

## **Image Analysis and Data Visualization**

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### **General introduction to image-mining**

The basic method for this tutorial was developed in the Software Studies Lab, now known as the Cultural Analytics Lab. Various details discussed in this document have been adjusted or changed based on my own research performed on different type of images. For more see <http://lab.softwarestudies.com/> and <http://lab.culturalanalytics.info/>. For more on my research see <http://remixdata.net> and <http://remixtheory.net>

#### **Activities:**

Analyze images to discover patterns for comparative analysis.

Choose a video or sequence of images

Download ImageJ to your own computer: <http://rsbweb.nih.gov/ij/>

#### **How to analyze patterns in videos:**

You may choose a series of photographs or images to analyze using the following method. Format them into the same exact size, then batch sequence them either using Bridge or Automator. (See tutorial on how to batch-sequence images).

If you want to analyze a film or video, you need to download it to your computer. The easiest way to experiment with this process is to download a video from YouTube or Vimeo. Choose a video that you want to analyze, then use the “download” feature on YouTube, or use keepvid: <http://keepvid.com/>. There are other software applications you can evaluate if you do an online search.

Once you have the video on your hard drive, open it in Photoshop. (Make sure the video is compatible with Photoshop. There is also freeware online, such as MPEG Streamclip that you can use). Usually .mp4 or .mov formats are compatible. It is best to use .mp4.

Photoshop:

- In Photoshop, with the video file open go to the top menu and select: File > Export > Render Video. (This order is different in more recent versions of Photoshop. The main thing is to look for “render video” options.)
- A window will open, select the button for “Image Sequence” and assign it a folder of your choice (you can create this folder here, click the proper button available on this window).
- *Make sure that the images you export are either “.png” or “.jpg” You will not be able to analyze .psd files.*

Once you have the folder with stills, these can be indexed appropriately on a Mac using the application Automator, if necessary, although if you did things right using Photoshop this will not be necessary. Make sure the stills are numbered in a proper sequence.

## MPEG Streamclip:

If you don't have Photoshop, you can also extract frames using MPEG Streamclip.

- Open the video of your choice, then on the top menu select File > Export to Other Formats.
- A window panel will appear. At the top there should be a tag that reads "Format," and likely has selected by default "Quicktime." Select the tab and choose "Image Sequence."
- Click "OK" at the bottom, and a save window will appear.
- Select a folder or create a new folder by clicking "new folder."
- Click "Save."

## Open the sequence in Imagej

Once you have your images, you can then begin to analyze them by evaluating their patterns as well as analyzing data. This can be done with the Open Source Software ImageJ:

<http://rsbweb.nih.gov/ij/>

Launch ImageJ:

- ImageJ tends to be fickle with RAM, for this reason, you should optimize the memory when running this application.
- On the top menu select Edit > Options > Memory & Threads
- Choose 3800 MB for Maximum Memory.

To open an image sequence go to the top menu and select:

- File > Import > Image Sequence.
- Look for the folder with the images for analysis.
- When you import an image sequence make sure that it will not take up more than 1500 MB.
- To adjust do you can do a few things. In the importing window adjust the options for "increment" and "Scale." For increment you can choose to import every other image, or whatever increment works best for your memory (every 4, 6, 10). You will likely need to experiment with the best option for your own set of images. The key is to make sure you are not missing anything in the pattern.
- You can also adjust the scale. Consider making it smaller, which will bring the overall size of the images. This will make their analysis more manageable.

The following may take a few minutes. Depending on the size of the stills and the sequence you choose (1 of every 3 stills, etc.)

Once the sequence is loaded run the following tests:

- 1) Image > Stacks > Make Montage. You will have a grid of your frames.
- 2) Image > Stacks > Orthogonal Views. You will have a series of slices ready for analysis
- 3) Image > Stacks > Z Project, select a series of analyses: average intensity, Median, Standard Deviation, Sum Slices. For each of these options a single image with all of the selected stills on top of each other should be displayed.

There are many more tests that could be done, but these will be enough for you to begin to see specific patterns in the video.

**Questions to consider**

- How is the video edited?
- If there is text, how it is displayed throughout the video?
- What type of imagery overall tends to dominate the video?
- If comparing two or more videos, what are their similarities and differences?

You may have other questions of your own. The above are suggestions to get you going with your analysis.