Multi-Model Approach to Recommend Personalized Music Playlist

TMP – 2023 – 24 - 065

Status Document – 1

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Sri Lanka
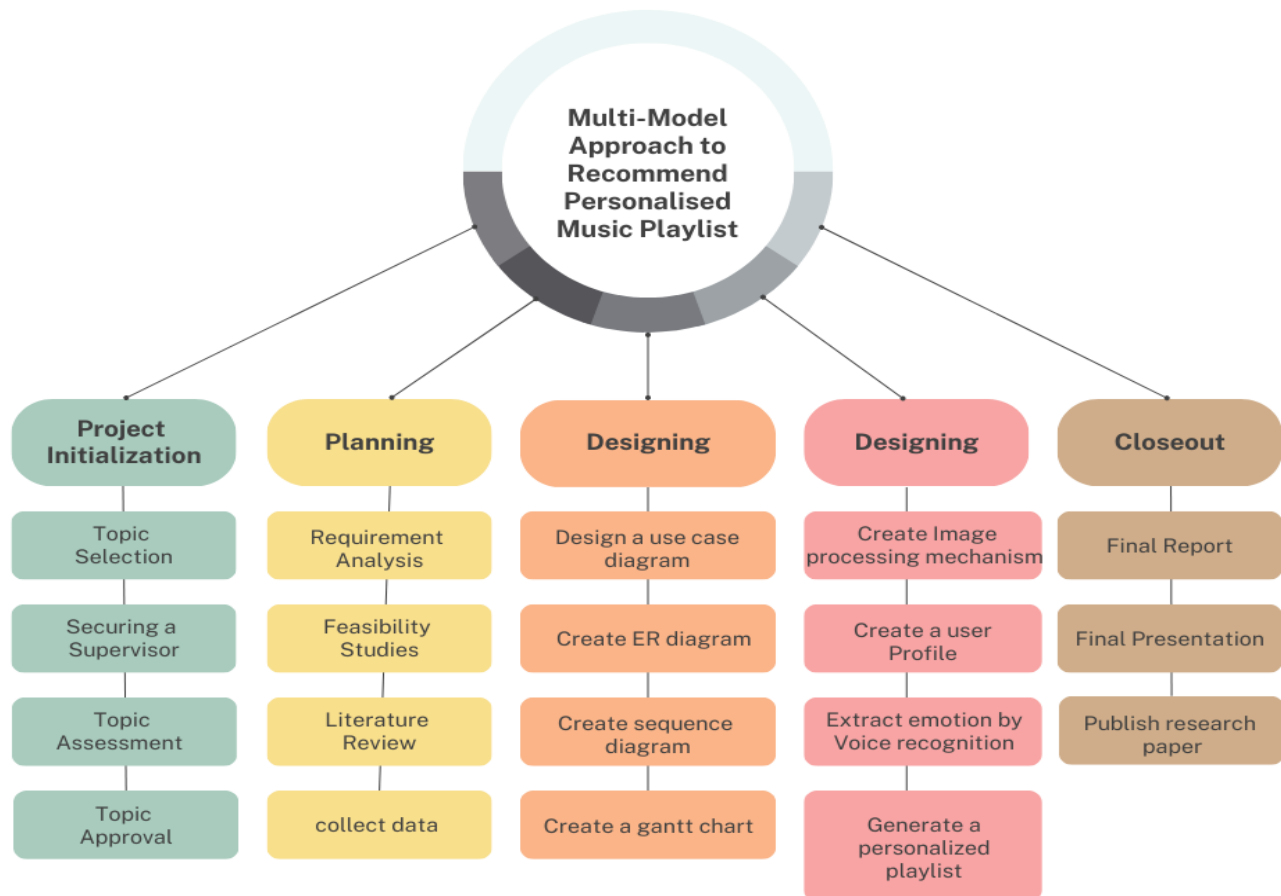
December 2023

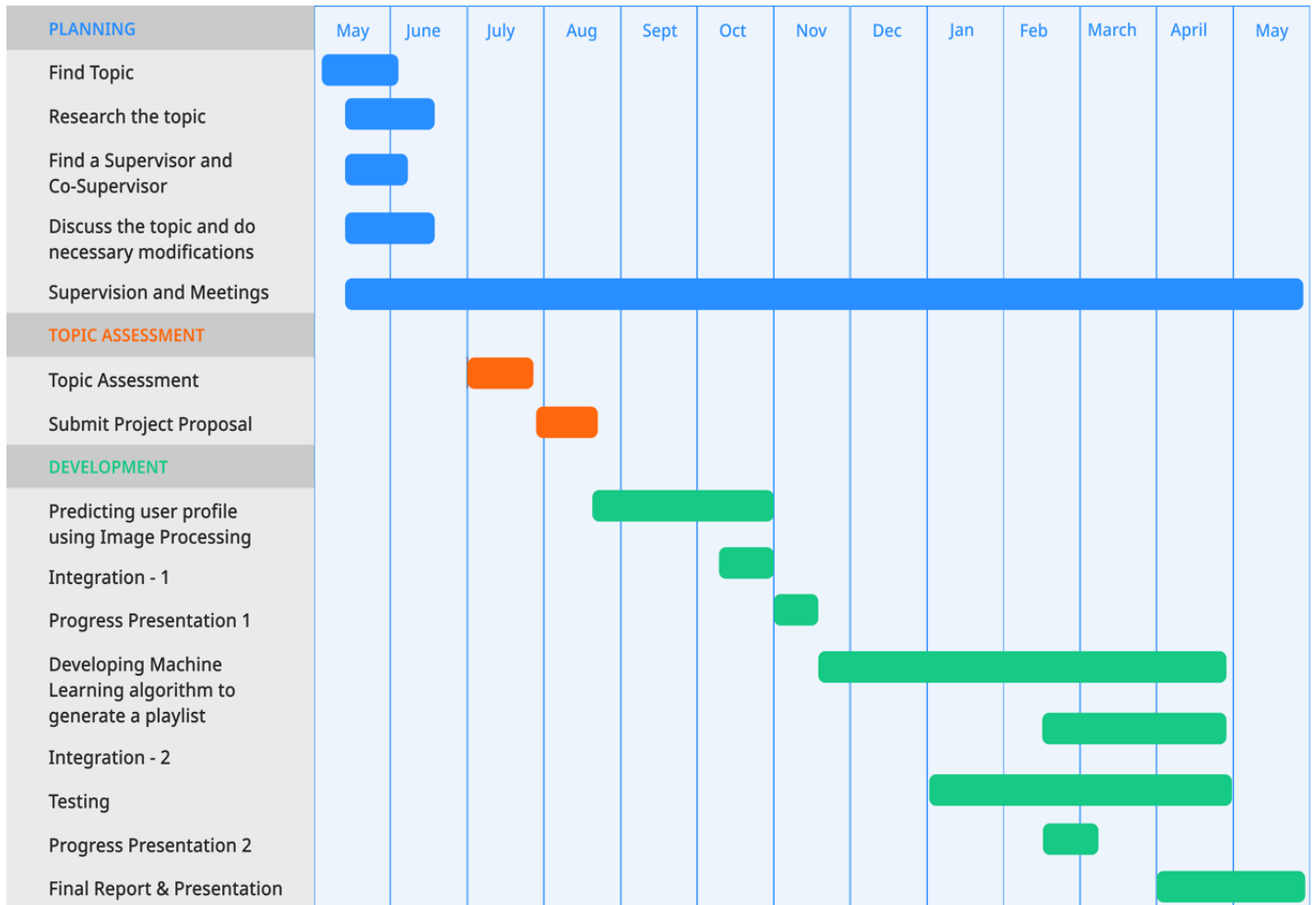# Table of content

Table of Contents

Introduction

Music recommender systems are essential for helping consumers find new music that suits their tastes and improving their overall music-consuming experiences. The end goal of our research is to implement a new system to provide a personalized music experience to the user. my contribution to the recommender system is to identify post emotional state of the user and based on the emotional state find how much effect our machine-generated playlist to the user. also if the user is not satisfied with the recommendation, based on post emotional state system generate a playlist according to the mood.

This document is prepared to showcase the status of the project along with the proofs with screenshots of the teamwork within the group.

Work Breakdown Chart

Multi-Model Approach to Recommend Personalised Music Playlist

Project Initialization
- Topic Selection
- Securing a Supervisor
- Topic Assessment
- Topic Approval

Planning
- Requirement Analysis
- Feasibility Studies
- Literature Review
- collect data

Designing
- Design a use case diagram
- Create ER diagram
- Create sequence diagram
- Create a gantt chart

Designing
- Create Image processing mechanism
- Create a user Profile
- Extract emotion by Voice recognition
- Generate a personalized playlist

Closeout
- Final Report
- Final Presentation
- Publish research paper

Gantt Chart

PLANNING	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May
Find Topic													
Research the topic													
Find a Supervisor and Co-Supervisor													
Discuss the topic and do necessary modifications													
Supervision and Meetings													
TOPIC ASSESSMENT													
Topic Assessment													
Submit Project Proposal													
DEVELOPMENT													
Predicting user profile using Image Processing													
Integration - 1													
Progress Presentation 1													
Developing Machine Learning algorithm to generate a playlist													
Integration - 2													
Testing													
Progress Presentation 2													
Final Report & Presentation													

Finding Supervisors and Selecting the research topic

Requesting an Appointment for Research Topics Discussion Inbox ×

it20665616 Sumanasekara H. P. <it20665616@my.sliit.lk>   Jun 5, 2023, 2:42 PM
to dharshana.k

Dear Sir,

I hope this email finds you well. My name is Hansi, and I am reaching out to request a meeting with you regarding my research project.

I kindly request an appointment tomorrow morning to discuss the topic of my project with you. I believe your expertise and guidance would be invaluable in shaping my research direction. Your valuable insights would contribute significantly to the success of my project.

I understand that your time is precious, and I genuinely appreciate any opportunity you can spare to meet with me. Please let me know if there is a convenient time for you, and I will gladly adjust my schedule accordingly.

I have attached a brief summary of what we have in mind as the research topics.

Thank you for your attention, and I look forward to the possibility of meeting with you.

Yours sincerely,
Hansi

One attachment • Scanned by Gmail ⓘ

PDF Discussion for Re...

Requesting for the supervision for final year research Inbox ×

it20665616 Sumanasekara H. P.   Tue, Jun 6, 2023, 8:30 PM
Dear Sir, I hope this email finds you in good health and high spirits. My name is Hansi, and I am writing to respectfully request your consideration in becoming

Thusithanjana Thilakarthna   Wed, Jun 7, 2023, 5:42 PM
Dear student, I am available tomorrow. can we have a meeting after 10 AM? Thank you! Best regards, [cid:424fba11-ef19-4063-ad2d-e1a33bfa6c05] <https://www.sliit

it20665616 Sumanasekara H. P.   Wed, Jun 7, 2023, 10:17 PM
Sure sir. Are you available on Teams ? or physically sir ?

Thusithanjana Thilakarthna <thusithanjana.t@sliit.lk>   Thu, Jun 8, 2023, 9:25 AM
to me

I can come to the campus around 11

Get Outlook for iOS<https://aka.ms/o0ukef>
_____
From: it20665616 Sumanasekara H. P. <it20665616@my.sliit.lk>
Sent: Wednesday, June 7, 2023 10:17:12 PM
To: Thusithanjana Thilakarthna <thusithanjana.t@sliit.lk>
Subject: Re: Requesting for the supervision for final year research

[EXTERNAL EMAIL] This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.
Sure sir. Are you available on Teams ? or physically sir ?

On Wed, Jun 7, 2023 at 5:42 PM Thusithanjana Thilakarthna <thusithanjana.t@sliit.lk<mailto:thusithanjana.t@sliit.lk>> wrote:
Dear student,

My calendar

Dr. Dharshana's meeting for research topics discussion

Jun 6 8:00 PM – 9:00 PM

Join Edit

Microsoft Teams Meeting

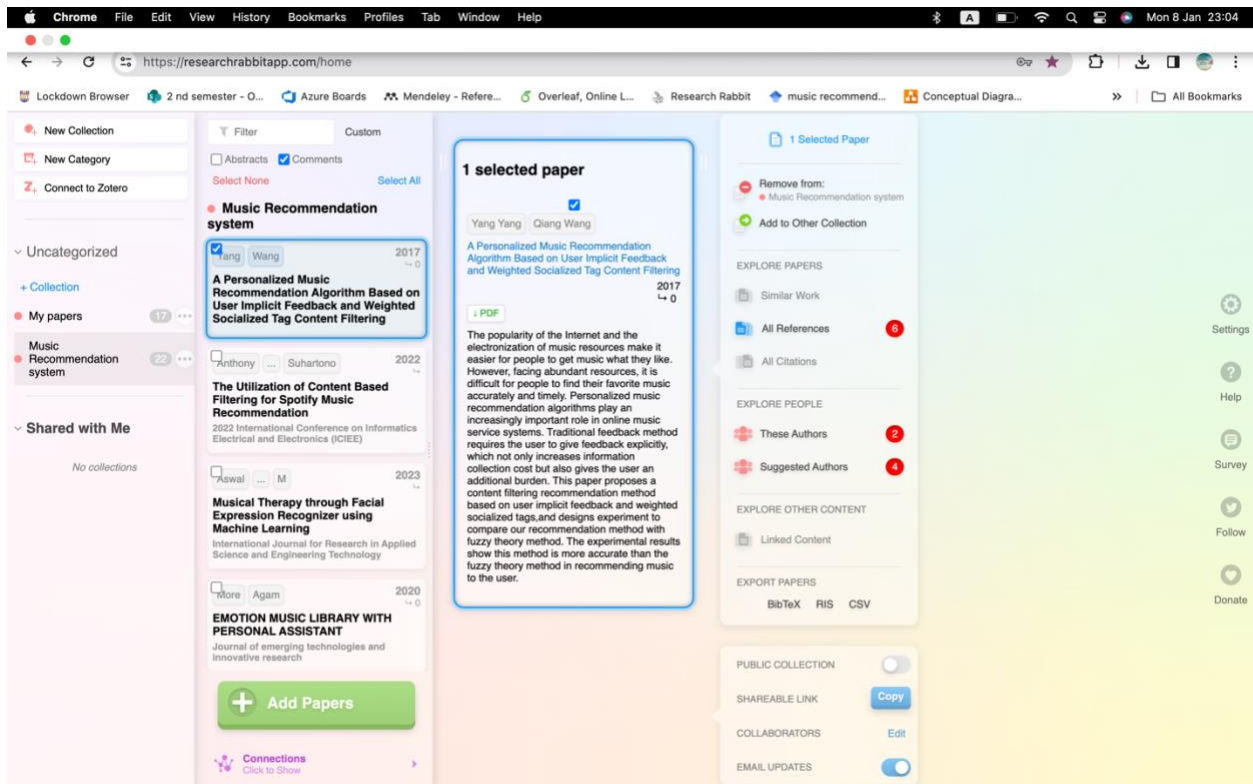https://teams.microsoft.com/l/meetup-join...

Chat with participants

Sumanasekara H. P. it20665616
Organizer

Dr. Dharshana's meeting for research topics discussion
Microsoft Teams Meeting
Sumanasekara H. P. it20665616

Data Gathering and Research

Request a Permission Letter to Collect Data for 4th Year Research Inbox ×

it20665616 Sumanasekara H. P.   Thu, Oct 12, 2023, 1:10 AM ☆

Dear Sir, I am writing to formally request a permission letter to collect data for my upcoming 4th-year research project, which is a critical component of my ac

Madusha Weerasooriya   Thu, Oct 12, 2023, 1:14 PM ☆

Dear Student, Make the letter request through the Courseweb form. Thanks Get Outlook for iOS<https://aka.ms/o0ukef> _____ From: La...

it20665616 Sumanasekara H. P. <it20665616@my.sliit.lk>   Thu, Oct 19, 2023, 1:28 PM ☆ ↩ ⋮

to Madusha ▾

Dear Madam,

I requested the letter through the Course Web link. Madam could you please check and proceed it for us madam.

Thank you. Regards.

...

↩ Reply   → Forward

B57   fx   2023-10-03 21:29:46

D	Start time	Completion time	Email	Name	Last modified time	What is your gender ?	During which time of t	In which language do y	Is music an important	What is your age group	What is your favourite
1	10-3-23 15:30:41	10-3-23 15:31:29	anonymous			Female	Evening;Night;	English;Sinhala;Other ;	Yes	18-24	Rock;Latin;
2		10-3-23 17:20:25	anonymous			Male	Night;	Sinhala;English;Hindi;Tam	Slightly	18-24	Rock;POP;Latin;
3	10-3-23 17:21:16	10-3-23 17:23:57	anonymous			Female	Night;	English;Hindi;	No	18-24	R&B/Soul;Classicle;Hi
4	10-3-23 17:26:19	10-3-23 17:28:27	anonymous			Female	Night;	English;Sinhala;	Yes	25-34	Classicle;R&B/Soul;
5	10-3-23 17:32:08	10-3-23 17:35:33	anonymous			Male	Night;	English;Hindi;Sinhala;	Yes	25-34	Rock;Country;Electron
6	10-3-23 17:35:20	10-3-23 17:39:43	anonymous			Female	Day;Afternoon;Morning;E	English;Sinhala;Tamil;Hind	Yes	18-24	Country;R&B/Soul;Cla
7	10-3-23 17:37:24	10-3-23 17:40:05	anonymous			Male	Evening;Morning;	English;Sinhala;Hindi;	Slightly	25-34	Country;Classicle;R&E
8	10-3-23 17:39:21	10-3-23 17:40:51	anonymous			Male	Evening;	English;Sinhala;	No	18-24	Country;Classicle;
9	10-3-23 17:41:10	10-3-23 17:43:14	anonymous			Male	Night;	Sinhala;English;	Slightly	25-34	Country;POP;
10	10-3-23 17:42:10	10-3-23 17:43:37	anonymous			Male	Evening;Night;Afternoon;	English;Sinhala;Hindi;	Slightly	25-34	POP;Hip-Hop/Rap;Cou
11	10-3-23 17:42:04	10-3-23 17:44:33	anonymous			Female	Night;	Sinhala;	No	35-44	Classicle;
12	10-3-23 17:42:59	10-3-23 17:44:57	anonymous			Male	Night;	English;Sinhala;Tamil;Hind	Yes	25-34	POP;
13	10-3-23 17:42:06	10-3-23 17:45:29	anonymous			Male	Morning;Afternoon;Eveni	Tamil;English;	Yes	18-24	Classicle;
14	10-3-23 17:45:43	10-3-23 17:47:19	anonymous			Female	Night;	Sinhala;	Yes	25-34	Country;
15	10-3-23 17:52:42	10-3-23 17:54:30	anonymous			Male	Night;Evening;Afternoon;I	English;Sinhala;Hindi;Tam	Yes	18-24	Electronic;Dance;R&E
16	10-3-23 17:55:01	10-3-23 17:57:11	anonymous			Male	Night;	Sinhala;English;	Slightly	18-24	Classicle;Hip-Hop/Rap
17	10-3-23 18:09:39	10-3-23 18:10:39	anonymous			Female	Evening;	Sinhala;	Yes	25-34	Hip-Hop/Rap;
18	10-3-23 18:12:33	10-3-23 18:16:02	anonymous			Male	Night;	English;Sinhala;	Yes	18-24	R&B/Soul;
19	10-3-23 18:26:20	10-3-23 18:28:20	anonymous			Female	Night;	Sinhala;English;Tamil;Hind	No	18-24	Classicle;Country;Reg
20	10-3-23 18:24:10	10-3-23 18:30:28	anonymous			Male	Night;Afternoon;Evening;I	English;Sinhala;Hindi;	Yes	18-24	Jazz;Rock;Classicle;Co
21	10-3-23 18:27:44	10-3-23 18:30:35	anonymous			Male	Evening;	English;Sinhala;	Slightly	18-24	Country;Classicle;
22	10-3-23 18:28:52	10-3-23 18:30:43	anonymous			Male	Night;	English;Sinhala;	Slightly	18-24	R&B/Soul;Electronic/I
23	10-3-23 18:26:03	10-3-23 18:32:00	anonymous			Female	Night;	Sinhala;English;Hindi;	Yes	25-34	Classicle;Rock;POP;La
24	10-3-23 18:30:52	10-3-23 18:32:26	anonymous			Male	Night;	Sinhala;	No	25-34	Classicle;Rock;POP;
25	10-3-23 18:30:54	10-3-23 18:33:53	anonymous			Male	Night;	Sinhala;English;Hindi;	Yes	25-34	Rock;Hip-Hop/Rap;Jaz
26	10-3-23 18:31:07	10-3-23 18:34:27	anonymous			Female	Night;	Sinhala;English;Tam	Yes	18-24	Classicle;Electronic/D
27	10-3-23 18:37:29	10-3-23 18:38:40	anonymous			Male	Day;Night;Evening;Afterno	English;Sinhala;Hindi;	Yes	18-24	POP;Hip-Hop/Rap;R&
28	10-3-23 18:33:28	10-3-23 18:41:56	anonymous			Female	Night;	English;Sinhala;	Yes	18-24	Electronic/Dance;Clas
29	10-3-23 18:39:19	10-3-23 18:43:23	anonymous			Male	Morning;Night;	English;Sinhala;	Yes	18-24	Rock;Latin;POP;
30	10-3-23 18:47:41	10-3-23 18:49:45	anonymous			Male	Morning;Afternoon;Eveni	English;Sinhala;Hindi;Oth	Yes	18-24	POP;Rock;Hip-Hop/Ra
31	10-3-23 18:47:56	10-3-23 18:50:49	anonymous			Female	Night;	Sinhala;Hindi;	No	25-34	Classicle;Country;
32	10-3-23 18:48:29	10-3-23 18:52:10	anonymous			Female	Morning;Evening;Night;	English;Other Foreign lang	Yes	25-34	POP;R&B/Soul;Hip-Ho
33	10-3-23 18:55:02	10-3-23 18:57:03	anonymous			Male	Morning;Afternoon;Eveni	English;Sinhala;	No	25-34	POP;Hip-Hop/Rap;Cou
34	10-3-23 18:56:39	10-3-23 18:58:10	anonymous			Female	Night;	Sinhala;English;Hindi;	No	25-34	Country;Classicle;
35	10-3-23 19:01:17	10-3-23 19:02:01	anonymous			Male	Night;	English;	Yes	18-24	Classicle;
36	10-3-23 19:00:56	10-3-23 19:03:00	anonymous			Male	Night;	Sinhala;English;Hindi;	No	18-24	Reggae;Classicle;
37	10-3-23 19:01:39	10-3-23 19:05:30	anonymous			Female	Day;	Sinhala;English;Tamil;Hind	Slightly	18-24	R&B/Soul;Classicle;
38	10-3-23 19:04:15	10-3-23 19:05:48	anonymous			Male	Morning;Night;Afternoon	English;Sinhala;Hindi;	Yes	18-24	Classicle;Country;POP
39	10-3-23 19:06:51	10-3-23 19:10:39	anonymous			Male	Morning;Night;	English;	Yes	18-24	Classicle;Electronic/D
40	10-3-23 19:11:59	10-3-23 19:14:04	anonymous			Male	Night;	English;Sinhala;Hindi;	Yes	25-34	Electronic/Dance;Clas
41	10-3-23 19:24:42	10-3-23 19:25:17	anonymous			Male	Morning;	English;	Yes	18-24	Electronic/Dance;

Sheet1   +

Ready   100%

MS Teams Group Creation and continuous meetings
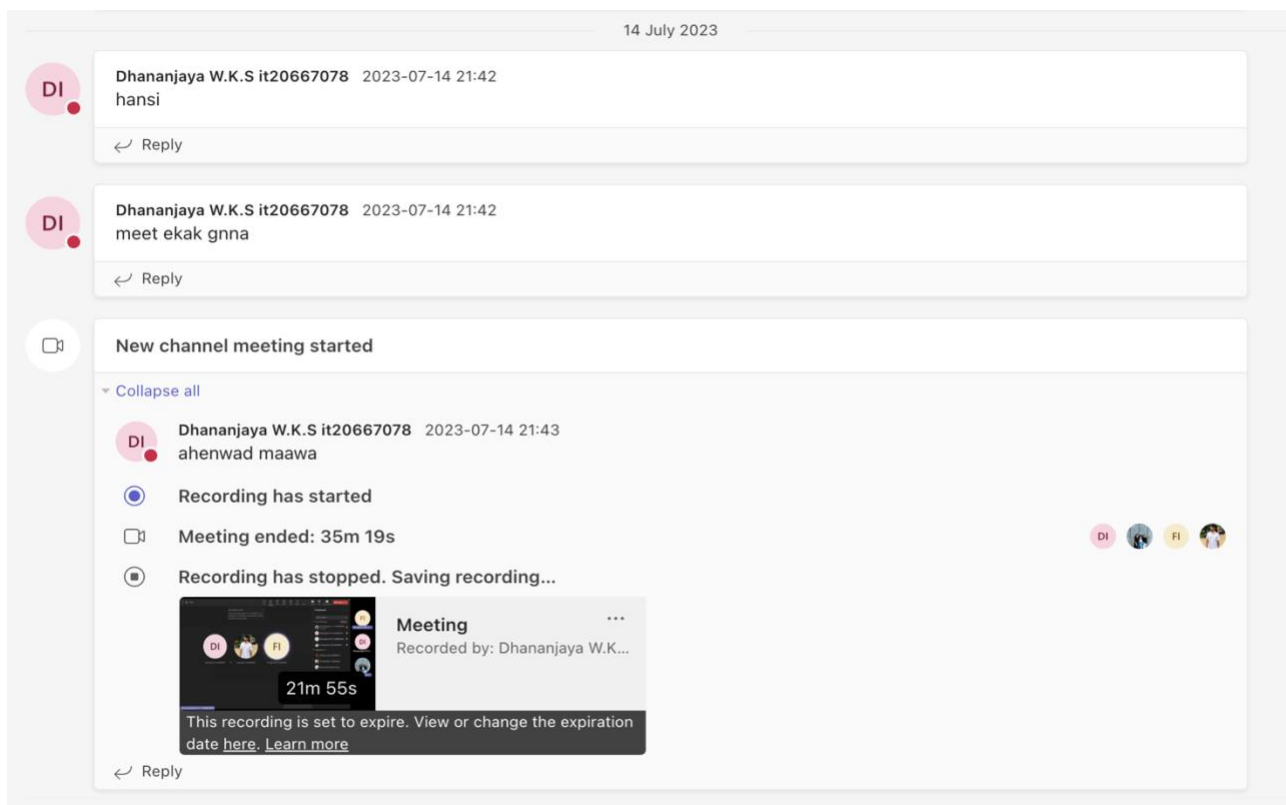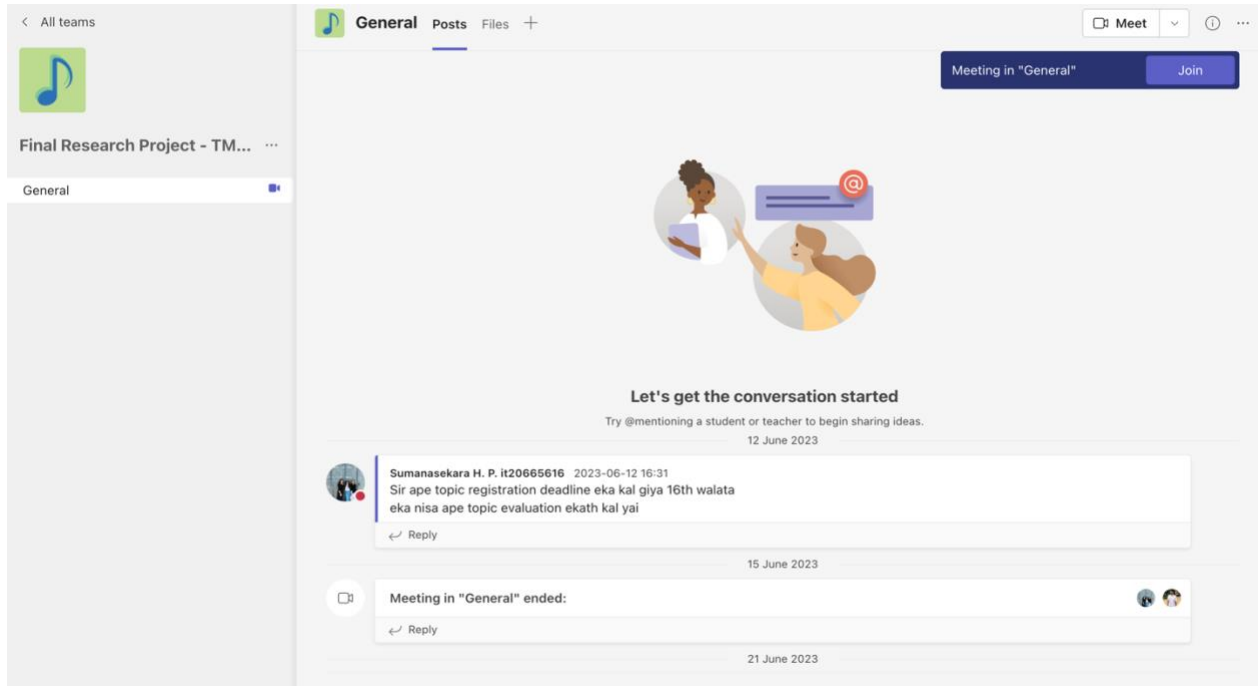
Meeting in "General" started

Collapse all

○ **Recording has started**

Sumanasekara H. P. it20665616 2023-06-21 20:08
4th year Research

Thusithanjana Thilakarthna 2023-06-21 21:23
We Are Your Friends

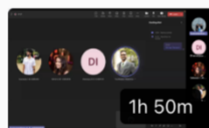**Thusithanjana Thilakarthna** 2023-06-21 21:41
https://scholar.google.com/citations?view_op=list_works&hl=en&hl=en&user=RCGYhLsAAAAJ

▢ **Meeting ended: 1h 53m**

◉ **Recording has stopped. Saving recording...**

Meeting • • •
Recorded by: Dhananjaya W.K...

1h 50m

This recording is set to expire. View or change the expiration date here. Learn more

↩ Reply

Sumanasekara H. P. it20665616 2023-06-22 22:28
Thusithanjana Thilakarthna
Dharshana Kasthurirathna

Sir here is our modified conceptual diagram
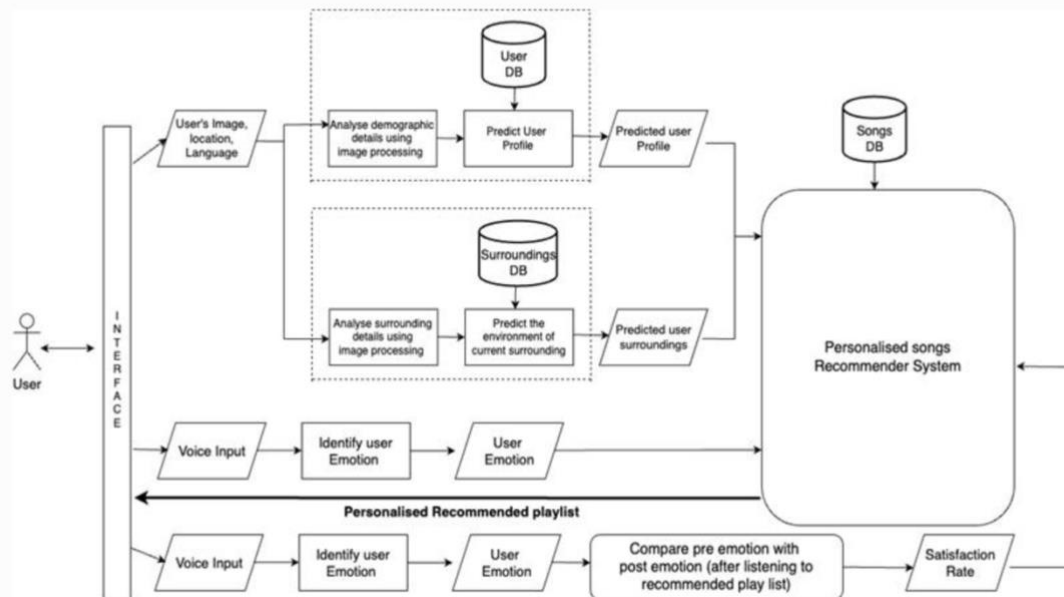
Meeting in "General" started

4 replies from IT20665852

↵ Reply

Meeting in "General" started

▾ Collapse all

◉ **Recording has started**

Thusithanjana Thilakarthna 2023-10-11 20:15
http://www.scholarpedia.org/article/Ensemble_learning

◉ **Recording has stopped. Saving recording...**

▢ᴵ **Meeting ended: 51m 21s**
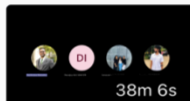
Meeting
⋯
Recorded by: Dhananjaya W.K...

38m 6s

This recording is set to expire. View or change the expiration date here. Learn more

↵ Reply

Meeting in "General" ended:
FI

↵ Reply

Meeting in "General" ended:
FI

▢ᴵ **Meeting ended:**
DI

↵ Reply

Meeting now ended:
FI DI

↵ Reply

Meeting in "General" ended:

↵ Reply

Meeting in "General" started

▾ Collapse all

Collapse all

Sumanasekara H. P. it20665616 2023-07-30 17:19
search karanna

music recommendation based on surroundings kiyala

othanin select karaganna oyata compare karanna puluwan research thunak hari 4k hari

ita passe research gap eka ganna

e dekath balanna
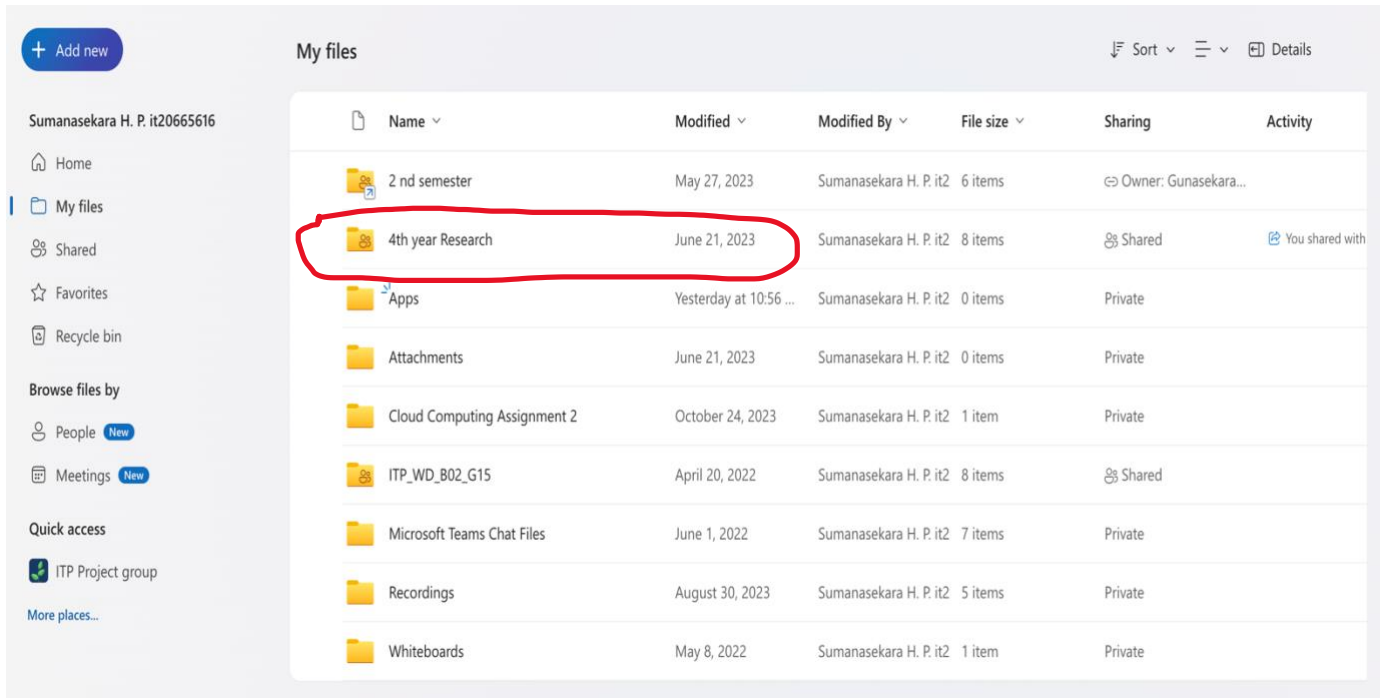
eke nama athi

▢ᴵ **Meeting ended: 7h 22m**
FI
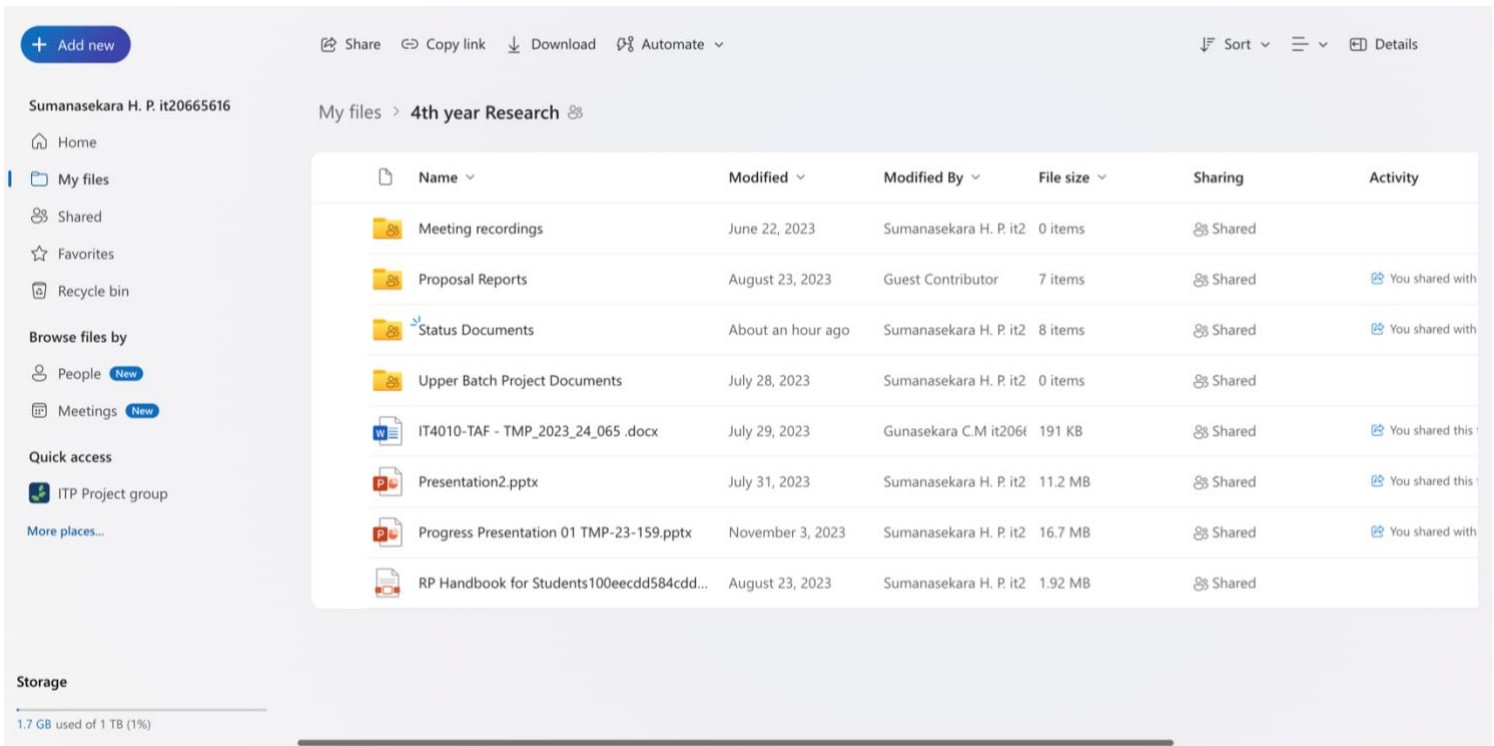
↵ Reply

Maintaining a OneDrive (Cloud) Folder for easy collaboration

Maintaining a WhatsApp Group for the Team collaboration
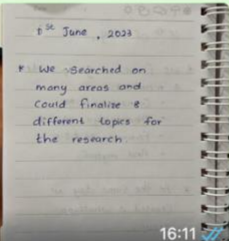
Progress so far....

```python
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import librosa
import librosa.display
from IPython.display import Audio
import warnings
warnings.filterwarnings('ignore')
```
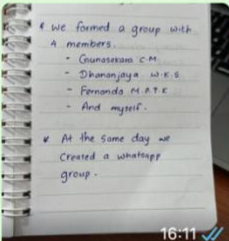
```python
import os
from google.colab import drive
drive.mount('/content/drive')

# Define the path to your dataset in Google Drive
dataset_path = '/content/drive/MyDrive/archive/TESS'

# Lists to store file paths and labels
paths = []
labels = []

for dirname, _, filenames in os.walk(dataset_path):
    for filename in filenames:
        file_path = os.path.join(dirname, filename)
        paths.append(file_path)
        label = filename.split('_')[-1]#split file name
        label = label.split('.')[0]
        labels.append(label.lower())
    if len(paths) == 2800:
        break

print('Dataset is Loaded')
```

```
Mounted at /content/drive
Dataset is Loaded
```

```python
#print the number of elements (file paths)
print(len(paths))
```

```
2200
```

```
X = np.expand_dims(X, -1)
X.shape
```

```
(2200, 40, 1)
```

```python
from sklearn.preprocessing import OneHotEncoder
enc = OneHotEncoder()
y = enc.fit_transform(df[['label']])
y = y.toarray()
y.shape
```

```
(2200, 7)
```

```python
from keras.models import Sequential
from keras.layers import Dense, LSTM, Dropout

model = Sequential([
    LSTM(256, return_sequences=False, input_shape=(40,1)),
    Dropout(0.2),
    Dense(128, activation='relu'),
    Dropout(0.2),
    Dense(64, activation='relu'),
    Dropout(0.2),
    Dense(7, activation='softmax')#output layer
])

model.compile(loss='categorical_crossentropy', optimizer='adam', metrics=['accuracy'])
model.summary()
```

```
Model: "sequential"
```

Layer (type)	Output Shape	Param #
lstm (LSTM)	(None, 256)	264192
dropout (Dropout)	(None, 256)	0
dense (Dense)	(None, 128)	32896
dropout_1 (Dropout)	(None, 128)	0
dense_1 (Dense)	(None, 64)	8256
dropout_2 (Dropout)	(None, 64)	0

```
# creating a waveform plot and a spectrogram
emotion = 'fear'
path = np.array(df['speech'][df['label']==emotion])[0]
data, sampling_rate = librosa.load(path)
waveplot(data, sampling_rate, emotion)
spectrogram(data, sampling_rate, emotion)  # Corrected function name
Audio(path)
```


fear

fear

happy
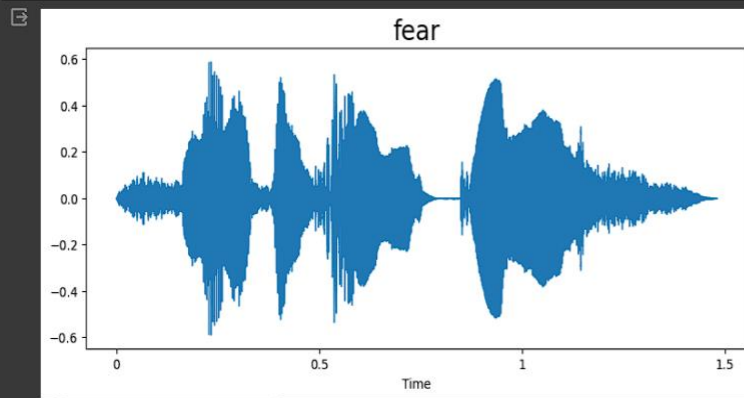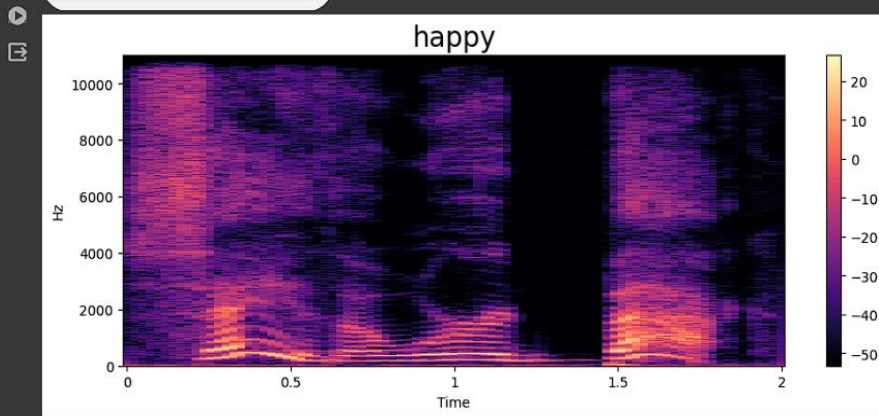
FEATURE EXTRACTION

```python
import pandas as pd
import numpy as np
import os
import librosa

#Mel-Frequency Cepstral Coefficients (MFCCs)
# extract MFCC features from an audio file
def extract_mfcc(filename):
    y, sr = librosa.load(filename, duration=3, offset=0.5)
    mfcc = np.mean(librosa.feature.mfcc(y=y, sr=sr, n_mfcc=40).T, axis=0)
    return mfcc

X_mfcc = df['speech'].apply(lambda x: extract_mfcc(x))
```
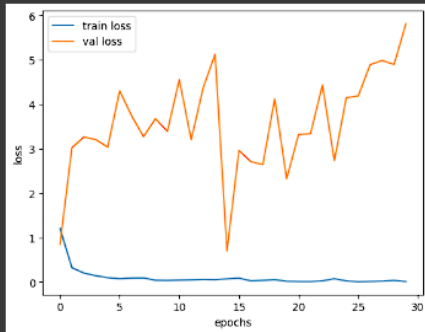
```
plt.plot(epochs, acc, label='train accuracy')
plt.plot(epochs, val_acc, label='val accuracy')
plt.xlabel('epochs')
plt.ylabel('accuracy')
plt.legend()
plt.show()
```
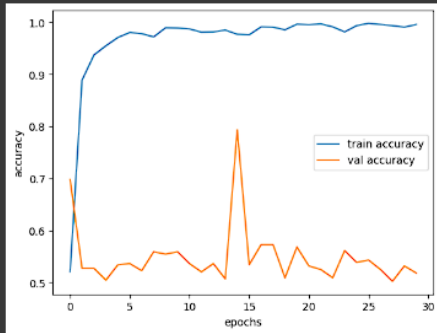


```
loss = history.history['loss']
val_loss = history.history['val_loss']

plt.plot(epochs, loss, label='train loss')
plt.plot(epochs, val_loss, label='val loss')
plt.xlabel('epochs')
plt.ylabel('loss')
plt.legend()
plt.show()
```



```
train_accuracy = model.evaluate(X, y, verbose=0)[1]

print(f"Training Accuracy: {train_accuracy * 100:.2f}%")
```