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CS Independent Study  
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## Extracting Images Using VLC - User Manual

### Overview

There are three main tasks that are involved in the project for classifying Harmful Algal Blooms in the Finger Lakes through machine learning. The components include acquiring images, often through extracting frames from videos, training the machine learning model, and classifying the images using the trained model. Therefore, this project is broken up into three separate programs: the VLC media player, the training program, and the classifier program.

The VLC media player provides a convenient way for users to extract frames from videos and save them as images. Below are the steps for extracting frames using VLC on a Mac. For Windows users, the concepts and ideas are the same, but the layout and button labels vary for some steps. The following link is a good reference to use along with this document:

<https://www.raymond.cc/blog/extract-video-frames-to-images-using-vlc-media-player/>.

Scroll down on the page until you reach “2. VLC Media Player.”

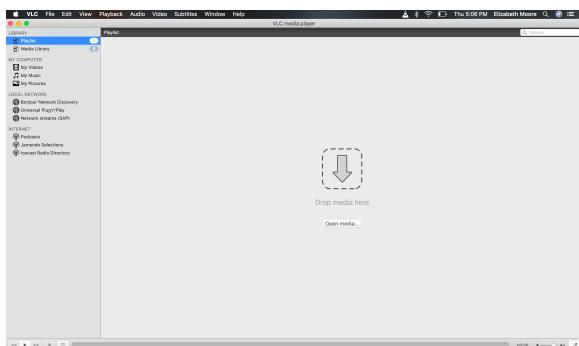
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### VLC Steps for Mac User

#### **Step 1: Download VLC Media Player (VLC)**

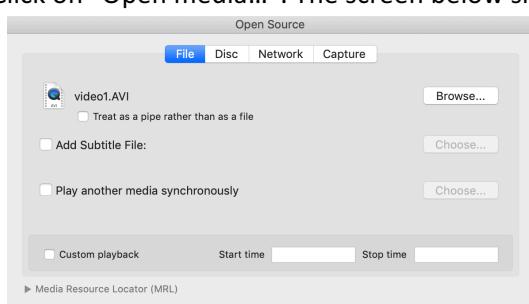
<https://www.videolan.org/vlc/>

**Step 2:** Open VLC. It should look like the screen below.



**Step 3:** Click on “Playlist” in the menu bar on the left hand side of the window. (shown above)

**Step 4:** Click on “Open media...”. The screen below should pop up.



**Step 5:** Click “Browse” and navigate through your directories on your computer to the folder that contains the video that you want to extract images from. Double click this file. It should now be loaded into VLC’s playlist.

**Step 6:** Click “Open”. Once this is done, the video should automatically pop up on the screen and start playing. Pause the video, but keep the window open.

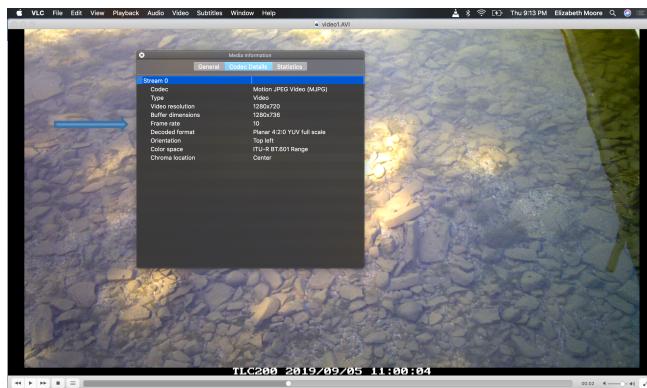


**Step 7:** We are now going to find the frame rate of the video (how many frames per second the video plays). This information will be useful in later steps. Click the “Window” tab that is on the toolbar on the top of the screen.

**Step 8:** Click on “Media Information”



**Step 9:** Click on the tab that says “Codec Details”



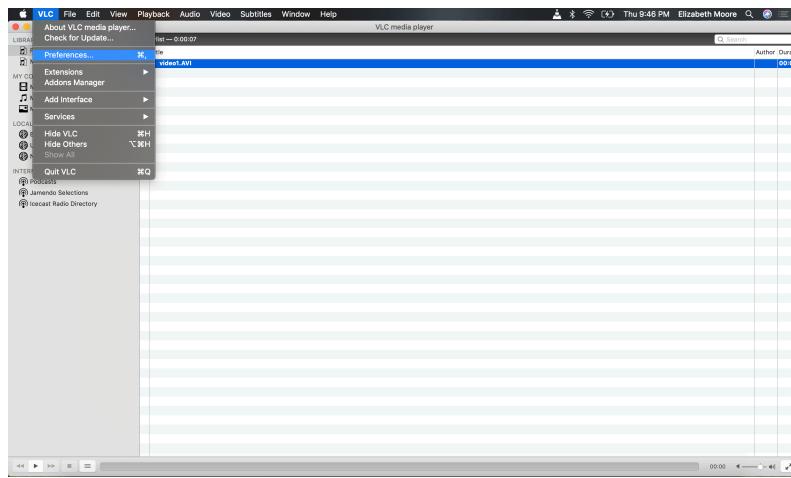
**Step 10:** The frame rate should be given in the new window that is above. Write down and record the frame rate for that particular video to save and use for later steps.

**Step 11:** Once you have the frame rate recorded, close out of the “Media Information” window.

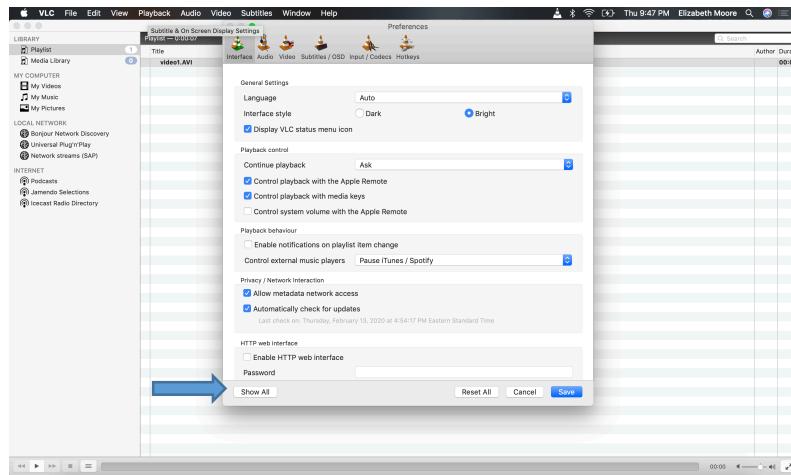
**Step 12:** Un-pause the current video and let the video finish playing. Once the video finishes, it should automatically close the video window and return to VLC’s “home screen”.

**Step 13:** Click the “VLC” tab which is located on the left of the top toolbar.

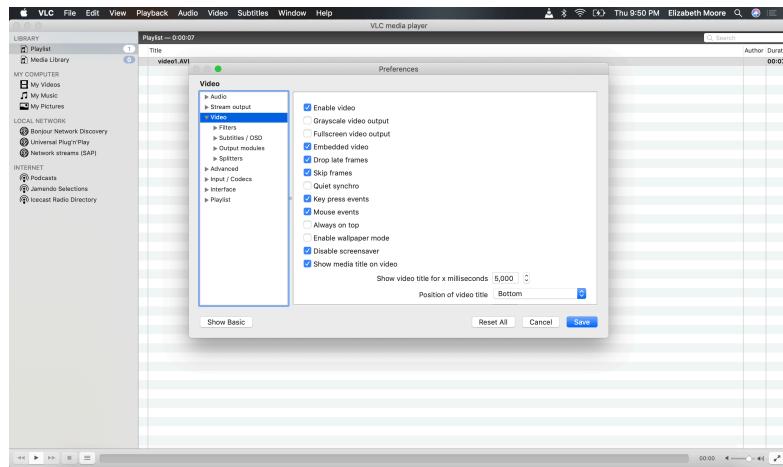
**Step 14:** Click “Preferences”. This should open up a window with a bunch of various settings.



**Step 15:** Select the “Show All” button on the bottom left of this screen. This should bring you to another window with a menu on the left-hand side of different options to choose from.

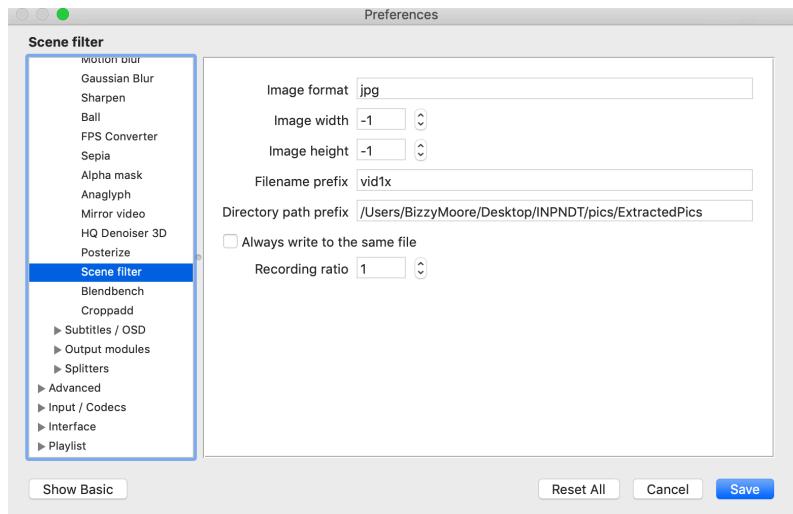


**Step 16:** Expand the “Video” option by clicking on the small triangle next to “Video”.



**Step 17:** Expand the “Filters” option by clicking on the small triangle next to “Filter”.

**Step 18:** Scroll down and double click on “Scene filter”. The screen shown below should pop up.



**Step 19:** Make sure that “jpg” is filled in next to “Image format”.

**Step 20:** The “Image width” and “Image height” should be -1.

**Step 21:** The “Filename prefix” is the prefix that will be used for each image that is extracted from a video. Following the prefix, VLC adds a number in order to give each image an individual identity. This is the format of how each image will be named. The prefix “vid1x” as shown in the picture above, is short for “Video 1”, meaning that the image was extracted from Video 1. The “x” after the number,1, is used to separate the number of the video from the number that VLC assigns the image. A couple example names of images that would be saved are “vid1x00095.jpg” and “vid4x00117.jpg”. “vid1x” and “vid4x” are the specified prefixes while 00095 and 00117 are the designated numbers. You can make the prefix be whatever you want. Having it be the name of the video that you are extracting images from is a good option.

**Step 22:** In the “Directory path prefix” spot, specify the path where to save the extracted images on your computer.

**Step 23:** The “Recording ratio” will save an image every xx number of frames.

Therefore, if the video is 30 frames per second (frame rate) a value of 150 will save an image every 5 seconds. Specify the recording ratio that you want. It is important that the recording ratio that you select is not too large because the whole idea is that we want to get as many pictures extracted as possible so that we can have a large data set. However, if your recording ratio is too small, then it is possible that some frames will be represented by the same image, so there will be duplicate images extracted. It is trial and error, but you want to make sure that you are not skipping out on any important data (ex. blue-green algae images) because your recording ratio is too high. Another tip is that the recording ratio should be a multiple of the frame rate that you found in Step 10. I have been using a recording ratio of 1 because the videos that I have been using up to this point have been pretty short (less than 10 seconds). The ratio of 1 means that every frame is being saved as an image. For longer videos, this may not be a great idea because that is a lot of frames, therefore a lot of images will be extracted. However, since the videos I have used so far have a frame rate of 10 and are less than 10 seconds, then I will not get more than 100 images for each video (10 frames per sec X 10 sec = 100). That is a reasonable amount to be able to sort through.

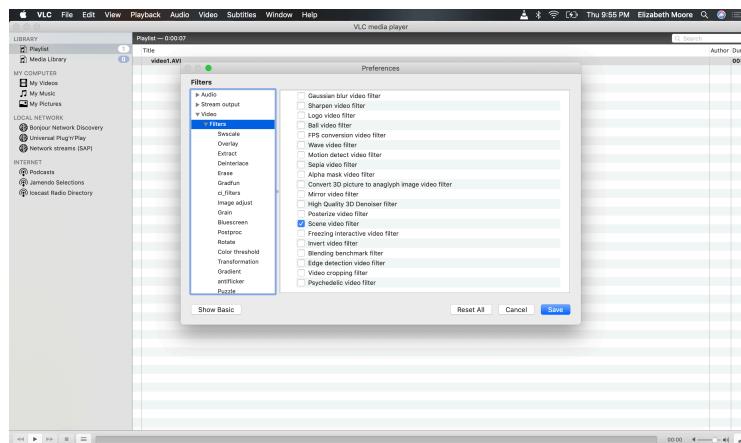
**Step 24:** After the correct information is entered in the “Preferences” screen, click the “Save” button to save the information that you entered in steps 19-23.

**Step 25:** We are going to complete steps 13 -15 again in order to get back to the preferences window. Click the “VLC” tab which is located on the left of the top toolbar.

**Step 26:** Click “Preferences”. This should open up a window with a bunch of various settings.

**Step 27:** Select the “Show All” button on the bottom left of this screen. This should bring you to another window with a menu on the left-hand side of different options to choose from.

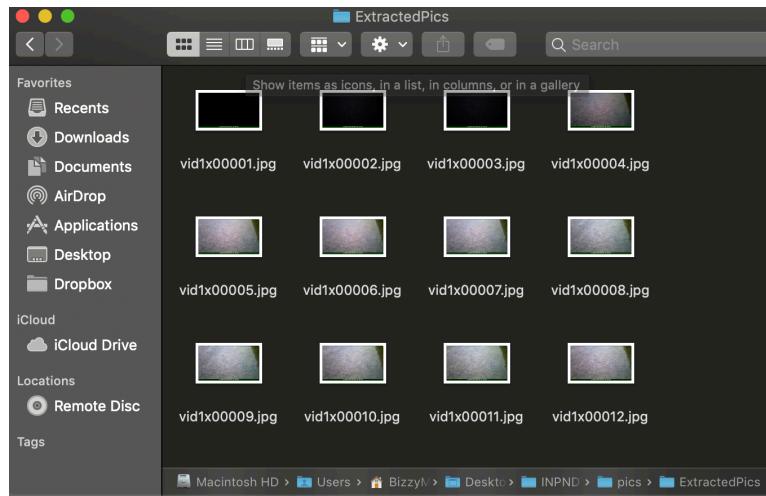
**Step 28:** Click on “Filters”. On the right-hand side, scroll through the list of options and check the “Scene video filter” option.



**Step 29:** Click save. The Preferences window should close and return back to VLC’s “home screen”.

**Step 30:** Complete steps 3 through 6 again, to open and run the video. But, instead of pausing the video, let the video run all the way through. When the video runs, VLC will extract images from the video. These images should be automatically saving in the path that you specified in step 22. When the video is finished running, it should close by itself and return to VLC's "home screen".

**Step 31:** Open Finder on your Mac, and go to the Path that you specified in step 22. All of the extracted images from the video that you just ran in VLC should be saved there.



**IMPORTANT NOTE #1:** If images are not being created and saved in the specified path after following these steps, close VLC after step 4 and re-open it, then play the video. For some reason more recent versions of VLC do not recognize the scene filter is enabled until you close and re-open the program.

**IMPORTANT NOTE #2:** After you set the preferences in steps 13 through 29, VLC is set to save images in the specified path EVERY TIME you run a video from that point on! If you want to run a video without extracting and saving images, you need to go back to step 28 and UNCHECK "Scene video filter". The next time you want to extract images, go back and re-check it!