# Instant Harmonies: Enhancing Music Tuning with Algorithms

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**Abstract**

Using ratio-based pitch adjustment algorithms, we created a web-based application that dynamically retunes MIDI files from standard 12-tone equal temperament (12-TET) to Just Intonation (JI) as our first step. At the same time, we investigate the MIDI Tuning Standard (MTS) as a substitute microtonal control mechanism. Initial studies show that MTS's direct frequency setting provides a valuable alternative to the potential overhead or resolution limits of channel-based pitch bend; however, our current system relies on pitch-bend messages for a broader hardware compatibility. We demonstrate the system using sounds from digital instruments. This approach addresses the aspects related to the inharmonicity found in acoustic counterparts and incorporates a library-based pitch identification module to improve tuning choices. Our proposed project aims to achieve just-intonation harmony in real time without disrupting performance with the help of AI.