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MEMO Number: 007
DATE: 12-08-2014
TO: ACME Chief Engineer E.F. Charles Laberge, PhD
FROM: GuPS1 (Written by Matthew Massimilla)
SUBJECT: Team Status Report 4

1 Introduction

This memo details the progress and effort of the GuPS1 guitar pitch shift project during the period of November 14, 2014 through December 19, 2014. Included is a breakdown of work to be completed in the upcoming development period.

2 Completed Work

The following project tasks were completed by the entire GuPS1 team:

- Task 1.4: Additional audio samples were recorded that were at least 6 seconds long
- Task 1.5: Additional pitch shifting and pitch detection algorithms have been researched.
- Completed PDR
- Decided what items are to be demoed by 12/19/14.
- Perform demo on 12/19/14

Additionally, the following individual efforts were made:

- Designed ADC parameters/configuration, assisted with Detection and Pedal Interface GUI, developed MIDI design plan, developed simple dynamic cosine value generating script, wrote Program Plan excluding Work Breakdown Structure (Jon)
- Wrote Detection and Pedal Interface GUI, developed MIDI design plan, developed time delay cosine modulator, co-wrote Requirements Document, researched time domain pitch shifting methods, researched Hilbert Transform, performed algorithm tradeoff for demo, developed code flowcharts for demo (Natalie)
- Wrote Work Breakdown Structure, researched phase vocoder pitch shifting methods, performed algorithm tradeoff for demo, assisted in pitch detection algorithm, researched other pitch shifting methods (Matthew)
- Co-wrote Requirements Document, researched phase vocoder pitch shifting methods, researched time domain methods(PSOLA), wrote pitch detection algorithm, researched methods to overcome latency and

resolution issues(Adaptive Resolution), wrote peak detection algorithm for finding harmonics (David)

3 Work Expected During Next Reporting Period

- Research alternative methods for pitch shifting (MIDI, Audacity libraries, Simulink)
- Further research hardware options
- Implement pitch shifting for single string method (One string guitar)

4 Issues

Currently, GuPS1 has no new concerns. We are still concerned with audio quality and latency. These concerns are going to remain concerns throughout the project. We want to ensure that the audio remains as close as possible to what the user would normally hear when he or she plays directly into an amp. We are also currently working our way through a pitch detection algorithm. We are currently behind on the simulations but this is the place that we expected to fall behind on because developing the algorithm is the most difficult part.