Harmony Hand 🎶✋

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Steven Winnick (shw2139), Maria Rice (mhr2154), Zachary Coeur (zjc2106), Sanjay
Rajasekharan (sr3765)

Harmony Hand is a device that allows a singer to hit each note perfectly, even if their voice can't quite get there. We propose an interface that combines a wearable glove equipped with an Inertial Measurement Unit (IMU) with the DE1-SOC for pitch correction. The idea is simple: users wear a glove that tracks the height of their hand, and the system adjusts the pitch of their singing accordingly. The user simply raises their hand to sing higher notes, and lowers it for lower notes. Also connected to the DE1-SOC will be a speaker to play back the singer's pitch-altered voice in real-time, taking advantage of the FPGA's customizable circuitry to ensure that the lag between input and output is imperceptible. An especially fun time to bust out Harmony Hand is on Karaoke Night. Not only could it help some of us less gifted singers hit the high notes, but also mess with our friends while they sing.

Components

1) FPGA
2) Microphone
3) IMU
4) Speaker
5) Glove

Milestones

Our plan is to approach this project in an incremental manner, ensuring that each component of our system works in the manner we intend before combining them.

- ☐ Testing reception of microphone input
- ☐ Testing playback of mock microphone input
- ☐ Testing reception of IMU input
- ☐ Playback of audio directly from microphone to speaker
- ☐ Removing echo and feedback
- ☐ Playback of pitch-corrected audio from microphone to speaker
- ☐ Glove-controlled pitch-corrected audio