

REAL TIME ANDROID APPLICATIONS USERS' GUIDE

The document contains instructions for the user, to run the real time digital signal processing applications implemented on android smartphone. There are instructions for 4 applications which implement the convolution and its properties.

Lesson 3 exercise 2:

Android application is about the convolution between input audio file and the impulse response generated during run time of the code of same size as each frame of audio. To run the app on phone follow the following lines below.

1. Home Page of app has 1. app name, 2. Display sampling frequency selected, 3. Whether playback tone is selected or not, 4. There is button 'start' to record audio from microphone and run the app 5. 'Stop' button to terminate the running app. 6. Button 'Read File' to select the audio files stored in phone memory. 7. 'Settings' button changes various parameters of audio file to run the app.
2. In 'Settings' preference, you will find various parameters to select like frame size, debugging options.
3. **First choice:** 'Output audio to speaker?' is a check button, if selected there will be audio output from the mobile or else just the calculation with no audio output. **Second:** 'output to playback', you shall select the required output either filtered or original audio from the mobile phone.
4. 'Frame Size', this will allow user to choose the required number of frame size to be sent at a time for calculating (filtering) the audio samples. Basically frame size of each sample.
5. 'Sampling Frequency', user can select the required sampling frequency with range from 8000 Hz to 192000Hz, with higher sampling frequency (= higher number of samples) time taken for the calculation(filter) increases.
6. 'Debugging level', here user gets 4 choices All (generates the filtered output also stores the generated values in text file and PCM format), Text file (generates output and stores numerical values in text file), PCM (generates output and PCM format of output), none (just generates output). This can be used to cross verify whether user is getting the proper output values.

Lesson 3 exercise 3:

Android application is about the convolution between two audio signals, one taken from either microphone or saved audio file and signal generated during run time of the code. Generated signal will be of same size as the input audio file, as frame size will be passed as parameter to the code. To run the app on phone follow the following lines below.

1. Home Page of app has 1. app name, 2. Display sampling frequency selected, 3. Whether playback tone is selected on not, 4. There is button 'start' to record audio from microphone and run the app 5. 'Stop' button to terminate the running app. 6. Button 'Read File' to select the audio files stored in phone memory. 7. 'Settings' button changes various parameters of audio file to run the app.
2. In 'Settings' preference, you will find various parameters to select like frame size, debugging options.
3. **First choice:** 'Output audio to speaker?' is a check button, if selected there will be audio output from the mobile or else just the calculation with no audio output. **Second:** 'output to playback', you shall select the required output either filtered or original audio from the mobile.
4. 'Frame Size', this will allow user to choose the required number of frame size to be sent at a time for calculating (filtering) the audio samples. Basically frame size of each sample.
5. 'Sampling Frequency', user can select the required sampling frequency with range from 8000 Hz to 192000Hz, with higher sampling frequency (= higher number of samples) time taken for the calculation(filter) increases.
6. 'Debugging level', here user gets 4 choices All (generates the filtered output also stores the generated values in text file and PCM format), Text file (generates output and stores numerical values in text file), PCM (generates output and PCM format of output), none (just generates output). This can be used to cross verify whether user is getting the proper output values.

Lesson 3 exercise 4:

Android application is about the various properties of the convolution like commutative, associative and distributive properties. Two impulse functions are

generated during the run time of the code, which are used to prove the properties. To run the app on phone follow the following lines below.

1. Home Page of app has 1. app name, 2. Display sampling frequency selected, 3. Whether playback tone is selected on not, 4. There is button 'start' to record audio from microphone and run the app 5. 'Stop' button to terminate the running app. 6. Button 'Read File' to select the audio files stored in phone memory. 7. 'Settings' button changes various parameters of audio file to run the app.
2. In 'Settings' preference, you will find various parameters to select like frame size, debugging options.
3. **First choice:** 'Output audio to speaker?' is a check button, if selected there will be audio output from the mobile or else just the calculation with no audio output. **Second:** 'output to playback', you shall select the required output either filtered or original audio from the mobile.
4. 'Frame Size', this will allow user to choose the required number of frame size to be sent at a time for calculating (filtering) the audio samples. Basically frame size of each sample.
5. 'Sampling Frequency', user can select the required sampling frequency with range from 8000 Hz to 192000Hz, with higher sampling frequency (= higher number of samples) time taken for the calculation(filter) increases.
6. 'Choice', enables the user to select the property that he/she wants to conduct, which is merely a number from 1-6. Apps informs the user about what number corresponds to what property.
7. 'Debugging level', here user gets 4 choices All (generates the filtered output also stores the generated values in text file and PCM format), Text file (generates output and stores numerical values in text file), PCM (generates output and PCM format of output), none (just generates output). This can be used to cross verify whether user is getting the proper output values.

User can store values generated from one 'choice' and compare with the values from another 'choice'.

Lesson 3 exercise 5:

Android application is about the solving the electrical circuit problems using convolution technique. Two circuits are implemented in the app, one is RL circuit and other RC circuit. To run the app on phone follow the following lines below.

1. Home Page of app has 1. app name, 2. Display sampling frequency selected, 3. Whether playback tone is selected on not, 4. There is button 'start' to record audio from microphone and run the app 5. 'Stop' button to terminate the running app. 6. Button 'Read File' to select the audio files stored in phone memory. 7. 'Settings' button changes various parameters of audio file to run the app.
2. In 'Settings' preference, you will find various parameters to select like frame size, debugging options.
3. **First choice:** 'Output audio to speaker?' is a check button, if selected there will be audio output from the mobile or else just the calculation with no audio output. **Second:** 'output to playback', you shall select the required output either filtered or original audio from the mobile.
4. 'Frame Size', this will allow user to choose the required number of frame size to be sent at a time for calculating (filtering) the audio samples. Basically frame size of each sample.
5. 'Circuit select', this button helps user to choose either RL or RC circuit. 'Resistor value', 'Inductor value', 'capacitance value', these can be filled with the resistance, inductance and capacitance values for the circuit
6. 'Sampling Frequency', user can select the required sampling frequency with range from 8000 Hz to 192000Hz, with higher sampling frequency (= higher number of samples) time taken for the calculation(filter) increases.
7. 'Choice', enables the user to select the property that he/she wants to conduct, which is merely a number from 1-6. Apps informs the user about what number corresponds to what property.
8. 'Debugging level', here user gets 4 choices All (generates the filtered output also stores the generated values in text file and PCM format), Text file (generates output and stores numerical values in text file), PCM (generates output and PCM format of output), none (just generates output). This can be used to cross verify whether user is getting the proper output values.