

Offline process to extract video/audio semantics:

This is an offline step that should be run prior to running your query. You can analyze all the frames of video and audio for every file and extract semantics that will later help you run a query to index/match. These could be quantitative measures based on concepts learned in class. There are a few suggestions are listed below, please give thought to how you would extract them, and organize them to be used for searching.

- Color – For every video you can find a color theme. Eg extracting the most dominant colors per frame as a list of numbers and collating this information.
- Motion – For every video you can compute motion statistics. Every frame can be given a quantitative number depending on how much motion you perceive in that frame.
- Sound – Based on the wave PCM samples, you could compute audio threshold levels or even frequencies that give allow you to compute a quantitative assessment of how much sound/frequency there is in an audio segment.

*While you may of course use all or some of these descriptors mentioned above, **you are also required to implement an additional descriptor**. Please give this thought and research as needed.*

Querying your database with a clip

This should be a process that takes a short video/audio clip and queries the semantics generated above. An example invocation might be

```
MyQuery.exe queryvideo.rgb queryaudio.wav
```

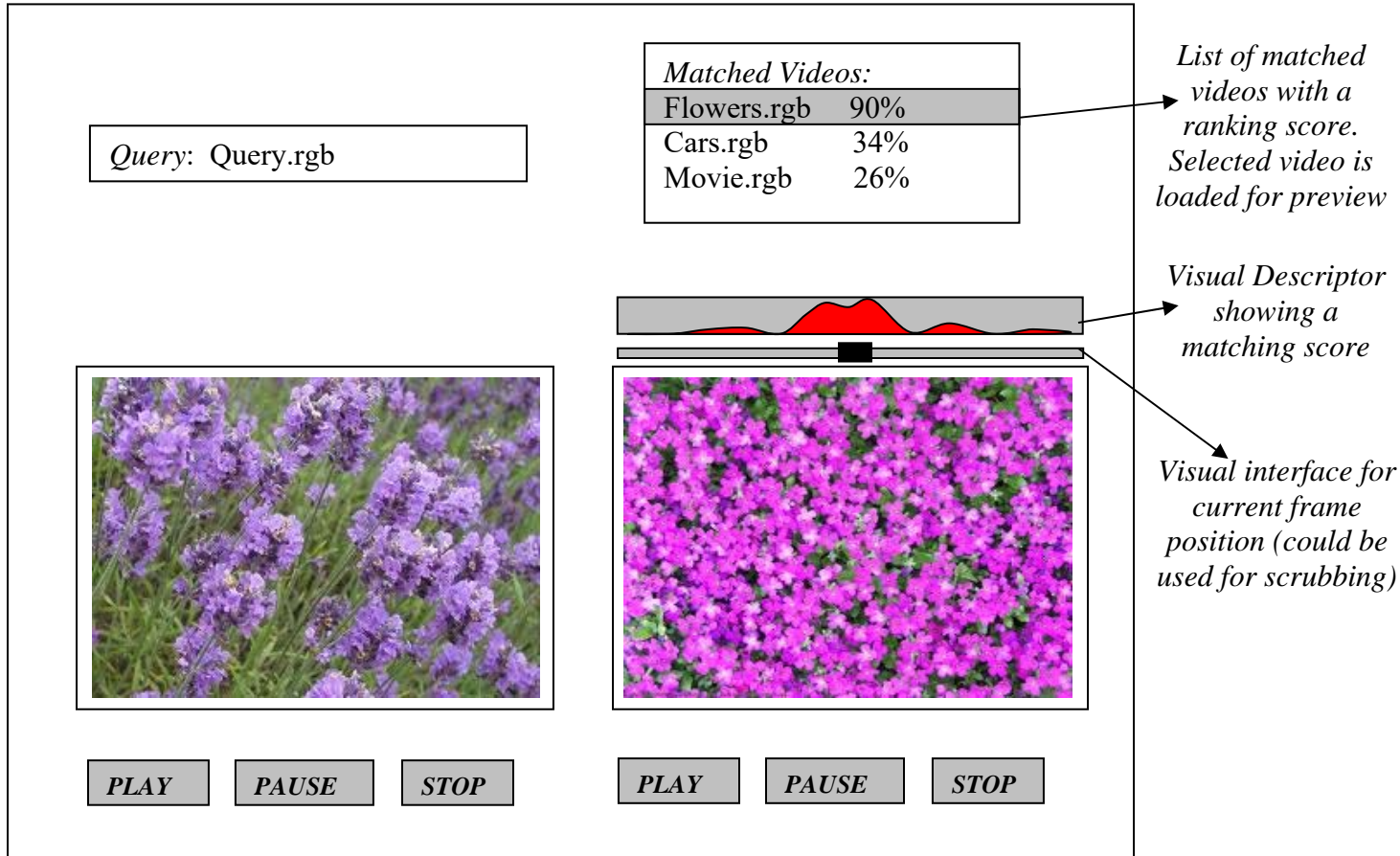
This should search and create a list of videos that either contain the query media elements or contain similar elements in a **ranked** order. At end of your search, you should open and interface to show your results or alternatively you could start you interface and load a video/audio file to run a query. An example interface is shown below in the next subsection.

A/V Player and Query Interface

Design a simple interface that shows the short query video clip and a list of matched videos that contain the query clip or similar clips in some ranked order. Here are a few requirements that you need to implement

- You should be able to play, pause and stop the query clip (and it corresponding audio)
- You should be able to show a list of video files that contain the matched query in some ranking order. You should be able to select a video from this list and be able to play, pause and stop the video (and it corresponding audio)
- Additionally, for all selected videos, you should display a visual indicator that shows you where in the video you found a match with the query clip.

An example of such an interface is shown below, you don't need to create the exact same interface, but whatever you create should have the above functionality and allow us to evaluate your result clearly and easily.



Expectations and Evaluations:

We do expect that you analyze the problem space and produce a solution. The answers are subjective (*when there is no exact match*) depending on what parameters and descriptors you extract and how you justifiably use them to compute a quantitative distance measure. Consequently, rather than perceptually making sense, we will be evaluating if your results match the descriptors you have extracted. Therefore, it is imperative for you to help the evaluation process by showing a visual description of where (frames) your video is best matching, why it is matching etc. as in the matched clip as shown above. You don't need to create the same interface as shown above, but as long as it helps us evaluate the correctness of your result, we will be able to assess your output, even if the output is not entirely correct or consistent

When it comes to playing audio and video, we do expect them to be synchronized.