

Tonal Interpreter

Group Members

Akash Bhairav Gupta	150040099	+91 9024-470429	akashbgupta@gmail.com
Kanush Agarwal	150040083	+91 8818-883924	
Vishal Jetley	150040005		
Kevin Vivek	150040004		

Introduction

We intend to make a device that would have a tuner as well as a chord displayer in it. The device will have two modes. The first would be used to tune string instruments like guitar, sitar or violin. The other part of the project would be able to display the chords/notes being played on the musical instrument. We will be using DSP microprocessor for sound processing in this project.

Motivation

We wish to pursue this project as it encompasses a wide range of concepts from physics, electronics & computing which would be instrumental in learning and growth. Also, as beginners in music, everyone faces this problem of getting to know the scale of the songs that we hear. This device would be able to tackle and solve these music related problems with considerable accuracy.

Going about the Project

Input

We'll use a **microphone** that would take the sound produced by the instrument as input. also, the user can use the switch on our device to switch between the two modes.

Processing

The input that we'll get using the microphone will be processed with the help of a DSP micro controller. The DSP micro controller would then be coded to process the frequencies of the input and filter them accordingly to get the desired and most prominent frequencies in the input. Fourier transform will decompose the components of the input into corresponding frequencies

and give the most prominent one while filters will help filter the unwanted harmonics that may creep in with the input.

The processing for the second part will be similar, the only difference being that it'll have to process 6 frequencies at a time, as a chord in guitar has 6 characteristic frequencies associated with it. The processor will then match the frequencies associated with that particular scale and send the corresponding output.

Output

The output will be through an LCD screen. In the first mode, it will display whether the string is tuned or not, i.e. if the frequency overshoots the one that is desired, the display will prompt the user to lessen the frequency of the string and *vice-versa*.

In the second mode, it'll display the chord that is being played on the guitar.

Cost Estimate

DSP Microprocessor: Rs. 3,000

Microphone: Rs. 2,500

LCD Screen & other

electrical instruments: Rs. 500-1000

Total estimate ~ Rs.6,000-6,500;

Work Plan

Week 1

Planning and chocking out schedules to go about doing the project efficiently.

Week 2

Gaining the essential knowledge needed to make this project happen. This would include leaning coding for DSP, Arduino, designing a PCB, Fourier transforms, Filters, etc.

Week 3

Start making the project in its true sense.

Week 4

Continue making it and finish it within this week. Also test it in this week itself and debug the problems.

Week 5

Buffer Week.