

# Brass Auto-Tune Charter

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Group 14

## 1 Problem Statement

In order to play with any degree of tonal accuracy, a brass instrument's tuning slide must be adjusted to a position in which any desired note can be played in-tune. A musician will typically center their tuning around a given note, which will tune the other notes by proxy. However, this method is imperfect. Regardless of which note the instrument is tuned to, there will always exist notes that will be out of tune without the conscious adjustment of the pitch by the musician via their embouchure. Even with skilled musicians, this adjustment will never produce perfect intonation. This product seeks to change this by using the power of computation to produce an auto-tuner that listens to, interprets, and adjusts the pitch of brass instruments via a device that continuously pushes and pulls the tuning slide.

## 2 Project Objectives

- Create a device that is capable of listening to, interpreting, and adjusting the pitch of a brass instrument.
- Create software that can continuously measure pitch and send tuning instructions to a step motor that moves the tuning slide.
- Create a desktop application that can configure the device to fit specific instrument specifications and display a visual representation of the tuning information.
- Allow the device to be compatible with as many brass instruments as possible via interchangeable parts and software configurations.

## 3 Stakeholders

- **Users**  
Brass players who would like to have superhuman intonation.
- **Developers**  
Adam Davis, India Hutson, Ryan Ellison, Zach DeRuiter
- **Product Manager**  
Aline Becerra Carranza
- **Product Owners**  
Adam Davis, India Hutson, Ryan Ellison, Zach DeRuiter

## 4 Deliverables

- Tuning software built with Python and run on a Raspberry Pi Zero that interprets the pitch and sends out instructions to a step motor that moves the tuning slide.
- Desktop application built with Python that can configure the device. Configurations would allow the user to input the length of the tuning slide and the maximum range that the device will move. This application will also provide instructions on using the tuner and give a visual representation of the tuning data itself when connected.
- A step motor that can receive instructions from the tuning software and adjust the tuning slide continuously.
- Software-based safety feature that will detect insufficient slide movement and cease moving the slide if it gets stuck.