



NEXT-GENERATION GUITAR TUNER

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Introduction

- Guitar tuners are owned and used by guitarists around the world.
- They come in the form of pedals, clip-on tuners, rack, or software plugins for, e.g., Cubase or ProTools.
- The PolyTune is capable of finding the pitch of all strings at the same time, but only for open strings.
- Clip-on tuners, another recent innovation, are based on piezo sensors.



The Idea

- Traditional guitar tuners are based on simple PLLs, and the PolyTune is believed to be based on harmonic summation.
- These are quite limited in accuracy and have problems with noise and for low pitches.
- The Audio Analysis Lab at AAU has invented a number of statistical parametric methods for pitch estimation. These methods have many nice properties (e.g., robustness, optimality) and include
 - a) Subspace methods
 - b) Statistical methods
 - c) Filtering methods
- In this project, the goal is to develop a superior guitar tuner based on these methods!

The Project

- Based on an thorough analysis, a signal model and an estimation method should be chosen for the guitar tuner (e.g., a maximum likelihood, Bayesian, subspace or filtering method).
- Fast implementations of the method should then investigated (e.g., subspace tracking, time-recursive implementation).
- A real-time prototype should be developed (VST plugin, standalone, android app, guitar pedal).
- The features for the guitar tuner could be: piezo sensor/cable/microphone-based, polyphonic/monophonic, open strings only, etc.
- Advanced features could include on-line transcription and editing, fingering, scale and chord classification, and intonation help.



Literature

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