February 1, 2012

- 1. Added Web check for updates at address <http://SamplePoint.org>.**
- 2. Minor changes to the "about" box.**
- 3. Added a MessageBox to allow easy loading of the Label file that was just created (if a database has been loaded).**

Version 1.03 Dated January 3, 2014

- 1. Added the menu item "Calculate GSD" to allow calculation of the GSD from a reference image.**

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Troubleshooting of Common Problems:

As with any software, closing the program and reopening solves 99% of all problems.

1. Database cannot be created using the database wizard.

>> This can result from security measures imposed by your IT Administrator. If your user login does not have certain permissions, you will not be able to ask SampleFreq to create an Excel file.

>> Try creating a database under the My Documents folder, and not in the Program Files folder.

>> Be sure you have .NET 2.0 or later installed on your machine. If you engage in regular online Microsoft Windows updates, you should have the latest version installed.

>> You must have Microsoft Excel or OpenOffice.org Calc installed on your PC

.

>> Images must be located on a writable disk, not a CD or DVD.

2. Error message: Wrong image type.

>> Be sure your database is located in the same folder as the images. Images

must be on a writable drive (not a CD or DVD).

3. Images do not show up in the folder when creating database.

>> If your images have four-letter extensions, like JPEG or TIFF, just select “Files of Type: All Files” in the file select box. These extensions will work fine in SampleFreq.

4. Error message: Data error in update

>>This is a rare error that is suspected to have one of two possible causes: Either the machine is lacking in RAM and cannot process the information to the database fast enough, or the auto-save function in Excel has kicked on while SampleFreq is attempting to write data to the database. SampleFreq to attempt up to 5 database writes should the first one fail.

5. Error message of the type:

```
"5 Trys: EXIT, RESTART, THEN REDO THIS DATA POINT!  
Data Error in UpDate = UPDATE DATA SET Comment = "" WHERE KEY  
= '42' ".....
```

This can be caused by having the Excel Database open while running SampleFreq, if so, close it.

It can also be caused momentarily by having the Excel Autosave function enabled, turn it off.

This can also be caused by using an automatic continuous backup system which is frequently accessing the Excel Database.