

SampleFreq

Software to measure vegetation frequency from digital images for ecological monitoring

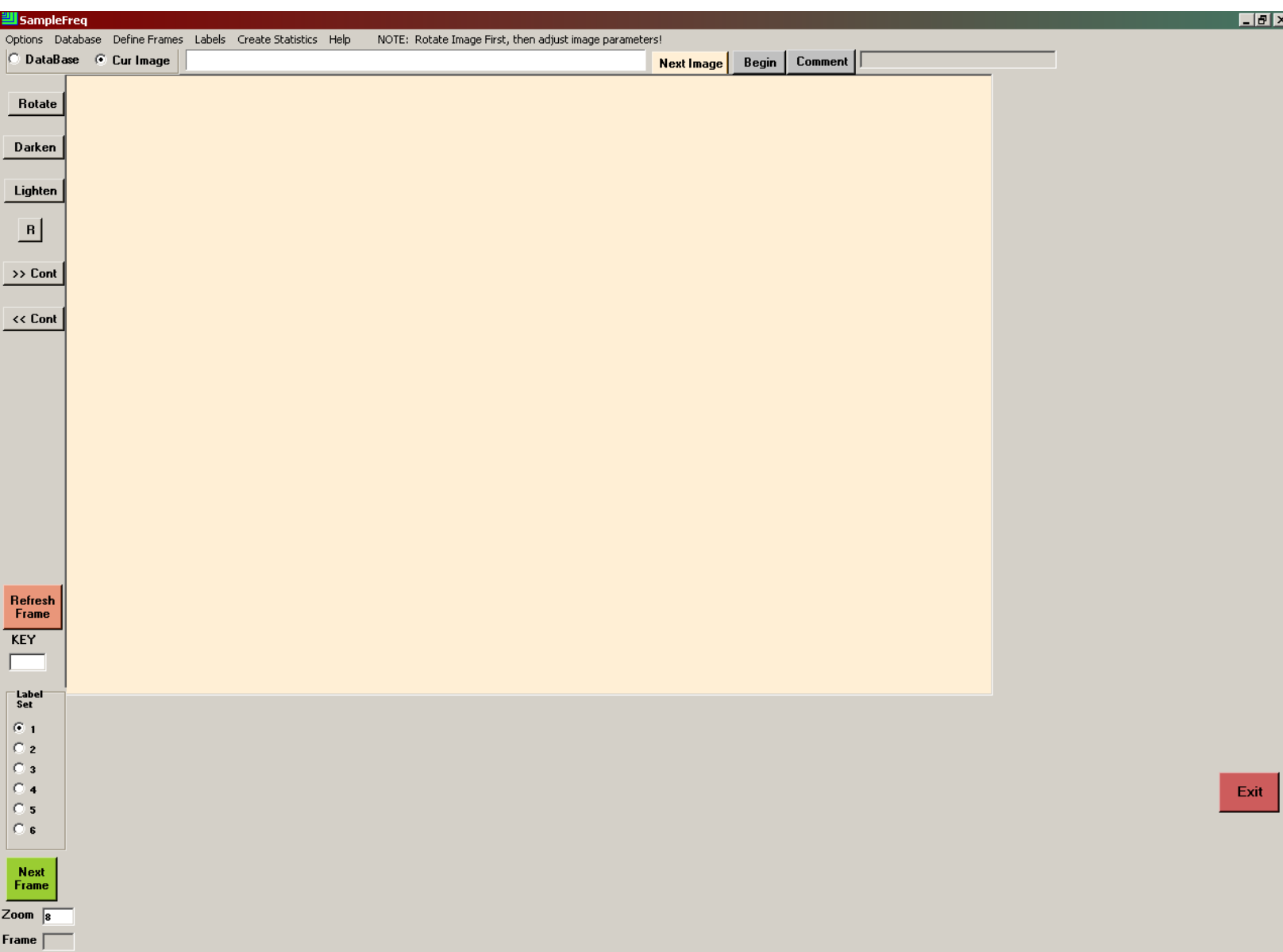
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SampleFreq analysis steps

1. Open SampleFreq
2. Define images to analyze in a database
3. Open the database
4. Define the number and size of nested frames to use
5. Define the vegetation types to be analyzed
6. Analyze frequency, image by image, frame by frame
7. Create a frequency summary
8. Bask in the wonderfulness of your frequency data

1. Open SampleFreq.



2. Define which images to analyze in a database. Click Database>Create New to open the database wizard. Title your database. Enter the image resolution in mm(GSD) if it's the same for all images. If GSD varies by image, check NO, and manually enter GSD after the database is created. Click Create/Populate database and select all images to analyze. Then click Done. To manually enter GSD, open the database in Excel (it's in the folder with the images) and enter GSD values. GSD must always be entered in millimeters.

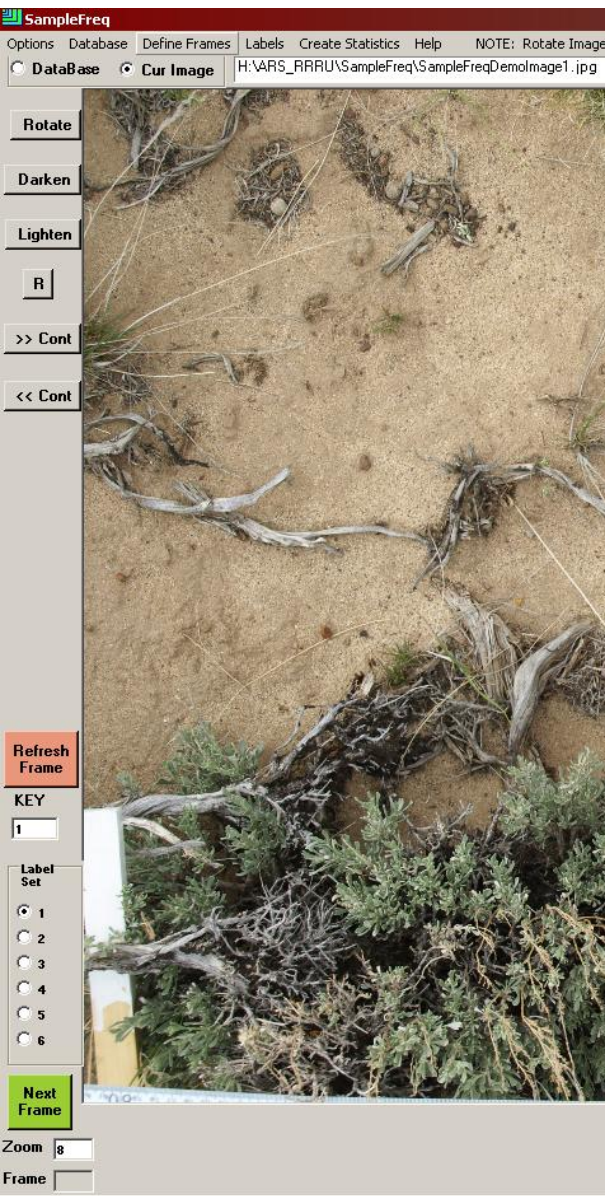
The screenshot shows the SampleFreq software interface. The main window is titled "Create and Populate the DataBase". It features a sidebar on the left with various image processing options like "Rotate", "Darken", "Lighten", and "R". The main area contains a form for creating a database. The "DataBase Name" field is filled with "FebruaryDemo". Below this, a question asks "Do all of the images have the same GSD?". The "Yes, as is at the right" option is selected, with a GSD value of "0.4" entered in the adjacent field. A "NOTE" below states: "NOTE: GSD can be written either as a text string e.g. '2.57 or as a number. However, all entries MUST be the same type, text or numeric." At the bottom of the wizard, there are "Create/Populate DataBase" and "Done" buttons. A "NOTE" at the very bottom reads: "NOTE: If you get an error message when loading files, reduce the number of files to less than 200! NOTE: GSD values are to be entered in millimeters."

An "Open" file dialog is overlaid on the right side of the main window. The "Look in:" field shows "Demo". The file list contains several .tif files and three .jpg files: "SampleFreqDemoImage1.jpg", "SampleFreqDemoImage2.jpg", and "SampleFreqDemoImage3.jpg". The "SampleFreqDemoImage3.jpg" file is selected. The "File name:" field shows the selected file name, and the "Files of type:" dropdown is set to "Image Files (*.BMP;*.JPG;*.TIF)". "Open" and "Cancel" buttons are visible at the bottom right of the dialog.

3. **Save the database.** Once the images are loaded, click Done and the blank database is saved. You will be asked if you want to open the database right away. Alternatively, to open a database not just created, click Database>Load and navigate to the database you want to load.

The screenshot shows the 'SampleFreq' software interface. The main window has a menu bar with 'Options', 'Database', 'Define Frames', 'Labels', 'Create Statistics', and 'Help'. Below the menu bar is a toolbar with buttons for 'Data', 'Load', 'Next Image', 'Begin', and 'Comment'. The 'Data' button is currently selected, and a sub-menu is open showing 'Load', 'Create New', and 'Next Image'. On the left side, there are several buttons: 'Rotate', 'Darken', 'Lighten', 'R', '>> Cont', and '<< Cont'. At the bottom left, there are buttons for 'Refresh Frame', 'KEY', 'Label Set' (with radio buttons 1-6), 'Next Frame', 'Zoom', and 'Frame'. The main area of the window is a light yellow color and contains a dialog box titled 'Create and Populate the DataBase'. This dialog box has a text input field containing 'FebruaryDemo' and a label 'DataBase Name'. Below this, it asks 'Do all of the images have the same GSD?' with two radio button options: 'Yes, as is at the right' (selected) and 'No, I will manually enter GSD into the database using Excel'. The 'Yes' option has a text input field containing '0.4' and a label 'mm'. Below the options, there is a note: 'NOTE: GSD can be written either as a text string e.g. '2.57 or as a number. However, all entries MUST be the same type, text or numeric.' At the bottom of the dialog box, there are two buttons: 'Create/Populate DataBase' and 'Done'. To the right of the main dialog box, there is a smaller dialog box titled 'Successful Creation of new DataBase!' with a close button. It contains the text: 'The DataBase was created as: H:\ARS_RRRU\SampleFreq\FEBRUARYDEMO.XLS' and 'Do you want to load this database now?'. Below this text are two buttons: 'Yes' and 'No'. In the bottom right corner of the main window, there is a red 'Exit' button.

4. **Define the number and size of nested frames to use.** Click Define Frame s. Enter the number of nested frames you want, click SET, then enter their sizes in descending order in square meters. Note that the largest frame cannot be larger than the smallest image in the database, which is listed as the Maximum area allowed at the top of the menu.



Create Frames for this Database

The Maximum area allowed in this database set is = 01.60 sq Meters

If this area is smaller than the frame size you require, remove images smaller than your largest nested frame from the data set

Please Enter the Number of Frames (<=10)

Frame 1 sq Meters Largest Frame First

Frame 2 sq Meters

Frame 3 sq Meters Insert Frames in Descending Order

Frame 4 sq Meters

5. Define the vegetation types to be analyzed. Click Labels>Create. Fill in the form to define up to 60 vegetation classes to analyze. Save the label file wherever you like. To load the label file, click Labels>Load, and load the file you just created. You can also load a SamplePoint button file.

The screenshot shows the SampleFreq software interface. The main window displays a satellite image of a desert landscape with a 'Define Custom Labels' dialog box overlaid. The dialog box contains 60 label input fields arranged in four columns. The first column has labels 1 through 15, the second 16 through 30, the third 31 through 45, and the fourth 46 through 60. The first seven labels in the first column are pre-filled with vegetation types: sagebrush, rabbitbrush, horsebrush, greasewood, perennial grass, annual grass, and perennial forb. The remaining labels are empty. At the bottom of the dialog box are buttons for 'Cancel', 'Load Existing', and 'Save'. A note and caution are also present.

SampleFreq
Options Database Define Frames Labels Create Statistics Help NOTE: Rotate Image First, then adjust image parameters!
Database Cur Image H:\ARS_RRRU\SampleFreq\SampleFreqDemolmage1.jpg Next Image Begin Comment

Rotate
Darken
Lighten
R
>> Cont
<< Cont
Refresh Frame
KEY
1
Label Set
1
2
3
4
5
6
Next Frame
Zoom 8
Frame

Define Custom Labels

Label 1	sagebrush	Label 16		Label 31		Label 46	
Label 2	rabbitbrush	Label 17		Label 32		Label 47	
Label 3	horsebrush	Label 18		Label 33		Label 48	
Label 4	greasewood	Label 19		Label 34		Label 49	
Label 5	perennial grass	Label 20		Label 35		Label 50	
Label 6	annual grass	Label 21		Label 36		Label 51	
Label 7	perennial forb	Label 22		Label 37		Label 52	
Label 8	annual forb	Label 23		Label 38		Label 53	
Label 9		Label 24		Label 39		Label 54	
Label 10		Label 25		Label 40		Label 55	
Label 11		Label 26		Label 41		Label 56	
Label 12		Label 27		Label 42		Label 57	
Label 13		Label 28		Label 43		Label 58	
Label 14		Label 29		Label 44		Label 59	
Label 15		Label 30		Label 45		Label 60	

Cancel Load Existing Save

NOTE: Labels must be longer than one character!
CAUTION: When editing Btn files created by SamplePoint, save the result as a new file so as not to clear the Descriptions and ShortCuts in the original.

Note that only 10 buttons are visible at once. To toggle between groups of 10, use the radio buttons in the Label Set panel, lower left corner.

Image brightness, contrast or rotation can be adjusted using buttons to the left of the image. The R button returns the image to the default state. Image adjustments made in SampleFreq do not alter the source file.



6. **Analyze frequency, image by image, frame by frame.** Click the Begin button, and all nested frames appear. The red frame is the first frame to analyze. The color of the active frame can be changed with Options>Change Active Frame Color. Zoom in or out incrementally with the mouse scroll wheel or up and down arrow keys, or toggle between 1X and 8X by right clicking at specific locations within the image. To record frequency data, click Yes or No to indicate presence/absence of each vegetation type within the first frame. When all vegetation types have been completed for the first frame, click Next Frame.



7. **Create a frequency summary.** Once all images have been analyzed, click Create Statistics to create a frequency summary for the dataset. The summary file will be the name of the database, followed by “_SUMMARY.csv” and can be opened in Excel.

The screenshot shows the SampleFreq software interface. The main window displays a photograph of a field with a yellow rectangular selection box. A progress dialog box is overlaid on the image, containing the following text:

Statistics files were successfully created,
in 0.093 Seconds
A total of 12 cells were processed.
This is 7.75 msec per cell.

Below the dialog box is an "OK" button. The software interface includes a menu bar (Options, Database, Define Frames, Labels, Create Statistics, Help), a toolbar (DataBase, Cur Image, Next Image, Begin, Comment), and a sidebar with various controls (Rotate, Darken, Lighten, R, >> Cont, << Cont, Refresh Frame, KEY, Label Set, Next Frame). At the bottom, there is a row of buttons for different plant species: sagebrush, rabbitbrush, horsebrush, greasewood, perennial grass, annual grass, perennial forb, and annual forb. Each species button has "Yes" and "No" sub-buttons. The "Zoom" is set to 1 and the "Frame" is set to 4.

7. Create a frequency summary (continued). In Excel, the summary file shows the nested frame size across the top row, and the frequency hit data for each vegetation type. At the bottom, total hits and percent frequency for each nested frame size is shown. Frequency data is complete.

Button Label	Image	GSD(mm)	Frame Area (M^2)	Comment
sagebrush			0.1	
	1 SampleFrame	0.4	0	
	2 SampleFrame	0.4	0	
	3 SampleFrame	0.4	0	
		Number of Hits	0	3
		% Frequency	0.00%	100.00%

Button Label	Frame Area(M^2)	0.1	0.5	1	1.59
sagebrush		0.00%	0.00%	100.00%	100.00%
rabbitbrush		0.00%	0.00%	66.67%	66.67%
horsebrush		0.00%	0.00%	0.00%	0.00%
greasewood		0.00%	0.00%	0.00%	0.00%
perennial grass		100.00%	100.00%	100.00%	100.00%
annual grass		0.00%	0.00%	33.33%	66.67%
perennial forb		0.00%	0.00%	0.00%	33.33%
annual forb		0.00%	33.33%	33.33%	33.33%

More options:

- Toggle Information Window display between current image and current database with the radio buttons adjacent to each.
- Add comments by clicking on the Comment button and typing a comment. Comments are saved in the database beside the image name and are included in the frequency summary file.
- Turn on Frame Zoom, which automatically zooms into the active frame, with Options>Frame Zoom
- See what nested frame sizes are currently being analyzed in a database with Options>Show Frames Defined
- Advance quickly from nested frame to nested frame by using the N key for NEXT.
- Manually edit data with Options>Simple Data Editor

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