ANDROID APP FOR RECREATING OLD-RECORDING SOUND EFFECTS FOR VOICE

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EXTENDED ABSTRACT

Since the beginning of the computer era, there has been a growing interest on the creation or modification of sound by digital machines. At the present time, almost all of the audio is recorded, processed and played digitally. The characteristic sound of analog recording media is largely lost due to this digital revolution. However, there is still interest in listening and recreating this kind of recorded sounds in a digital way [8].

Nowadays, mobile devices are no longer just wireless mobile phones, they are rather tiny portable computers that provide entertainment and information [6]. In the Android mobile application market, many Apps focused on the processing of the audio digital signals can be found [1], [2], [4]. However, it was not possible to find anyone aimed at recreating old-recording sound effects for voice in an easy and funny way.

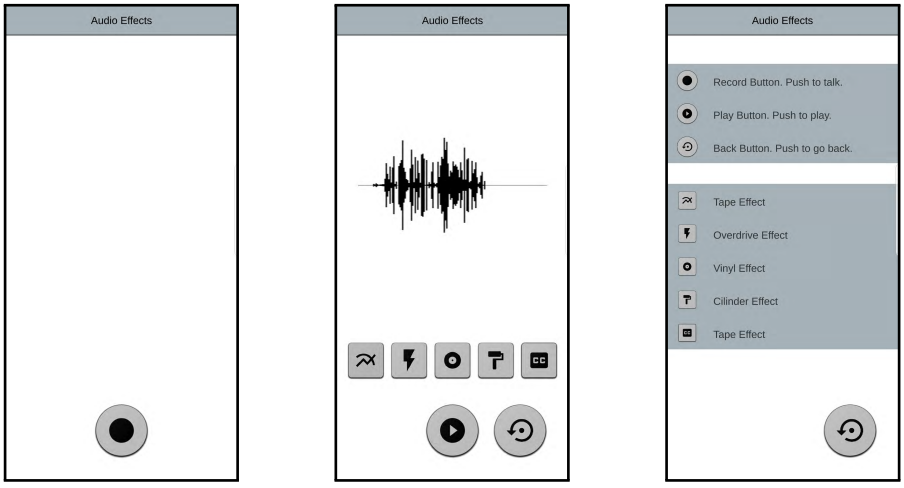
Thus, in this contribution, an Android App for recreating old-recording sound effects for voice is presented. The old-recording sound effects recreated are: Vinyl effect, Cylinder effect and Tape effect. Also, two nonlinear audio effects: Tube effect and Overdrive effect, are implemented since analog recording and reproduction are based on nonlinear signal processing.

The general modeling scheme of the implemented effects is presented in Figure 1. First, the input audio signal amplitude is normalized. Then, the normalized signal passes through the nonlinear distortion block. Two different nonlinear distortion blocks have been implemented: Asymmetrical clipping and Overdrive [9]. Asymmetrical clipping is used for tube effect and Overdrive is used for all the other effects, with different configuration parameters. Next, a second order Butterworth high pass filter [3] tuned to each effect is applied: no filtering is applied for Tube and Overdrive effect, cutoff frequency of 500Hz for Cylinder and Tape Effect and cutoff frequency of 100Hz for Vinyl effect. Later, background noise is added. Note that noise is only added for the old recording sound effect and this noise is different for each effect [5], [7]. Finally, the audio signal is normalized to the input amplitude.

Figure 1. General processing scheme of all the implemented effects.

The basic technologies used to develop this App are: *Unity* as developed framework, *Visual Studio* as programming environment for *C#*, *Android Asset Studio* for the design of graphical interface elements and *Interactive Digital Filter Design* for filter design.

The recording screen, the main screen and the tutorial screen of the developed application are shown in Figure 2. The user must press the recording button for audio recording in the recording screen. Next, in the main screen, the different effects can be applied to the original recording as many times as desired and the resulting sound can be played.



(a) Recording screen (b) Main screen (c) Tutorial screen

Figure 2. Screenshots of the Android App developed for recreating old-recording sound effects for voice.

A survey has been carried out to evaluate the quality of the designed App. The participants were requested to evaluate the user experience and the applied audio effect. These questions had to be answered with a number from 1 to 5, where 1 means difficult/lowest/worst and 5 means easy/highest/best. The average score of the user experience was 3.7 and the average score of the applied audio effect was 4. The conclusions of this test were very positive, finding, the subjects, the application interesting. However, the user experience could be improved by allowing the possibility of sharing audio by means of WhatsApp and allowing to modify the parameters of the audio effects.

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