my_notebook

August 6, 2025

[2]:
```
# Import necessary libraries
import torch
import numpy as np
import os
import subprocess
import threading
import queue
import re
import json
import time

# for model
from transformers import AutoProcessor, Gemma3nForConditionalGeneration

# for video streaming
import cv2
from PIL import Image

# for audio streaming
from pydub import AudioSegment
import librosa

# for youtube links
from yt_dlp import YoutubeDL

# for visualization
import matplotlib.pyplot as plt
from IPython.display import Audio, display

# for creating app demo
import gradio as gr
```

```
/home/amal/anaconda3/envs/gemma3n_env/lib/python3.10/site-
packages/tqdm/auto.py:21: TqdmWarning: IProgress not found. Please update
jupyter and ipywidgets. See
https://ipywidgets.readthedocs.io/en/stable/user_install.html
  from .autonotebook import tqdm as notebook_tqdm
```

1 Model

[3]:
```
model_id = "google/gemma-3n-e4b-it"

processor = AutoProcessor.from_pretrained(model_id)
model = Gemma3nForConditionalGeneration.from_pretrained(model_id,␣
 ↪device_map="cpu", torch_dtype=torch.bfloat16).eval()
```

```
Loading checkpoint shards: 100%|      | 4/4 [00:00<00:00,  6.00it/s]
Some weights of the model checkpoint at google/gemma-3n-e4b-it were not used
when initializing Gemma3nForConditionalGeneration:
['model.vision_tower.timm_model.conv_stem.conv.bias']
- This IS expected if you are initializing Gemma3nForConditionalGeneration from
the checkpoint of a model trained on another task or with another architecture
(e.g. initializing a BertForSequenceClassification model from a
BertForPreTraining model).
- This IS NOT expected if you are initializing Gemma3nForConditionalGeneration
from the checkpoint of a model that you expect to be exactly identical
(initializing a BertForSequenceClassification model from a
BertForSequenceClassification model).
```

[4]:
```
yes_token_id = processor.tokenizer("Yes",␣
 ↪add_special_tokens=False)["input_ids"][0]
no_token_id = processor.tokenizer("No",␣
 ↪add_special_tokens=False)["input_ids"][0]
```

2 Method

[5]:
```
# A list indications of harm, abuse, agrression in videos and audios.
visual_harm_indicators = ["Violence" , "Sexual Content"]
optional_visual_harm_indicators = ["Child Smoking", "Child Unsupervised"]

audio_harm_indicators = ["Inappropriate Language" , "Verbal Abuse"]
optional_audio_harm_indicators = ["Child Screaming", "Child Crying"]

system_message = {
    "role": "system",
    "content": [{"type": "text", "text": """You are a harm detection assistant.
                You must answer each prompt with **only one word**: "Yes" or␣
 ↪"No".
                Do not provide explanations, comments, or any extra text.
                Be precise and cautious in your judgment."""}],
}


def preprocess_user_prompt(input_type, personalized_harm_indicators):
```

```
    if input_type == "VIDEO":
        indicators = visual_harm_indicators + [i for i in␣
↪personalized_harm_indicators if i in optional_visual_harm_indicators]
        PROMPT = f"""Watch the video and respond with "Yes" if you see **any**␣
↪of the following: {" OR ".join(indicators)}"""
    else:
        indicators = audio_harm_indicators + [i for i in␣
↪personalized_harm_indicators if i in optional_audio_harm_indicators]
        PROMPT = f"""Listen to the audio and respond with "Yes" if you hear␣
↪**any** of the following: {" OR ".join(indicators)}"""

    PROMPT =  PROMPT + """. Otherwise Respond with "No"."""
    return PROMPT
```

[6]:
```
def detect_harm(messages, threshold =0.9):

    inputs = processor.apply_chat_template(
        messages,
        add_generation_prompt=True,
        tokenize=True,
        return_dict=True,
        return_tensors="pt",
    ).to(model.device)

    with torch.inference_mode():
        output = model.generate(**inputs.to(torch.bfloat16),
                                max_new_tokens=140,
                                return_dict_in_generate=True,

                                # the models' answers should be either Yes␣
↪or No, set do_sample=False to generate more deterministic and predictable␣
↪outputs.
                                do_sample=False,

                                # List of tensors, one per generated token.␣
↪Each tensor represent the unnormalized probabilities for all vocabulary␣
↪tokens (Logits)
                                output_scores=True
                                )

        logits = output.scores
        yes_logit = logits[0][0][yes_token_id]
        no_logit =  logits[0][0][no_token_id]
```

```
        softmax_probs = torch.softmax(torch.tensor([yes_logit, no_logit],␣
↪dtype=torch.float64), dim=0)
        yes_softmax = softmax_probs[0].item()
        no_softmax = softmax_probs[1].item()

        if yes_softmax > threshold:
            harm_flag= True
        else:
            harm_flag = False


        # input_len = inputs["input_ids"].shape[-1]
        # print("model input len",input_len)
        # generated_ids = output.sequences # The full generated token ids␣
↪(prompt + new tokens)
        # generated_ids = generated_ids[0][input_len:]  # Only new tokens
        # output_text = processor.decode(generated_ids,␣
↪skip_special_tokens=True)
        # print("output_text", output_text)
        # print("softmax_probs", softmax_probs)
        print("yes probability: ", yes_softmax)


    return harm_flag, yes_softmax
```

[7]:
```
def record_visual_evidence(frames, timestamps, input_file, output_dir):
    name = input_file.split("/")[-1].split(".")[0]
    folder_path = os.path.join(output_dir, f"{name}_evidence_v_s_{timestamps[0]:
↪.2f}s_e_{timestamps[-1]:.2f}s")
    os.makedirs(folder_path, exist_ok=True)

    for idx, frame in enumerate(frames):
        frame.save(os.path.join(folder_path, f"frame_{idx}.png"))

def visualize_visual_window(frames, progress, cols=8, image_size=2):
    print(progress)
    rows = (len(frames) + cols - 1) // cols
    figsize = (cols * image_size, rows * image_size)
    plt.figure(figsize=figsize)
    for i, frame in enumerate(frames):
        plt.subplot(rows, cols, i + 1)
        plt.imshow(frame)
        plt.axis("off")

    plt.tight_layout()
    plt.show()
```

```
def extract_youtube_video(url, output_path="outputs"):
    # with YoutubeDL({'quiet': True}) as ydl:
    #     info = ydl.extract_info(url, download=False)
    #     title = info.get("title", "video")
    #     title = title.replace(" ", "_").replace("/", "_")
    url_id = url.split("=")[-1]
    video_filename = f"example_videos/{url_id}.mp4"
    command = [
        "yt-dlp",
        "-f", "mp4",
        "-o", video_filename,
        url
    ]
    subprocess.run(command, check=True)
    return video_filename, url_id

def visual_moving_window(input_file, personalized_harm_indicators, output_dir,␣
 ↪target_fps, window_duration_sec, overlap_duration_sec, visualize=False):
    max_frames = int(target_fps * window_duration_sec)
    overlap_frames = int(target_fps * overlap_duration_sec)

    harm_detection_prompt = preprocess_user_prompt("VIDEO",␣
 ↪personalized_harm_indicators)

    cap = cv2.VideoCapture(input_file)
    if not cap.isOpened():
        raise RuntimeError(f"Failed to open video: {input_file}")

    original_fps = cap.get(cv2.CAP_PROP_FPS)
    if original_fps <= 0:
        original_fps = 30  # fallback # raise RuntimeError("FPS is zero. Can't␣
 ↪continue.")
    frame_interval = max(1, int(original_fps // target_fps))

    frames, timestamps = [], []
    window_idx, frame_idx = 0, 0
    while True:
        ret, frame = cap.read()
        if not ret:
            break

        if frame_idx % frame_interval == 0:
            timestamp_sec = cap.get(cv2.CAP_PROP_POS_MSEC) / 1000.0
            timestamps.append(round(timestamp_sec, 3))

            rgb_frame = cv2.cvtColor(frame, cv2.COLOR_BGR2RGB)
            pil_image = Image.fromarray(rgb_frame)
```

```
            frames.append(pil_image)


            if len(frames) == max_frames:
                print("frames_len", len(frames))
                progress = f"Processing video window {window_idx}:␣
↪start={timestamps[0]:.2f}s, end={timestamps[-1]:.2f}s"
                yield progress

                if visualize:
                    visualize_visual_window(frames, progress)

                messages = [
                    system_message,
                    {
                        "role": "user",
                        "content": [
                            *[{"type": "image", "image": frame} for frame in␣
↪frames],
                            {"type": "text", "text": harm_detection_prompt},
                        ],
                    },
                ]
                is_harm , yes_prop = detect_harm(messages)
                print(is_harm)
                yield is_harm, yes_prop

                if is_harm:
                    record_visual_evidence(frames, timestamps, input_file,␣
↪output_dir)

                window_idx += 1
                frames = frames[-overlap_frames:]  # keep overlap frames only
                timestamps = timestamps[-overlap_frames:]

        frame_idx += 1

    cap.release()
```

[8]:
```
def record_audio_evidence(audio_buffer, start, end,input_file, output_dir):
    name = input_file.split("/")[-1].split(".")[0]
    filename = f"{output_dir}/{name}_evidence_a_s_{start / 1000.0:.2f}s_e_{end /
↪ 1000.0:.2f}s.wav"
    # Store the sliced audio file to the defined path
    audio_buffer.export(filename, format ="wav")

def play_audio_window(samples_float, target_sampling_rate, progress):
```

```
    print(progress)
    display(Audio(samples_float, rate=target_sampling_rate))

def extract_audio_to_wav(stream_path, target_sampling_rate,␣
 ↪output_dir="outputs"):
    '''
        Audio encoding
        When encoding audio data with your own code implementation for use with␣
 ↪Gemma 3n, you should follow the recommended conversion process.
        If you are working with audio files encoded in a specific format, such␣
 ↪as MP3 or WAV encoded data, you must first decode these to samples using a␣
 ↪library such as ffmpeg.
        Once the data is decoded, convert the audio into mono-channel, 16 kHz␣
 ↪float32 waveforms in the range [-1, 1].

        For example, if you are working with stereo signed 16-bit PCM integer␣
 ↪WAV files at 44.1 kHz, follow these steps:

        Resample the audio data to 16 kHz
        Dowmmix from stereo to mono by averaging the 2 channels
        Convert from int16 to float32, and divide by 32768.0 to scale to the␣
 ↪range [-1, 1]
        https://ai.google.dev/gemma/docs/capabilities/audio
    '''
    name = stream_path.split("/")[-1].split(".")[0]
    output_wav_path = f"{output_dir}/{name}_audio.wav"
    command = [
        "ffmpeg",
        "-y",
        "-i", stream_path,
        "-vn",
        "-acodec", "pcm_s16le",
        "-ar", str(target_sampling_rate), #16 kHz
        "-ac", "1", #mono-channel
        output_wav_path
    ]
    subprocess.run(command, check=True, stdout=subprocess.DEVNULL,␣
 ↪stderr=subprocess.DEVNULL)
    return output_wav_path

def audio_moving_window(input_file, personalized_harm_indicators, output_dir,␣
 ↪target_sampling_rate, window_duration_seconds, overlap_duration_sec,␣
 ↪visualize=False):
    interval = window_duration_seconds * 1000
    overlap = overlap_duration_sec * 1000
    if overlap >= interval:
```

```
        raise ValueError("Overlap duration must be less than window duration.")

    harm_detection_prompt = preprocess_user_prompt( "AUDIO",␣
↪personalized_harm_indicators)

    audio_stream = extract_audio_to_wav(input_file, target_sampling_rate)
    audio = AudioSegment.from_wav(audio_stream)

    window_idx, start, audio_len = 0, 0, len(audio)
    while start < audio_len:
        end = min(start + interval, audio_len)
        if end - start < interval and window_idx > 0:
            break

        chunk = audio[start:end]

        progress = f"Processing audio window {window_idx}: start={start / 1000.
↪0:.2f}, end={end / 1000.0:.2f}"
        yield progress

        samples = chunk.get_array_of_samples()
        samples_float = librosa.util.buf_to_float(samples,n_bytes=2, dtype=np.
↪float32)


        if visualize:
            play_audio_window(samples_float, target_sampling_rate, progress)

        messages = [
            system_message,
            {
                "role" : "user",
                "content": [
                    { "type": "audio", "audio" : samples_float },
                    { "type": "text",  "text" : harm_detection_prompt}
                ]
            },
        ]
        is_harm , yes_prop = detect_harm(messages)
        print("is_harm", is_harm)
        yield is_harm, yes_prop

        if is_harm:
            record_audio_evidence(chunk, start, end, input_file,output_dir)

        window_idx += 1
        if end == audio_len:
```

```
            break
        start = end - overlap
```

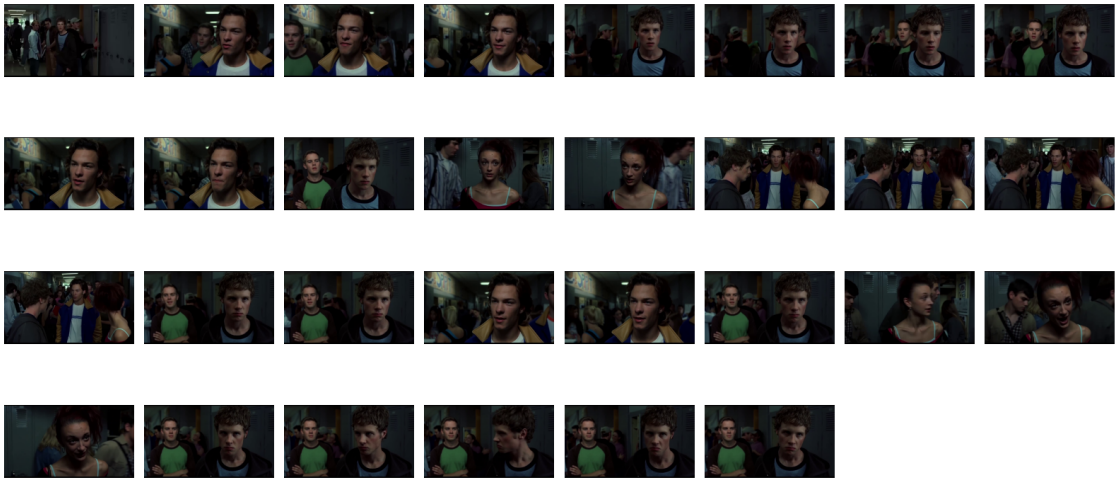
3 Testing

[8]:
```
def save_testing_results(file_path, input_source, optional_harm_indicators,␣
↪output_dir = "outputs", visualize=False, audio_only=False):
    print("MAIN INPUT: ",file_path)
    os.makedirs(output_dir, exist_ok=True)

    if input_source == "YouTube Link":
        file_path, name = extract_youtube_video(file_path, output_dir)
        print("youtube link file path", file_path)
    else:
        name, ext = os.path.splitext(os.path.basename(file_path))


    video_results, audio_results = [], []
    if not audio_only:
        for output in visual_moving_window(
            input_file=file_path,
            personalized_harm_indicators=optional_harm_indicators,
            output_dir=output_dir,
            target_fps=1,
            window_duration_sec=30,
            overlap_duration_sec=5,
            visualize=visualize
        ):
            if isinstance(output, str):
                video_results.append(f"[VIDEO] {output}\n")
                print(f"[VIDEO] {output}")
            else:
                icon = f"  Harm Detected with confidence score {output[1]:.2f}.␣
↪Saved Recorded Evidence.\n" if output[0] else "  No Harm Detected\n"
                video_results.append(icon)
                print(f"{output} {icon}")

    else:
        video_results.append("Visual track disabled. Skipping frames analysis.")


    # Check if the video contains audio
    probe = ["ffprobe", "-i", file_path, "-show_streams", "-select_streams",␣
↪"a", "-loglevel", "error"]
    has_audio = subprocess.run(probe, capture_output=True, text=True).stdout.
↪strip() != ""
```

```
    if has_audio:
        for output in audio_moving_window(
            input_file=file_path,
            personalized_harm_indicators=optional_harm_indicators,
            output_dir=output_dir,
            target_sampling_rate=16000,
            window_duration_seconds=30,
            overlap_duration_sec=5,
            visualize=visualize
        ):
            if isinstance(output, str):
                audio_results.append(f"[AUDIO] {output}\n")
                print(f"[AUDIO] {output}\n")
            else:
                icon = f"  Harm Detected with confidence score {output[1]:.2f}.␣
↪Saved Recorded Evidence.\n" if output[0] else "  No Harm Detected\n"
                audio_results.append(icon)
                print(f"{output} {icon}")
    else:
        audio_results.append("No audio track found. Skipping audio analysis.")

    # Store results and logs
    log_data = {
        "video_logs": video_results,
        "audio_logs": audio_results
    }

    log_output_path = f"{output_dir}/{name}_processed_results.json"
    with open(log_output_path, "w", encoding="utf-8") as f:
        json.dump(log_data, f, ensure_ascii=False, indent=2)

    print(f"MODEL RESULTS SAVED IN {log_output_path}")
```

[9]:
```
save_testing_results(file_path = "example_videos/verbal_abuse_movie.mp4",
                     input_source= "Local Video",
                     optional_harm_indicators= optional_audio_harm_indicators +␣
↪optional_visual_harm_indicators,
                     output_dir = "outputs",
                     visualize=True)
```

```
MAIN INPUT:  example_videos/verbal_abuse_movie.mp4
frames_len 30
[VIDEO] Processing video window 0: start=0.00s, end=29.00s
Processing video window 0: start=0.00s, end=29.00s
```

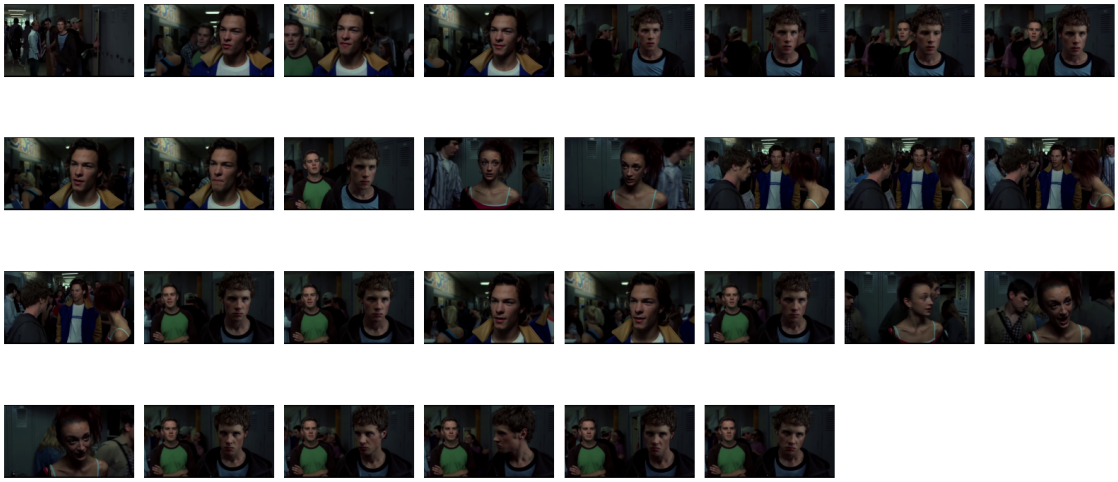


```
The following generation flags are not valid and may be ignored: ['top_p',
'top_k']. Set `TRANSFORMERS_VERBOSITY=info` for more details.

yes probability:  0.8596637505099167
False
(False, 0.8596637505099167)   No Harm Detected

[AUDIO] Processing audio window 0: start=0.00, end=30.00

Processing audio window 0: start=0.00, end=30.00

<IPython.lib.display.Audio object>

The following generation flags are not valid and may be ignored: ['top_p',
'top_k']. Set `TRANSFORMERS_VERBOSITY=info` for more details.

yes probability:  0.9993736658418905
is_harm True
(True, 0.9993736658418905)   Harm Detected with confidence score 1.00. Saved
Recorded Evidence.

MODEL RESULTS SAVED IN outputs/verbal_abuse_movie_processed_results.json
```

[10]:
```
save_testing_results(file_path = "example_videos/violance_movie.mp4",
                     input_source= "Local Video",
                     optional_harm_indicators= optional_audio_harm_indicators +␣
 ↪optional_visual_harm_indicators,
                     output_dir = "outputs",
                     visualize=True)
```

```
MAIN INPUT:  example_videos/violance_movie.mp4
frames_len 30
[VIDEO] Processing video window 0: start=0.00s, end=29.00s
```

```
Processing video window 0: start=0.00s, end=29.00s
```

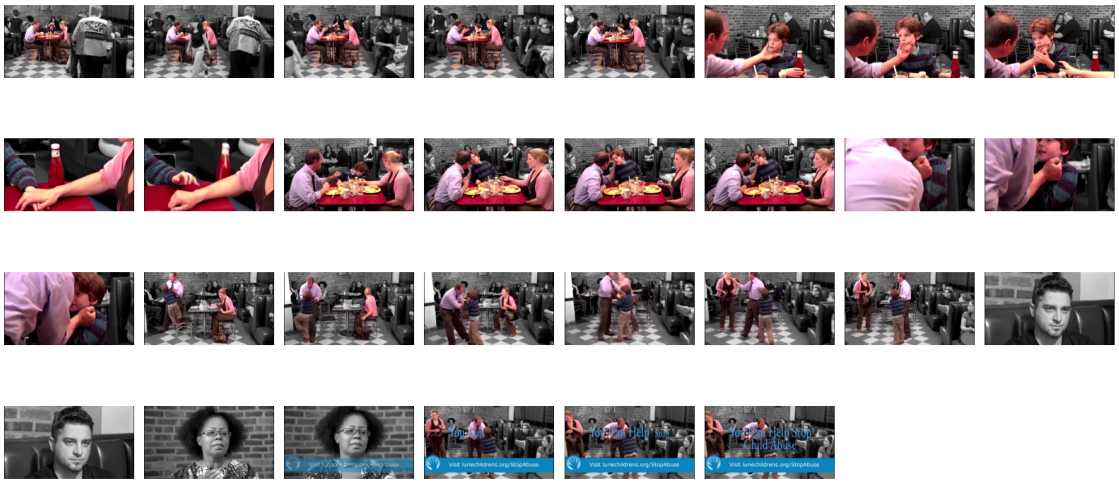


```
The following generation flags are not valid and may be ignored: ['top_p',
'top_k']. Set `TRANSFORMERS_VERBOSITY=info` for more details.

yes probability:  0.8596637505099167
False
(False, 0.8596637505099167)  No Harm Detected

[AUDIO] Processing audio window 0: start=0.00, end=30.00

Processing audio window 0: start=0.00, end=30.00

<IPython.lib.display.Audio object>

The following generation flags are not valid and may be ignored: ['top_p',
'top_k']. Set `TRANSFORMERS_VERBOSITY=info` for more details.

yes probability:  0.9993736658418905
is_harm True
(True, 0.9993736658418905)  Harm Detected with confidence score 1.00. Saved
Recorded Evidence.

MODEL RESULTS SAVED IN outputs/violance_movie_processed_results.json
```

[11]:
```
save_testing_results(file_path = "https://www.youtube.com/watch?v=F85XP1qoqjg",
                     input_source= "YouTube Link",
                     optional_harm_indicators=optional_audio_harm_indicators +␣
 ↪optional_visual_harm_indicators,
                     output_dir = "outputs",
                     visualize=True)
```

```
MAIN INPUT:  https://www.youtube.com/watch?v=F85XP1qoqjg
```

```
[youtube] Extracting URL: https://www.youtube.com/watch?v=F85XP1qoqjg
[youtube] F85XP1qoqjg: Downloading webpage
[youtube] F85XP1qoqjg: Downloading tv client config
[youtube] F85XP1qoqjg: Downloading tv player API JSON
[youtube] F85XP1qoqjg: Downloading ios player API JSON
[youtube] F85XP1qoqjg: Downloading m3u8 information
[info] F85XP1qoqjg: Downloading 1 format(s): 18
[download] example_videos/F85XP1qoqjg.mp4 has already been downloaded
[download] 100% of    2.58MiB
youtube link file path example_videos/F85XP1qoqjg.mp4
frames_len 30
[VIDEO] Processing video window 0: start=0.00s, end=28.06s
Processing video window 0: start=0.00s, end=28.06s
```



```
The following generation flags are not valid and may be ignored: ['top_p',
'top_k']. Set `TRANSFORMERS_VERBOSITY=info` for more details.

yes probability:  0.9992445943672705
True
(True, 0.9992445943672705)  Harm Detected with confidence score 1.00. Saved
Recorded Evidence.

[AUDIO] Processing audio window 0: start=0.00, end=30.00

Processing audio window 0: start=0.00, end=30.00

<IPython.lib.display.Audio object>

The following generation flags are not valid and may be ignored: ['top_p',
'top_k']. Set `TRANSFORMERS_VERBOSITY=info` for more details.

yes probability:  0.9999227780816594
is_harm True
```

```
(True, 0.9999227780816594)  Harm Detected with confidence score 1.00. Saved
Recorded Evidence.

MODEL RESULTS SAVED IN outputs/F85XP1qoqjg_processed_results.json
```

[12]:
```
save_testing_results(file_path = "https://www.youtube.com/watch?v=klJMNosyLPk",
                     input_source= "YouTube Link",
                     optional_harm_indicators=optional_audio_harm_indicators +␣
 ↪optional_visual_harm_indicators,
                     output_dir = "outputs",
                     audio_only=True,
                     visualize=True)
```

```
MAIN INPUT:  https://www.youtube.com/watch?v=klJMNosyLPk
[youtube] Extracting URL: https://www.youtube.com/watch?v=klJMNosyLPk
[youtube] klJMNosyLPk: Downloading webpage
[youtube] klJMNosyLPk: Downloading tv client config
[youtube] klJMNosyLPk: Downloading player 010fbc8d-main
[youtube] klJMNosyLPk: Downloading tv player API JSON
[youtube] klJMNosyLPk: Downloading ios player API JSON
[youtube] klJMNosyLPk: Downloading m3u8 information
[info] klJMNosyLPk: Downloading 1 format(s): 18
[download] example_videos/klJMNosyLPk.mp4 has already been downloaded
[download] 100% of    1.13MiB
youtube link file path example_videos/klJMNosyLPk.mp4
[AUDIO] Processing audio window 0: start=0.00, end=30.00

Processing audio window 0: start=0.00, end=30.00

<IPython.lib.display.Audio object>

The following generation flags are not valid and may be ignored: ['top_p',
'top_k']. Set `TRANSFORMERS_VERBOSITY=info` for more details.

yes probability:  0.9966233876182606
is_harm True
(True, 0.9966233876182606)  Harm Detected with confidence score 1.00. Saved
Recorded Evidence.

[AUDIO] Processing audio window 1: start=25.00, end=55.00

Processing audio window 1: start=25.00, end=55.00

<IPython.lib.display.Audio object>

The following generation flags are not valid and may be ignored: ['top_p',
'top_k']. Set `TRANSFORMERS_VERBOSITY=info` for more details.

yes probability:  0.8670357598021706
is_harm False
(False, 0.8670357598021706)  No Harm Detected
```

```
MODEL RESULTS SAVED IN outputs/klJMNosyLPk_processed_results.json
```

[9]:
```
testing_examples = ["example_videos/verbal_abuse_movie.mp4", "example_videos/
 ↪violance_movie.mp4"]
youtube_testing_examples = ["https://www.youtube.com/watch?
 ↪v=F85XP1qoqjg","https://www.youtube.com/watch?v=klJMNosyLPk"]

testing_examples_ids = [os.path.basename(i)[:-4] for i in testing_examples ]
youtube_testing_examples_ids = [i.split("=")[-1] for i in␣
 ↪youtube_testing_examples]

def retrieve_testing_results(file_path, input_source, output_dir = "outputs"):

    print("input preprocessed example:", file_path)

    if input_source == "YouTube Link":
        name = file_path.split("=")[-1]

    else:
        name = os.path.basename(file_path)[:-4]

    if name in testing_examples_ids or name in youtube_testing_examples_ids:

        log_output_path = f"{output_dir}/{name}_processed_results.json"
        print("retrieve testing results from: ", log_output_path)

        with open(log_output_path, "r", encoding="utf-8") as f:
            log_data = json.load(f)
        video_logs_list, audio_logs_list = log_data["video_logs"],␣
 ↪log_data["audio_logs"]

        return video_logs_list, audio_logs_list

    else:
        return None, None
```

4 Live Demo

[10]:
```
# SAME LOGIC AS save_testing_results BUT WITH YIELD FOR STREAMING RESULTS.
def run_audio(file_path, input_source, optional_harm_indicators, selected,␣
 ↪yt_url, output_dir = "outputs"):

    audio_logs = ""
    # RETRIEVE RESULTS FROM PREPROCESSED FROM TESTING EXAMPLES SHOWN ABOVE
    if input_source =="Preprocessed Example":
```

```
        file_path = selected
    if input_source == "YouTube Link":
        file_path = yt_url

    _, preprocessed_logs = retrieve_testing_results(file_path, input_source)
    if preprocessed_logs:
        for log in preprocessed_logs:
            audio_logs+=log
            yield audio_logs
            time.sleep(8)
    else:
        if input_source == "YouTube Link":
            file_path, name = extract_youtube_video(file_path, output_dir)

        # Check if the video contains audio
        probe = ["ffprobe", "-i", file_path, "-show_streams",␣
↪"-select_streams", "a", "-loglevel", "error"]
        has_audio = subprocess.run(probe, capture_output=True, text=True).
↪stdout.strip() != ""

        if has_audio:
            for output in audio_moving_window(
                input_file=file_path,
                personalized_harm_indicators=optional_harm_indicators,
                output_dir=output_dir,
                target_sampling_rate=16000,
                window_duration_seconds=30,
                overlap_duration_sec=5,
            ):
                if isinstance(output, str):
                    audio_logs += f"[AUDIO] {output} \n"
                else:
                    audio_logs += f"  Harm Detected with confidence score␣
↪{output[1]:.2f}. Saved Recorded Evidence.\n" if output[0] else "  No Harm␣
↪Detected\n"
                print("video logs", audio_logs)
                yield audio_logs
        else:
            audio_logs+= "No audio track found. Skipping audio analysis."

def run_video(file_path, input_source, optional_harm_indicators,␣
↪selected,yt_url, output_dir = "outputs"):
    video_logs = ""
    # RETRIEVE RESULTS FROM PREPROCESSED TESTING EXAMPLES SHOWN ABOVE
    if input_source =="Preprocessed Example":
        file_path = selected
    if input_source == "YouTube Link":
```

```
        file_path = yt_url
    preprocessed_logs, _ = retrieve_testing_results(file_path, input_source)
    if preprocessed_logs:
        for log in preprocessed_logs:
            video_logs+=log
            yield video_logs
            time.sleep(10)
    else:
        for output in visual_moving_window(
            input_file=file_path,
            personalized_harm_indicators=optional_harm_indicators,
            output_dir=output_dir,
            target_fps=1,
            window_duration_sec=10,
            overlap_duration_sec=1,
        ):
            if isinstance(output, str):
                video_logs+=f"[VIDEO] {output}\n"
            else:
                video_logs+= f"  Harm Detected with confidence score {output[1]:
 ↪.2f}. Saved Recorded Evidence.\n" if output[0] else "  No Harm Detected\n"
        print("video logs", video_logs)
        yield video_logs


example_paths = ["example_videos/verbal_abuse_movie.mp4", "example_videos/
 ↪violance_movie.mp4","example_videos/F85XP1qoqjg.mp4","example_videos/
 ↪klJMNosyLPk.mp4"]

#  Gradio App Layout
with gr.Blocks() as demo:
    gr.Markdown("##   Harm Detection for Child Protection")
    gr.Markdown("This app analyzes streaming or local videos with audio to␣
 ↪detect any indication of harm for the children")

    with gr.Row():
        harm_selector = gr.CheckboxGroup(
            label="  Select additional harm indicators you want to detect:",
            choices= visual_harm_indicators + audio_harm_indicators +␣
 ↪list(set(optional_visual_harm_indicators + optional_audio_harm_indicators)),
            value=visual_harm_indicators + audio_harm_indicators
        )

    with gr.Row():
        with gr.Column():
            input_source = gr.Radio(
                label="Select Input Source:",
```

```
                choices= ["Preprocessed Example", "Local Video", "YouTube␣
↪Link", "IP Camera Streaming URL"],
                value="Preprocessed Example"
            )

            ip_url = gr.Textbox(label="  RTSP URL", placeholder="rtsp://
↪username:password@192.168.1.64:554/stream1", visible=False)
            yt_url = gr.Textbox(label="  YouTube Link", placeholder="https://
↪youtube.com/watch?v=...", visible=False)
            yt_video = gr.Video(label="Displayed Video",  visible=False)
            video_upload = gr.Video(label="  Upload Video File", visible=False)
            video_example = gr.Video(label="  Select Preprocessed Example",␣
↪interactive=False, visible=True)
            example_selector = gr.Examples(
                examples=example_paths,
                inputs=[video_example],
                label="Example Videos"
            )
            run_btn = gr.Button("  Run Detection")

        with gr.Column():
            audio_output = gr.Textbox(label="Audio Logs", lines=11,␣
↪interactive=False)
            video_output = gr.Textbox(label="Video Logs", lines=11,␣
↪interactive=False)

    def toggle_inputs(source):
        return {
            ip_url: gr.update(visible=source == "IP Camera Streaming URL"),
            yt_url: gr.update(visible=source == "YouTube Link"),
            yt_video: gr.update(visible=source == "YouTube Link"),
            video_upload: gr.update(visible=source == "Local Video"),
            video_example: gr.update(visible=source == "Preprocessed Example")
        }

    input_source.change(
        fn=toggle_inputs,
        inputs=input_source,
        outputs=[ip_url, yt_url, video_upload, yt_video, video_example]
    )

    def display_yt_video(yt_path):
        print("ins display", yt_path)
        url_id = yt_path.split("=")[-1]
        video_filename = f"example_videos/{url_id}.mp4"
        print(video_filename)
```

```
        return video_filename

    def get_example_name(video_path):
        selected_filename = os.path.basename(video_path)
        return selected_filename


    selected= gr.State()
    video_example.change(fn=get_example_name,inputs=video_example,␣
 ↪outputs=selected)
    yt_url.change(fn = display_yt_video, inputs = yt_url, outputs=yt_video)
    run_btn.click(
        fn=run_audio,
        inputs=[video_upload, input_source, harm_selector, selected, yt_url],
        outputs=audio_output
    )

    run_btn.click(
        fn=run_video,
        inputs=[video_upload, input_source, harm_selector, selected, yt_url],
        outputs=video_output
    )

demo.launch(share=True)
```

```
* Running on local URL:  http://127.0.0.1:7876
* Running on public URL: https://50b6718d7592836380.gradio.live

This share link expires in 1 week. For free permanent hosting and GPU upgrades,
run `gradio deploy` from the terminal in the working directory to deploy to
Hugging Face Spaces (https://huggingface.co/spaces)
```

```
<IPython.core.display.HTML object>
```

[10]: