

机器学习与数据挖掘

语音变调方法分析及音效评估

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摘要:

对现有变调方法作了分类分析,分析了3种典型方法的变调原理和特点,即基于时域同步叠加固定合成变调法(synchronized overlap-add fixed synthesis, SOLA-FS)、频域插值法和基于相位声码器法,重点给出改进的时域SOLA-FS实现方法;通过仿真实验对比3种变调方法的效果:3种变调方法均能在保持音频播放时间不变的前提下,实现音调的改变,但在语音自然度的感知上有差别;通过主观测听实验评估了各种变调方法的音效。结果表明:不论对语音音高的提升还是降低,在相同变调系数下,时域SOLA-FS方法均具有最好的变调效果。

关键词: 语音变调 时域同步叠加固定合成 相位声码器 音效评估; 频谱插值

Study of pitch shifting technology and the sound quality evaluating

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Abstract:

Three pitch shifting methods were studied and implemented, which were the improved synchronized overlap-add fixed synthesis(SOLA-FS) method, interpolation-on-frequency method, and the phase vocoder method. The improved SOLA-FS method was especially discussed in detail. Principles and characteristics were analyzed and simulation results were provided. In the experiments, it was found that the three methods could all achieve the effects of pitch-shifting, that is the pitch of the audio would be changed but the duration would be kept unchanged. But the auditory perceptions of the three methods were different. So, a sound quality evaluation test was carried out. The results of auditory evaluation tests showed that, under the given pitch-shifting ratio, whether for up or down, the sound quality processed by the improved SOLA-FS method is the best.

Keywords: pitch shifting synchronized overlap-add fixed synthesis phase vocoder sound quality evaluation interpolation-on-frequency

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