Feedback Detection and Elimination System

A Design Proposal by

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Mentored by

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I. Abstract

The main focus of this project is to detect and remove acoustic feedback from a digital audio signal. This project was inspired from experience with this problem in everyday situations dealing with the amplification of an audio signal using a microphone and speaker based system. The technology developed will be applicable to any digital audio signal to improve signal quality, available gain from the system, protect equipment from unnecessary strain, and protect hearing. The algorithm will involve development of C++ coding based in a UNIX environment. To determine the accuracy of the system comparison testing between the processed and unprocessed signal will show the accuracy of the feedback detection and removal.

III.   Proposal

I would propose a system that would process a digital audio to find and remove feedback. The application of pre-existing DSP algorithms to detect feedback in a digital audio signal. In doing this, the center frequency, bandwidth, and magnitude of the spectral area of the feedback will be determined. This will be used to calculate an appropriate filter. It may also be possible to do a comparison on different algorithms to determine which has the best performance.

Once the feedback and its characteristics are determined, the next step will be to remove the feedback from the digital audio source using a filter. This will be done with a notch filter that would only remove the specific region of frequency that is causing the feedback. This filtering system should not affect the audio signal to such an extent that the signal distortion caused by filtering would not be very noticeable to the human ear.

III.   Concerns and Considerations

There are several problems that might be encountered in the development of a system of this type. The remove of the feedback by elimination of the frequencies causing the feedback by equalizing the signal could distort the signal to an undesirable level. It may be necessary to use several filters to remove feedback that may occur in different areas in the spectrum of the signal. The ability of the system operating in real-time will be limited by the processing power available.

IV. References

http://www.sabineinc.com/frames/fbx_prod.html

http://www.rolandus.com/products/MI/AP-700

http://www.peavey.com/

V. Project Outline

I.   Proposal

      A. General development of project.

      B. Revision and further planning.

II.   Research

III. Implementation and Development of Algorithms

      A. Development of feedback detection algorithm.

      B. Development of filter algorithms.

IV.   Algorithm Testing

      A. Feedback detection testing.

      B. Filter testing.

V.   GUI Development

      A. Development of TLC/CK based GUI interface.

      B. Testing GUI interface.

VI.   Presentation

      A. Project presentation

      B. Project demonstration

VII. Paper

VI. SCHEDULE

Task	Week													
	1/8	1/15	1/22	1/29	2/5	2/12	2/19	2/26	3/5	3/12	3/19	3/26	4/3	4/10	4/17
Proposal	←———→														
Research		←————→													
Implementation of Algorithms					←—————————→										
Algorithm Testing							←——————————→								
GUI Development											←———→				
Presentation											←————→				
Paper												←————→			