TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING

PURWANCHAL CAMPUS
Dharan, Sunsari

[Subject Code: CT654]

A MINOR PROJECT PROPOSAL ON

"YOUTUBE SONG SCALE FINDER USING KRUMHANSL-SCHMUCKLER KEY FINDING ALGORITHM"

Submitted by

Youbraj Kafle	[PUR075BCT094]
Siddhant Bhagat	[PUR075BCT079]
Sabi Kurmi	[PUR075BCT068]
Rishab Acharya	[PUR075BCT066]

Submitted to

Department of Electronics & Computer Engineering

May 24, 2022

Table of contents

1. INTRODUCTION

1.1 PURPOSE

YouTube song scale finder is a chrome browser extension for desktop system that finds scale of YouTube song that is open in current tab of the Chrome. This extension provides features like selecting particular section of YouTube video/song to find scale for that section.

1.2 BACKGROUND

A scale is a sequence of small intervals - in Western music, those intervals are usually tones (whole steps) and semi-tones (half steps). To identify a specific scale, we need to know its unique sequence of intervals. Scales based on the diatonic scale will always consist of 5 tones and 2 semi-tones. Therefore, manually recognizing these scales can be simplified by identifying the position of their two semitones.

Scales are one of the most important building blocks of music. Along with chords, intervals and progressions, scales are most essential music theory concept if we want to write songs or produce tracks. Scales in music are a collection of notes played one after another following a set pattern of intervals. The pattern defines the quality of the scale and repeats with the same set of pitches at each octave. Scales are most commonly used as the melodic form of the set of notes in keys.

1.3 PROBLEM STATEMENT

While using manual method of finding scale of song, it needs lots of knowledge about music theory so that it becomes hard for beginners in music learning. And even for those who have knowledge about music theory won’t be able to find scale without suitable musical instrument.

While using software tools, there are no such platforms from which we don’t need to download whole video/song from YouTube to know it’s music scale. And this cause lots of time consumption.

1.4 OBJECTIVE AND APPLICATION

It’s objective is to provide better and efficient way for identifying scale of song. This can be used by anyone who have interests in music or those who are involved in music like music artists.

1.5 PROJECT FEATURES

User will be able to select two options in which user can select auto scale finding option that will find scale of selected song on the basis of initial 30 second. While another option will be based on time duration selected by user for desired YouTube song.

1.6 FEASIBILITY

Considering this project will eventually help not only beginners in music learning but also help music artists for their works. Knowing the scale of desired song helps in composing the song and playing instruments on the song following the correct scale.

2. LITERATURE REVIEW

Although, many methods for retrieving music scale have been proposed through encoded symbols(like MID) format, they are not applicable in the case of acoustically encoded music data. There are three existing techniques present for indexing and retrieval of acoustic music: music transcription, temporal structure discovery, and genre classification.

For music transcription, only few techniques were proposed which characterizes musical regularity (up to measure level) in music signal. However, this only works for simple situations like a particular instrument.

For temporal structure (e.g. chorus) discovery, temporal structure of songs are detected by exploring the self similarity in the feature sequence.

For genre classification, various supervised classification techniques are proposed which aims to classify the audio files in certain categories of sound to which they belong.

In this project, we have proposed a generic approach for detecting the scale root and the key from the audio signal. This technique works for any style of music

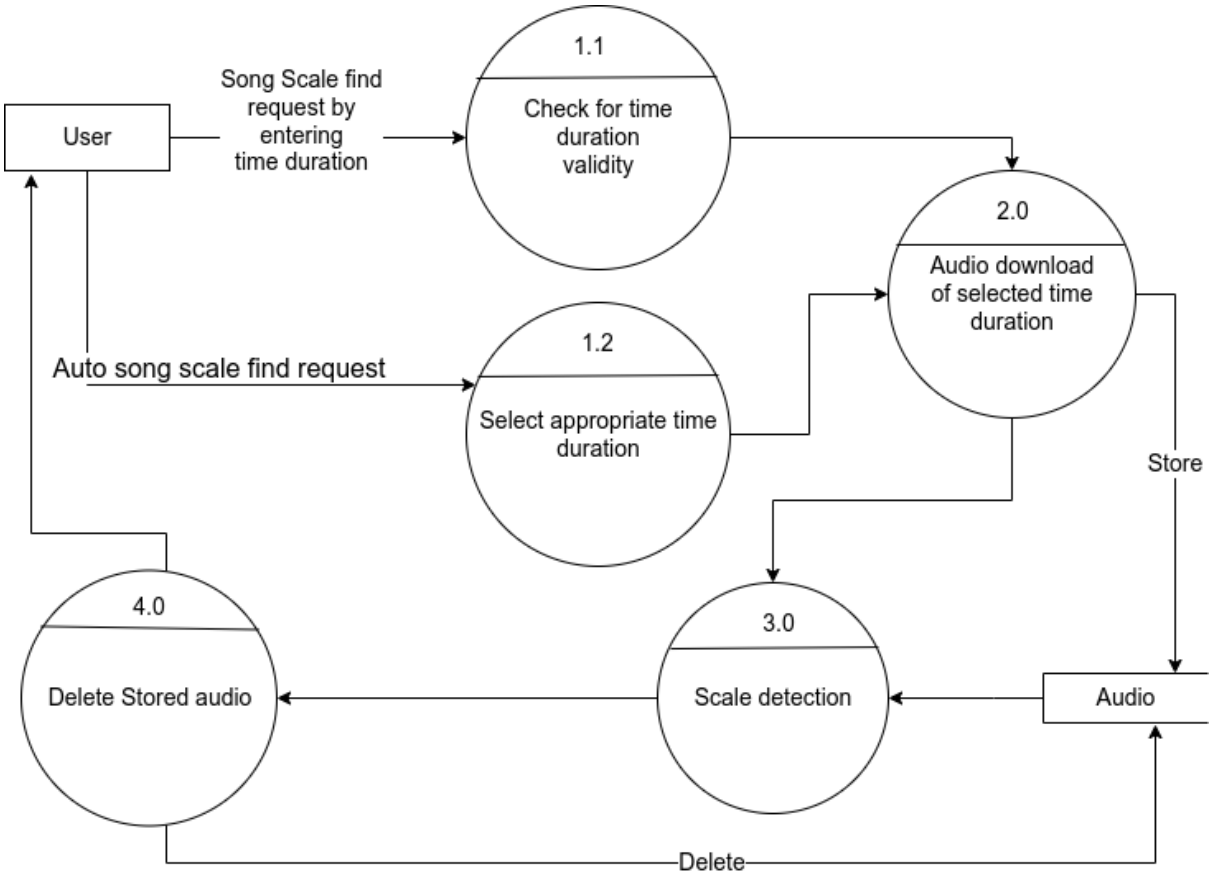
(pop or classical) that is based on diatonic scale or keys. In this approach we use Krumhansl-Schmukler key finding algorithm that compares a musical input to templates associated with different musical keys. These templates are derived from the probe-tone method. The template that provides the best match to the musical input is used to assign a key to the input.

3. METHODOLOGY

3.1 GENERAL DESCRIPTION

System will work with the combination of two components where front-end will be chrome extension while Django will work as back-end server. By hitting Django API, Chrome browser will be able to send request and get response.

3.2 SYSTEM DATA FLOW DIAGRAM



3.3 TOOLS

This project will be implemented using HTML, CSS, and JavaScript for front-end, Django for back-end.

3.3.1 EXTERNAL INTERFACE REQUIREMENT

User Interfaces

Front-end software: Chrome Browser

Back-end software: Python3

Hardware Interfaces

Any of the modern desktop operating system (Windows/Linux/Mac)

Latest, stable releases of chrome browser.(Any other browser except chrome is not supported.)

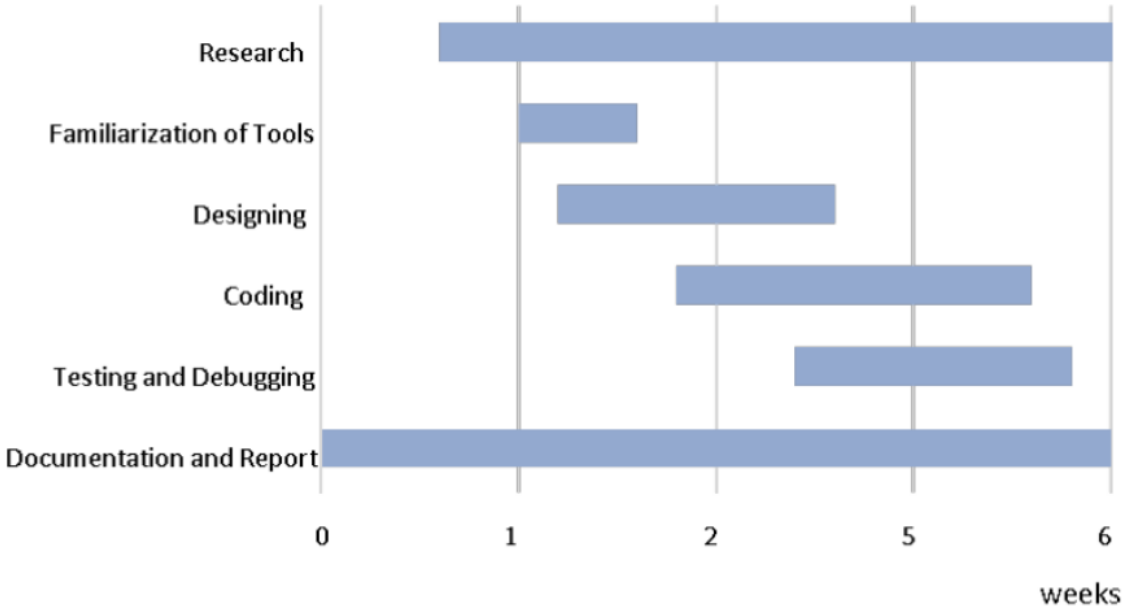
4. EXPECTED OUTCOME

We have expected to develop a chrome extension of YouTube song scale finder. The final product is expected to predict music scale of any song. For example: A# major. We are expecting the output model to be as accurate as possible and the performance of our model to be as quick as possible. The interface will be simple and attractive so that any user can easily use it.

The user will be provided with an interface where he/she can either input particular time duration or select automatic scale finding option for any song and the processing will be done in back-end. Thus finally, the output will be displayed showing the correct music scale of song.

5. PROJECT SCHEDULE

The following chart presents the tentative schedule for the project.



6. BIBLIOGRAPHY

REFERENCES

[1] Dawson, Michael H. R. “Connectionist Representations of Tonal Music”, *Athabasca University Press*, DawsonMarch 2018.

[2] Hart, Robert. “Key-Finding Algorithm.”*Robert Hart’s Homepage*, http://rnhart.net/articles/key-finding/. Accessed 16 May 2022.

[3] Yongwei, Zhu, et al.”Music Key Detection for Musical Audio” *11th International Multimedia Modelling Conference.* Feb 2005, doi:10.1109/mmmc.2005.56.

GLOSSARY

ANN	Artificial Neural Network
MIDI	Musical Instrument Digital Interface
HTML	Hypertext Markup Language
CSS	Cascading Style sheets
Chrome	Google Chrome
API	Application User Interface