

Investigation and Development of an Electronic Tuner for Santoor

By Iman Sayadi Choobari

I. Introduction

Musical instruments of different type of families have made in various models and shapes, need to be accurately *tuned* in order produce pleasant sound. *TUNING* is a process in which the highest (sharp) and lowest (flat) notes that produced by a musical instrument are adjusted in such a way that the intervals between the notes are in accordance with a specific system.

II. Project Background

An electronic Musical tuner is device which can detect and display the pitches of musical instruments. There have been many developed different type of tuners. Wooden pitch pipes, tuning forks(invented in 1711 by John Shore)[2], chromatic diapason were the old fashion of tuning devices. Electronics products equipped with an analogue needle-dial, LEDs, or an LCD screen are new generation and nowadays tunners can be find in mobile applications with less accuracy.



Figure1: Pocket-sized Korg chromatic LCD tuner, with simulated analogue indicator needle

III. Information on santoor

Santoor is a stringed instrument of the hammered dulcimer, or struck zither in trapezoidal shape with 72 strings. The strings, grouped in units of 4 and seat on top of small, movable, wooden bridge. Wooden bridges arranged in two rows that roughly parallel the right and left sides of the instrument and they are there in order to seat stretched metal strings across. Two small rosettes on the top panel helps to amplify the sound. Santoor played by two hammer shape plectrums called Mezrab.



Figure2: Exponential of Santoor with pair of Mezrab

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IV. Aim and Objectives

The aim of this project is to investigate electronic musical tuning technologies and develop a device which can be electronically tune a santoor.

1. Research technologies on musical tuning devices.
2. Test varicose components which have been identified through research.
3. Design tuner with selected components.
4. Prototype various design methods and build final device based on preferred prototype.
5. Evaluate finished device against the initial design.

V. Expected Outcomes

A finished working electronic product which can the santoor as well as a variety of musical instruments.

A final report will be produced outlining research, design, prototyping and results collected from finished design.

VI. References

- [1] Get-Tuned.com, "The Science of Tuning Musical Instruments," Get-Tuned.com TM, 2017. [Online]. Available: http://www.get-tuned.com/tuning_science.php. [Accessed 03 10 2017].
- [2] T. Rees, "Historical notes: a brief chronicle of the tuning fork," University of Cambridge, 2009. [Online]. Available: <http://www.sites.hps.cam.ac.uk/whipple/explore/acoustics/historicalnotes/>. [Accessed 20017].