MIRtoolbox workshop 1/2

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1. **Install** *MIRtoolbox.*
2. Try ***miraudio*** on an audio file of your choice.
   - miraudio(…, 'Extract', …)
   - miraudio(…, 'Trim')
     - Observe the differences in the signal (you need to zoom in in the Matlab figure)
3. **mirspectrum**('trumpet.wav')
   - mirspectrum('trumpet.wav', 'Min', …, 'Max', …)
   - mirspectrum('trumpet.wav', 'Terhardt')
   - mirspectrum('trumpet.wav', 'Mel')
   - mirspectrum('trumpet.wav', 'Bark')
   - mirspectrum('trumpet.wav', 'Bark', 'Mask')
   - mirspectrum('trumpet.wav', 'Cents')
   - mirspectrum('trumpet.wav', 'Cents', 'Collapsed')
   - Which note is played by the trumpet?
4. **mirautocor**('Cmaj.wav')   -> What are the pitches in the sound excerpt?
   - mirautocor('Cmaj.wav', 'Freq')
   - mirautocor('Cmaj.wav', 'Freq', 'Max', 500, 'Hz')
   - mirautocor('Cmaj.wav', 'Freq', 'Max', 500, 'Hz', 'Compres')
   - mirautocor('Cmaj.wav', 'Freq', 'Max', 500, 'Hz', 'Compres', 'Enhanced')
   - mirautocor('Cmaj.wav', 'Freq', 'Max', 500, 'Hz', 'Compres', 'Enhanced', 2:20)
5. **mirframe**('Cmaj.wav')
   - a = mirframe('Cmaj.wav',1,.5)
6. mirautocor(a)
   - mirautocor('Cmaj.wav', **'Frame'**)
7. Try ***mirflux*** on various audio files ('trumpet', 'piano', 'Cmaj3', 'ragtime')
   - Try *mirflux* on file 'movie2.wav'. Try with both *mirspectrum* and *mirautocor*. Try changing the options in *mirspectrum* and *mirautocor*, as well as changing the frame size and the distance measure (*mirflux(…, 'Dist', …)*)
8. **mirrms**('movie1.wav')
   - mirrms('movie2.wav')
   - mirrms(…, 'Frame')
   - Modify 'Frame' parameters
9. e = **mirenvelope**('ragtime.wav'), mirplay(e)
   - Compare with mirrms('ragtime.wav', 'Frame')
   - Try decreasing and increasing the '*Tau*' option in *mirenvelope*
   - e = mirenvelope('ragtime.wav', 'HalfwaveCenter'),   mirplay(e)
   - e = mirenvelope('ragtime.wav', 'Diff'),   mirplay(e)
   - e = mirenvelope('ragtime.wav', 'Diff', 'HalfwaveDiff'),   mirplay(e)
10. f = **mirfilterbank**('movie1.wav'), mirplay(f)
    - e = mirenvelope(f)
    - mirsum(e)

- Compare with mirenvelope('movie1.wav')

11. f = mirfilterbank('ragtime.wav')
   - e = mirenvelope(f)
   - ac = mirautocor(e)
   - s = mirsum(ac)
   - What is happening?

12. e = mirenvelope('ragtime.wav')
   - **mirpeaks**(e)
   - mirpeaks(e, 'Total', 5)
   - p = mirpeaks(e, 'Contrast', .01)
   - mirgetdata(p)   (Peaks X positions, from highest to lowest peaks)
   - v = get(p, 'PeakVal')
   - v{1}{1}{1}   (Peaks Y positions, from highest to lowest peaks)

13. Use *mirpeaks* in question 12 to find the BPM in 'ragtime.wav'

14. [p,a] = **mirpitch**('Cmaj.wav')
   - mirplay(p)
   - Check the numerical results. You can find pitch frequencies here: www.phy.mtu.edu/~suits/notefreqs.html
   - Improve the results using *mirpitch* options.
   - Do the same with 'Amaj3.wav'.
   - mirpitch('Cmaj.wav', 'Frame')
   - mirpitch('Cmaj.wav', 'Frame', 'NoFilterbank')
   - Try also with 'guitar.wav', 'ragtime.wav', …

15. **mirrolloff**('beethoven.wav', 'Frame')
   - Try different frame sizes.
   - Try different values of 'Threshold'.

16. Same with *mirbrightness*
   - Try different frame sizes.
   - Try different values of 'CutOff'.

17. Same with *mircentroid*
   - Try different frame sizes.

18. **mirmfcc**('beethoven.wav', 'Frame')
   - Try with other audio files, such as 'george.wav'

19. **mirroughness**('verdi.wav', 'Frame')
   - Compare with mirrms('verdi.wav', 'Frame')

20. **mironsets**('ragtime.wav')
   - o = mironsets('ragtime.wav', 'Attack')
   - **mirattackslope**(o)
   - **mirattackleap**(o)