Self-Tuning Guitar

Team 10: The Tune Squad
The Team

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Basic Idea

Our goal is to produce a system that can adjust the tune of a guitar’s strings to match a desired frequency.
Ideal user experience

- User enables tuning system (button/knob)
- User strums the guitar
- Guitar tunes (faster than a professional)
- User disables tuning system
- User plays
Visual Representation

![Diagram of a system involving strings, microcontroller, motors, and a user interface to achieve desired tuning. The diagram shows a feedback loop involving current string vibration frequency, pickup magnets, pickup coils, microcontroller, signal comparison, rotation converter, motor control, knobs, and tension to achieve new string vibration frequency.]
Alternatives

- Tighten the strings at the bridge
- Tension Gauges for each string
- Convert to digital system
  - Abandon physically tuning anything
  - Provide distortion effects
Current Research

- Microprocessors with DSP capabilities
  - Texas Instruments
  - Arduino etc.
- Motors
  - Servo vs Stepper
- Guitar Pickups
  - Hexaphonic
  - Self-made
- Signal processing
  - Matlab vs Octave
  - FFT vs Gabor
Project Status

- Power Gig Guitar
- Sample servo motor
- Signal Processing Techniques
- One-String test Apparatus
Obstacles

- Signal harvesting from multiple strings simultaneously
- Motor size for mounting purposes
- Collecting samples effectively
- Engineering 325