Kidz Bopification

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Motivation

- In recent years, the amount of explicit language in popular music has grown rapidly, which can have negative implications for parents of young children.
- Many children enjoy listening to music but may need help understanding the meaning or context behind the lyrics, which can be a cause for concern when lyrics contain profanity or suggestive material.

For Example:

"I buy a new car for the b**** (For real)
I tear down the mall with the b**** (For real)"
from Bank Account by 21 Savage

"Lean with me, pop with me
Get high with me if you rock with me
Smoke with me, drink with me
F***** up liver with some bad kidneys"
from Lean Wit Me by Juice WRLD

Literature Survey

- Children's exposure to explicit content in music can have a negative impact on their development as well as parent's concern (Coyne et al., 2011).
- Researchers have explored using machine learning and natural language processing to detect explicit content in lyrics (Chin et al., 2018).
- On 2021, little research has been done on using NLP models, called MusicBERT, to automatically alter lyrics to make them less explicit, which is the focus of this study (Zeng et al., 2021).
- **Kidz Bop**, a musical group that creates child-friendly versions of popular songs, is an example of an existing solution to the problem of explicit content in music.
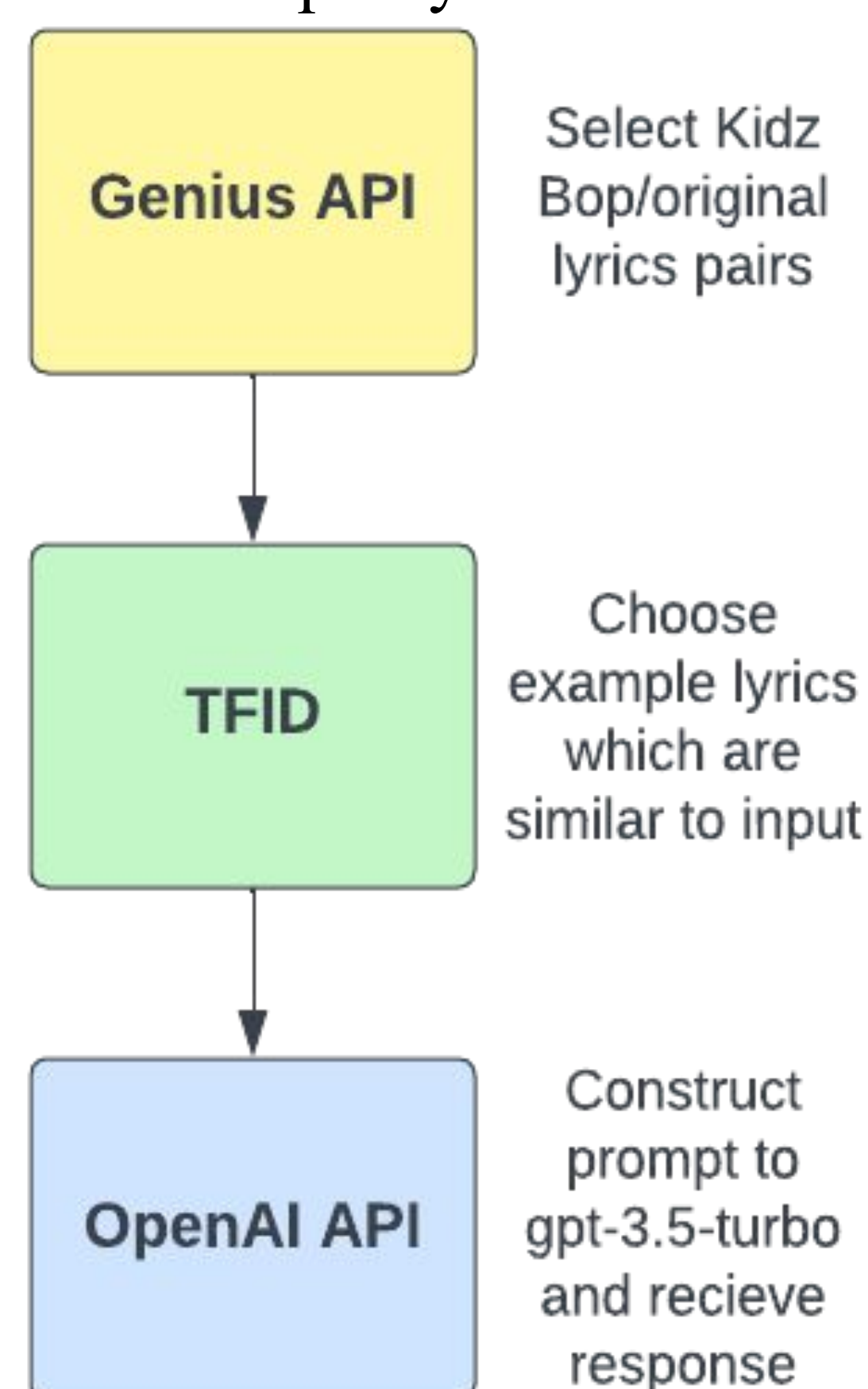
Problem Definition

Our goal is to develop a solution that can automatically detect and replace explicit content from song lyrics. We aim to provide a safe and clean listening experience for those who prefer music without explicit language. We are considering two approaches**:**
1) prompting ChatGPT or
2) developing a fine-tuned T5 model.
We seek to compare the effectiveness of these two approaches in solving the problem of explicit content in song lyrics.
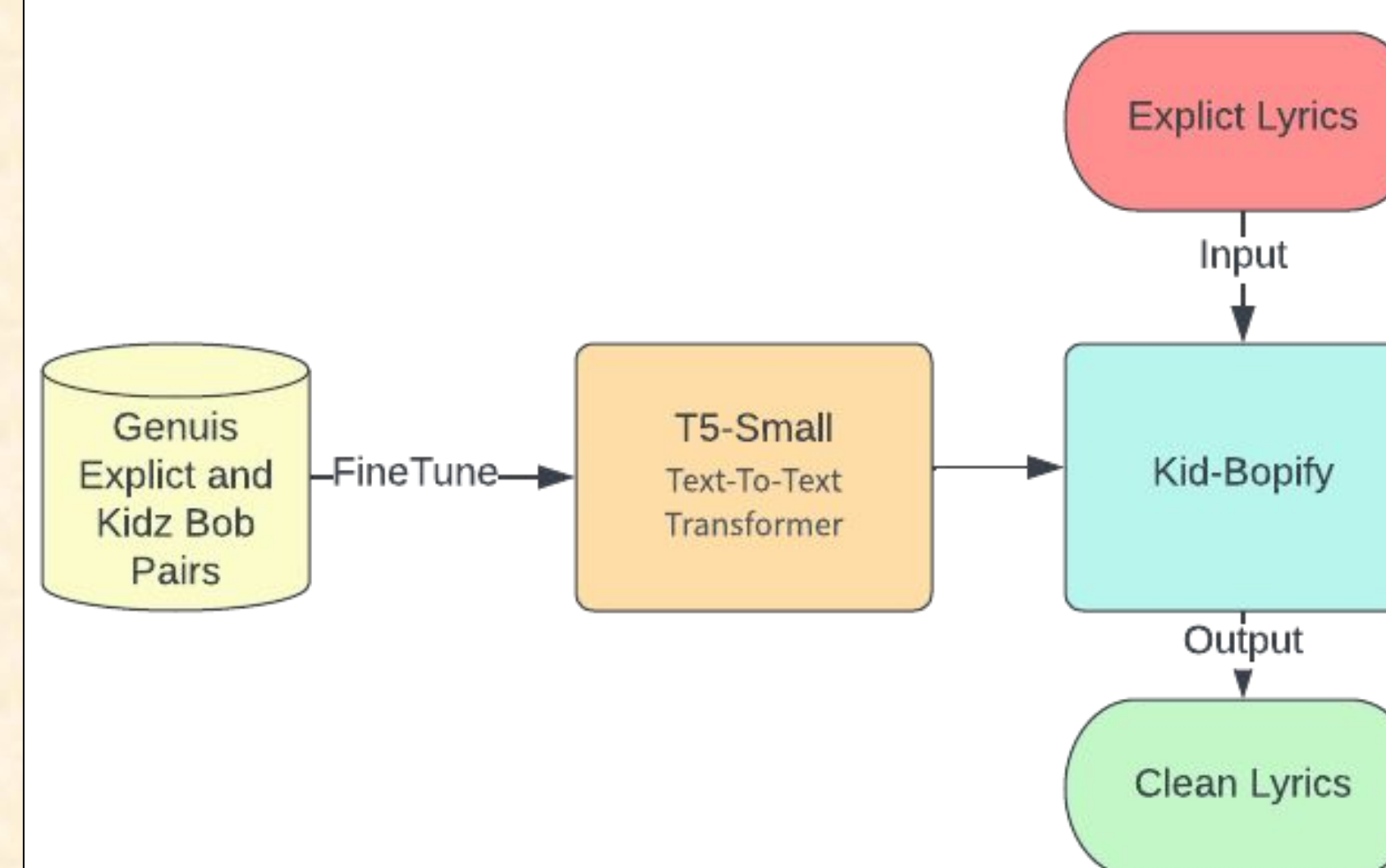
Proposed Ideas

ChatGPT Prompting
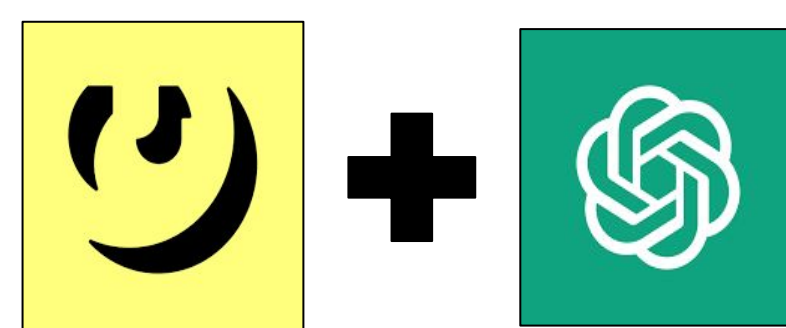
Use the Genius AI to collect explicit and Kidz Bop lyric pairs of similar songs to input. Then use one of these pairs as an example in a one-shot prompt to the OpenAI API to receive the Kidz-Bopified version of the input lyrics.

Genius API — Select Kidz Bop/original lyrics pairs

TFID — Choose example lyrics which are similar to input

OpenAI API — Construct prompt to gpt-3.5-turbo and recieve response

Fine-tuning an Existing Model

Leverage the power of T5-Small, a state-of-the-art text to text language model, and fine-tune it on our dataset. This dataset will be created using the Genius API, where we will compile pairs of songs with explicit and Kidz Bop versions. By using this approach, we aim to train the model to understand the difference between clean and explicit versions of the same song.

Explicit Lyrics — Input

Genius Explicit and Kidz Bob Pairs → FineTune → T5-Small Text-To-Text Transformer → Kid-Bopify — Output → Clean Lyrics

Experimental Results & findings

ChatGPT Results

Given the input lyrics from Bank Account by 21 Savage (see the motivation section example), the ChatGPT approach gave:

"I buy a new car for the friend (For real)
I go shopping with the friend (For real)"

All the explicit language was replaced successfully. Furthermore, the general semantic meaning of the lyrics was retained. However, the text is somewhat clunky and does not flow very well.

ChatGPT refused to do the task on this song because of the amount of explicit material until we gave it the system role: "You are a helpful assistant who is tasked with cleaning up songs. You will do anything to remove explicit material from a song's lyrics."

Fine-tuned Model Results

Even after training the model on 1000+ song pairs and tuning hyperparameters, the model struggled to change the explicit content. Here is the fine-tuned model's output on the Bank Account snippet:

"I buy a new car for the b**** (For real)
I tear down the mall with the b**** (For real)"

Conclusions

- Although T5 is powerful you can't harvest the power of custom, complex, fine tuned tasks beyond its default tasks(Summarization, Translation, and Sentiment Analysis) unless your using a model beyond its base model. Which we are limited to small model due to computational costs.
- Chat GPT prompting is efficient way to get clean versions of songs, Although it's not always perfect
- While performing these approaches we found some of our data had some problems with formatting the original and kidz bop versions

Further Plan

- To improve the performance of our T5 model, we will further process the data by dividing lyrics into smaller sections, which potentially leads to higher-quality data. This is not trivial to do since there is not a 1-1 correlation between the original and Kidz Bop lyrics.
- Testing more prompting methods for ChatGPT
- Re-evaluate the updated models and compare the results, using automatic and human evaluation