

Podcast Retrieval and Summarization

supervised by Johannes Kiesel, Marcel Gohsen & Shahbaz Syed

Jakob Schwerter - 27.05.21

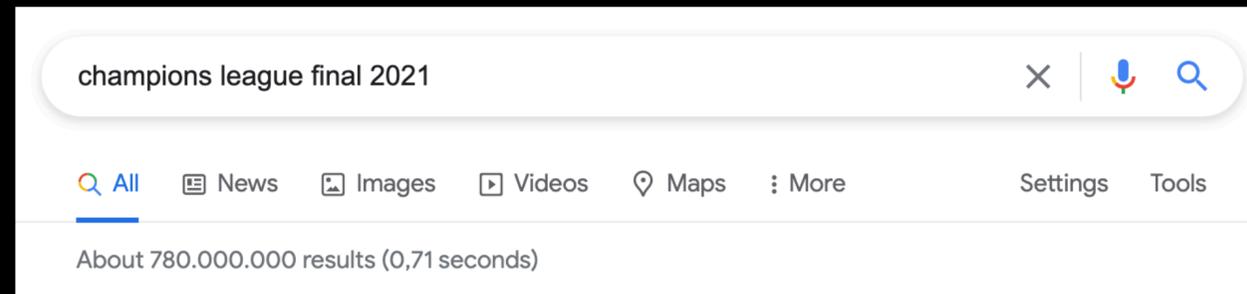
Motivation

- We can use Google to find almost anything
 - e.g. passages in books or news about a topic
- But what about podcast content?

- 2021: Podcasts are everywhere
- The amount of episodes can easily get overwhelming
- How to decide if an episode is worth a listen?

Potential Use Cases

- Add to existing search engines



- Teasers for episodes in podcast app
- Voice assistants
 - „Hey Siri, play a podcast episode discussing the 2014 world cup“
 - „Alexa, please tell me about the new episode of the Joe Rogan Podcast“

Objective

<https://trecpodcasts.github.io>

- TREC 2021 Podcast Track
- 2 tasks:
 - Task 1: Fixed-length Segment Retrieval
 - Task 2: Summarization

Task 1

Fixed-length Segment Retrieval

- All episodes segmented into 2 minute long segments
- Find relevant segments for a given query
- Additional reranking criteria:
 - Entertaining
 - Subjective
 - Discussion

Task 2

Summarization

- Given:
 - audio and transcript of a podcast episode
- Generate:
 - a short text snippet capturing the most important information in the content
 - an audio file selected from the podcast to give a sense of what the podcast sounds like

Dataset

<https://podcastsdataset.byspotify.com>

- Supplied by Spotify
- ~100,000 episodes
- For each episode:
 - Audio file
 - Metadata
 - Transcript (word error rate: ~18.1%)

[Clifton, Ann & Reddy, Sravana & Yu, Yongze & Pappu, Aasish & Rezapour, Rezvaneh -Shadi & Bonab, Hamed & Eskevich, Maria & Jones, Gareth & Karlgren, Jussi & Carterette, Ben & Jones, Rosie. (2020). 100,000 Podcasts: A Spoken English Document Corpus. In Proceedings of the 28th International Conference on Computational Linguistics (pp. 5903–5917). International Committee on Computational Linguistics.]

„you are able to push those aside pay those off and now you have one debt one huge debt that you can focus all your energy your time and your money and it just makes things a little easier that helps you drive the Focus drive the attention on to that one debt. Okay. Now you're motivated now, you're ready to start paying down your debts, right? That's awesome. I'm so proud of you. Now. You just need a debt payment tool, right? No worries have got that covered too. And guess what? It's free. All you have to do is visit the link that I'm going to put in the show notes click on it find it and then you'll get access to that free debt payment tool and then you'll be on your way to paying off your debt becoming debt free and living the life that you deserve. Thank you so much for listening. Thank you so much for tuning in again. Please do subscribe rate and review this podcast and I hope you all have a wonderful. and purposeful week“

Podcast: Habesha Finance Podcast

Episode: 45. How to Get Out of Debt [A Step-By-Step Guide]

Timestamp: 10:00

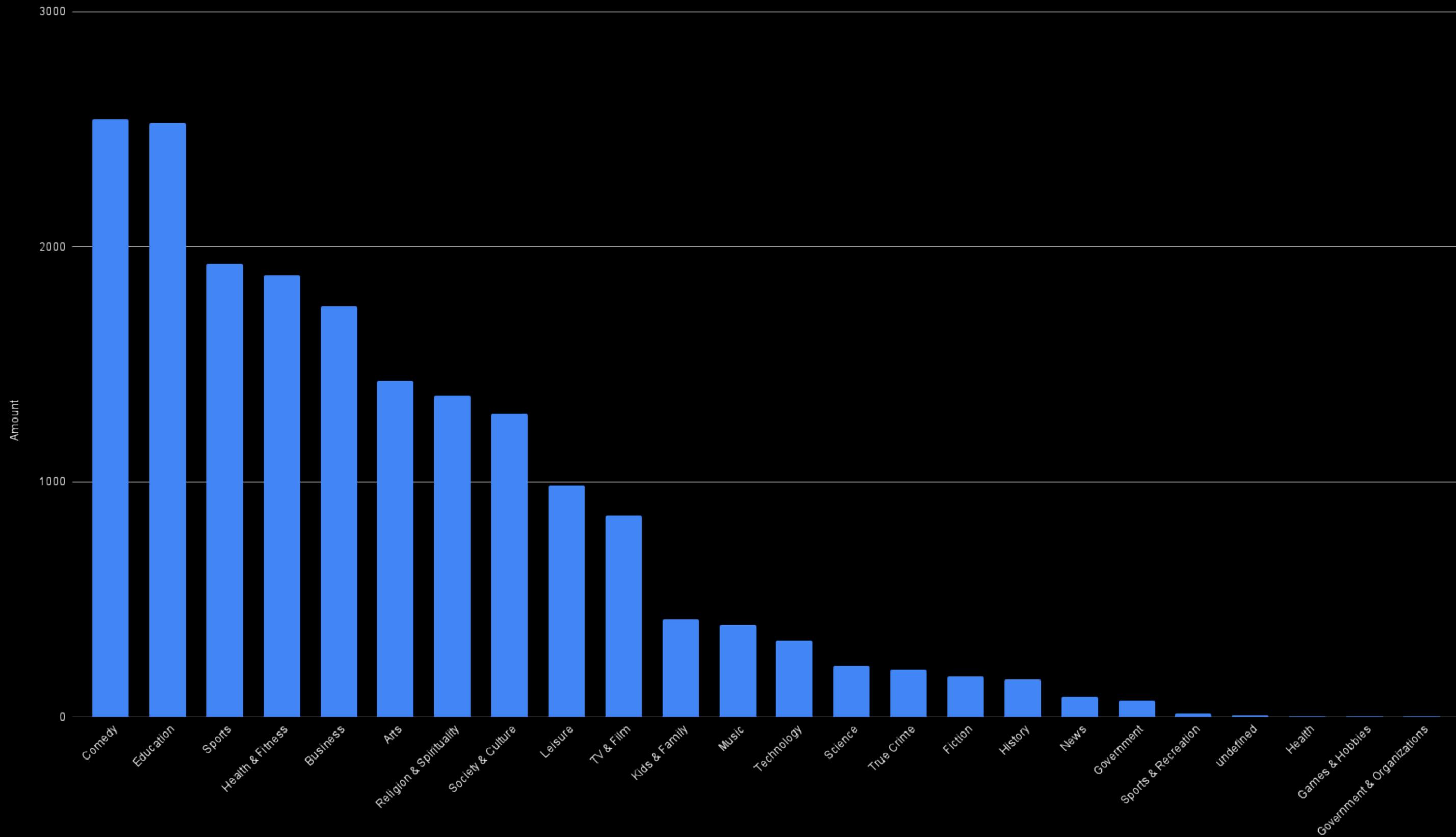
Link to episode: <https://open.spotify.com/episode/2z3zC4H2e6YDEDfUntcQs4>



HOW TO RECORD



AUDIO ON YOUR IPHONE



Approach

Retrieval - General

- Indexed using Elasticsearch
- Retrieval model: BM25
- Reranking for the 3 criteria separately:
 - Entertaining
 - Subjective
 - Discussion

Approaches

Retrieval

1. Text features for reranking
2. Audio features for reranking
3. Combined features for reranking

Approach

Retrieval - Text

- Train classifier on pre-trained paragraph embeddings
- Classify every snippet for all 3 criteria
 - 0 to 1

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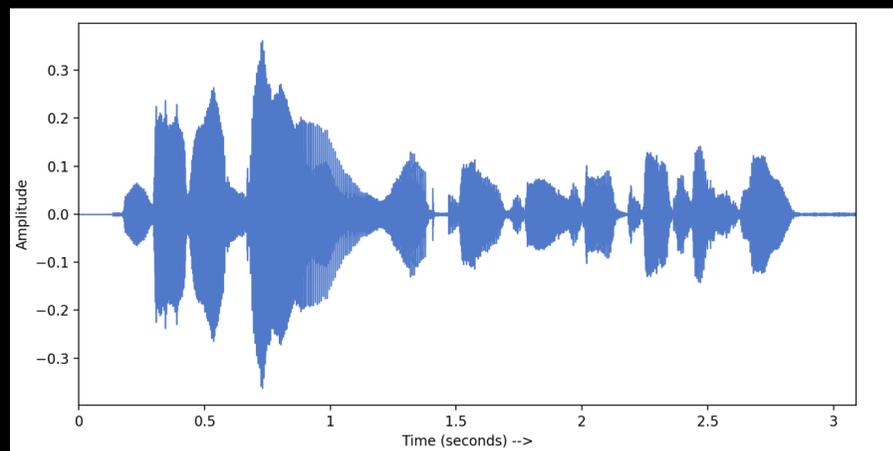


[0.73, -1.42, 0.99, ..., -0,12]

Approach

Retrieval - Audio

- Pre-Train model on podcast audio data to generate embeddings
 - COLA (Contrastive learning of general purpose audio representations)
[Aaqib Saeed, David Grangier, & Neil Zeghidour. (2020). Contrastive Learning of General-Purpose Audio Representations.]
 - Unsupervised
- Train classifier on pre-trained embeddings



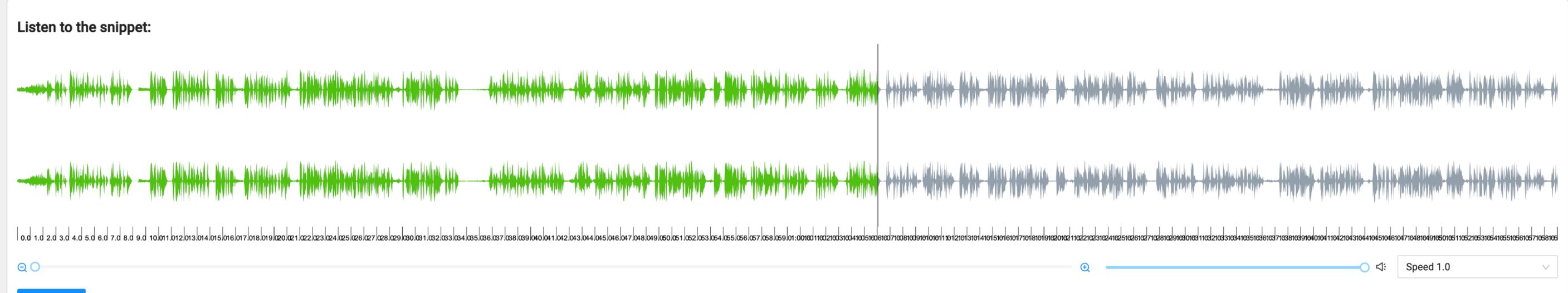
[0.73, -1.42, 0.99, ..., -0,12]

Problem: no annotated data

Manual Annotation

- Using Label Studio (<https://labelstud.io/>)
- 290 snippets
- Categories:
 - Relevance
 - Entertaining
 - Subjective
 - Discussion

Task #334 [Skip] [Submit]



Speed 1.0

Transcript:

Coming up next we'll discuss how Malcolm X went from a convict to a religious icon. Now back to the story before we begin our coverage of Malcolm X. We wanted to make a quick note many facts about the life of Malcolm X are contested we've done diligent research and are presenting what we found as the most likely biographical information on Malcolm X, but please bear in mind that records of his early life are conflicting. Malcolm X was born Malcolm little on May 19th 1925 in Omaha, Nebraska like Elijah Muhammad. He was the Son of a Preacher the Reverend Earl little and his wife Louise Malcolm was a victim of racism before he was even born one night while Louise was still pregnant a group of men wearing white hoods approached their home on Horseback. It was the Ku Klux Klan the It's been shouted for Earl to come outside Earl had preached in favor of black empowerment and the men wanted to run him out of town. Earl wasn't there that night Louise open the door hoping the clansmen would be moved by her pregnancy. They were not The Horseman galloped around the house shattered all the windows and rode back into the night Earl and Louise left. Omaha after Malcolm was born the littles settled in East, Lansing, Michigan. Where they raised Malcolm and his siblings like his future Mentor Elijah Muhammad Malcolm was heavily influenced by his father's preaching Earl was a Baptist preacher who belonged to the universal negro Improvement Association or unia, which preached black race Purity and advocated for the return to the African Homeland. Malcolm

Transcript of preceding snippet:

8th 1942 Elijah was arrested for evading the draft. He protested the arrests on the grounds that he was 45 and the age range for draft registration was 18 to 44 furthermore as a Muslim. He conscientiously objected to the war effort despite his protestations Elijah was imprisoned for the wars duration upon his release in 1946. He returned to Chicago where he Found a surge of interest in the Nation of Islam his refusal to participate in the war had inspired others and new members began to join in droves in 1948 Elijah received a letter from one of these new members the man who wrote the letter was serving time at Charlestown State Prison for larceny and breaking and entering he had learned about the Nation of Islam and sought Elijah's guidance. His name was Malcolm X Coming up next we'll discuss how Malcolm X went from a convict to a religious icon. Now back to the story before we begin our coverage of Malcolm X. We wanted to make a quick note many facts about the life of Malcolm X are contested we've done diligent research and are presenting what we found as the most likely biographical information on Malcolm X, but please bear in mind that records of his early life are conflicting. Malcolm X was born Malcolm little on May 19th 1925 in Omaha, Nebraska like Elijah Muhammad. He was the Son of a Preacher the Reverend Earl little and his wife Louise Malcolm was a victim of racism before he was even born one night while Louise was still pregnant a group of men wearing white hoods

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Additional info (and query):

ShowID: show_0GV1EPX2lvNnkNwnzZgF3F
EpisodeID: 3LWp4SENPtG7ZnksWC2mJt
Start: 780.0s

Settings Import Export JA

Annotations + [grid icon]

- Unsaved Annotation Started just now [trash icon]

Predictions

No predictions

Results

Nothing selected

Regions (0)

No Regions created yet

Relations (0)

No Relations added yet

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ShowID: show_OGV1EPX2lvNnkNwnzZgF3F
EpisodeID: 3LWp4SENPtG7ZnksWC2mJt
Start: 780.0s
End: 899.9s
Number of words: 273
Path to full episode: /raid0/spotify-podcasts-2020/podcasts-audio/0/G/show_OGV1EPX2lvNnkNwnzZgF3F/3LWp4SENPtG7ZnksWC2mJt.ogg
Query: malcolm x biography
Type: known item
Description: I heard about a podcast biography of Malcolm X and I would like to listen to it.

Adhoc topical retrieval (the segment is topically relevant to the topic description)

- Excellent (3): the segment conveys highly relevant information, is an ideal entry point for a human listener, and is fully on topic. An example would be a segment that begins at or very close to the start of a discussion on the topic, immediately signalling relevance and context to the user.[1]
Good (2): the segment conveys highly-to-somewhat relevant information, is a good entry point for a human listener, and is fully to mostly on topic. An example would be a segment that is a few minutes "off" in terms of position, so that while it is relevant to the user's information need, they might have preferred to start two minutes earlier or later.[2]
Fair (1): the segment conveys somewhat relevant information, but is a sub-par entry point for a human listener and may not be fully on topic. Examples would be segments that switch from non-relevant to relevant (so that the listener is not able to immediately understand the relevance of the segment), segments that start well into a discussion without providing enough context for understanding, etc.[3]
Bad (0): the segment is not relevant.[4]

Entertaining (the topic is presented in a way which the speakers intend to be amusing and entertaining to the listener, rather than informative or evaluative):

- Adhering (the segment is clearly intended to be entertaining)[5]
Partial (the segment may be intended to be entertaining or the participants react with appreciation or glee which may or may not be due to entertainment value of statements in the segment)[6]
Non-adhering (the segment is not intended to be entertaining nor is interpreted as such by its participants)[7]

Subjective (the speaker or speakers explicitly and clearly express a polar opinion about the query topic, so that the approval or disapproval of the speaker is evident in the segment):

- Adhering (the segment is subjective)[8]
Partial (the segment contains subjective or evaluative language but its target topic may be unclearly delimited or due to some previously mentioned discourse topic)[9]
Non-adhering (the segment does not express the speaker attitude vis-a-vis the topic)[0]

Discussion (the segment includes more than one speaker participating with non-trivial topical contribution (e.g. mere grunts, expressions of agreement, or discourse management cues ("go on", "right", "well, I don't know ..." etc) are not sufficient)):

- Adhering (the segment contains multi-party discussion)[d]
Partial (there are more than one participant and they contribute to the conversation but it remains unclear if they contribute to the topic or some other topic)[w]
Non-adhering (the segment does not involve multiple participants or only one speaker contributes to the topic)[e]

Approach

Summarization

- Extract most relevant sentences using TextRank
- Feed these sentences into state-of-the-art summarization model (BART)

[Mike Lewis, Yinhan Liu, Naman Goyal, Marjan Ghazvininejad, Abdelrahman Mohamed, Omer Levy, Ves Stoyanov, & Luke Zettlemoyer. (2019). BART: Denoising Sequence-to-Sequence Pre-training for Natural Language Generation, Translation, and Comprehension.]

- Generate short summarization

- Leverage the 3 criteria to generate audio clip

Hey there. Have you ever wanted to make your own podcast well anger is the easiest way to make one anger gives you everything you need in one place for free which you can use right from your phone or computer creation tools allow you to record and edit your podcast. So it sounds great. They'll even distribute your podcast for you. So it can be heard everywhere from Spotify to Apple podcasts to Google podcasts and many more download the anchor app or go to Anchor the FM to get started. All right, let's get to the show. Welcome to the habesha finance podcast a podcast dedicated to helping you Achieve Financial Independence and overcome your money problems. I met bringing you the education and tools to help you get your life back build wealth and make a difference. Hey everyone, Matt here with the have a shot Finance podcast. Thanks so much for tuning in before I get started. If you don't mind just go ahead and rate review And subscribe to this podcast on whatever platform you're listening to if you don't mind if you have an iPhone go to iTunes go to Apple podcasts and just submit a review five stars, hopefully, but really you reviewing this podcast helps get this message out there and helps this podcast grow. So whatever you can do. Would be really really much appreciated. **So on this podcast, I'm going to talk to you guys and gals about how to get out of debt and my favorite method of getting out of debt.** I'm going to touch on two different methods now if we can be honest and think about what we would do if we didn't have a car payment or if we didn't have a student loan payment from 10-15 years ago, or maybe that 30-year mortgage that we just can't seem to see the end of Of that's ultimately getting in the way of becoming debt-free. What Would You Do What would life be for yourself and your family paying debt sucks. All right, there's no other way to say it and it especially sucks. When you have to pay the interest that is attached to that debt. **And so today I'm going to go through the two different methods of getting out of debt and the one that my wife and I used and I will show you I will show you how to get Of dead at the very end.** I will tell you where to go. In fact, I'll tell you right now just go to the link in the show notes and there's a step-by-step guide in using the same method the same way that my wife and I were able to get out of debt, you know, I am most proud of this achievement of not having any Consumer Debt to pay each month as we diligently worked to pay off. My wife's student loan debt that was six figures. I have gained a new appreciation. Action for the goal of becoming debt-free. Honestly starting was the hardest part. However, if you follow some of the steps that I'm going to lay out you'll be debt free in no time. **And when I say no time talking about two three four years and that is a great feeling to have but first I want you to relax just breathe for a second whether you're looking at three thousand dollars thirty thousand dollars or three hundred thousand dollars of debt.** Just take a deep breath and relax. You will get through this no matter how big the hole is that you've dug for yourself. You will get out of it. Just do a few things, right and on your last payment for that last bit of debt you owe you will be so thankful that you embarked on this journey of becoming debt-free. So let's get to the first method of becoming debt-free. They are so many experts who try to teach you how to get out of debt. My absolute favorite way. I'm telling you right now. **My absolute favorite way of Knocking down debt is the debt snowball. This method is simple and as you know, I like simple the debt snowball method of paying down debt helps you significantly reduce the amount of time.** It takes to pay all your debts. You don't have to take my word for it. You can read this Harvard study for further proof Link in the show notes. There's also the great advantage of saving a lot of money on interest when using the debt snowball method now, Now what I like about the debt snowball method is that it helps you build little victories you get little winds you gained momentum after each debt is paid off and benefit psychologically. **My wife and I are living examples of how effective the debt snowball method can be in becoming debt free in achieving Financial Independence Financial Freedom.** So, let's see how the debt snowball method works first. You're going to list all your debts. Smallest amount to the largest amount so I'm talking about credit cards student loans, you know mortgage. Whatever you have list all your debts the Second Step pay the minimum on all the debts. Okay. Try to get enough income where you can pay the minimum on all the debts number three. Once the smallest debt is paid you take that payment that payment that you were giving to the smallest debt and then you add it to the next. **Smallest debt owed.** So if you collect the total amount of all your debts that never changes because what you're doing is you are allocating. You are moving how much you paid on the smallest debt over to the next debt the next smallest debt after you've already paid off the smallest debt. So what I'm saying is after each debt is paid off you continue to take those payments and add to each remaining debt until you have one large amount to pay off. The biggest and last debt that's what makes the debt snowball so effective because you are gaining little victories on your way to that big big victory that big big match that you have between you and your final largest debt and we are living proof. **We are a Living Testament how effective and very powerful the debt snowball method is now the other popular method of paying down debt is the debt Avalanche.** The same idea applies here as the debt snowball method except you list your debts in order of interest rates highest to lowest the goal. **Therefore is to pay off debts with the highest interest rates first.** Theoretically this method does save you a little more money than the debt snowball way. Usually the difference in savings between the snowball and the Avalanche method is not much though. You will have to use a debt payment. Pool as I'm going to introduce to you guys later on this podcast to see what's better for you. So the debt Avalanche steps. This is how it goes first you list all your debts highest interest rate to smallest interest rate. Then you pay the minimum on all debts. Just like the snowball except on this method you are paying the highest interest rate and working your way down to the smallest interest rate interest rate. So number three, once the highest interest rate debt is paid you. Take that payment and then you add it to the Dead with the next highest interest rate after each debt is paid off you continue to take those payments and add to each remaining debt until you have one large amount to pay off the final debt that had the lowest interest rate. So basically you're trying to knock off those debts that have very very high interest rates because you're getting charged theoretically more on those. You know, when you scale everything you're getting Charged more on those debts with the higher interest rate than the lower interest rate. Now. What is the best method to becoming debt-free you're going to have to look at your own situation your own personal finance goals and decide for yourself, but for me and my wife for my wife, and I I looked at both methods and without a doubt I can say that the debt snowball method is the better way. We would have saved a little more with a debt Avalanche but we stayed motivated with the debt snowball. Method remember Harvard already confirmed this their conclusion was the same conclusion that I came up with and personally put into action. The debt snowball is the best method to becoming debt-free now, why is this because you get small wins? It's like what I said before that keeps you motivated. And as you get those small wins at the very end, you have one dead left that you're attacking with a Vengeance you built up all this motivation this In showing you like hey, I knocked off this that I can do this you can do this. And that's where we were my wife and I we were there we were looking at each debt, you know, we listed all our debts down lowest balance all the way down to the highest balance as we knocked off the lowest balance that gave us so much encouragement and that gave us so much like energy and just motivation to keep going to stay focused. And now that we attacked that last student loan debt with everything we had we are in such an amazing place right now that I don't know if we would have been able to do that and stay as motivated if we were knocking off the highest interest rate because essentially with the dead Avalanche we would have been looking at the largest debt and paying that off while still having all those small debts lingering around into me for me. I think that's a little bit of a discouraging feeling, you know, when you're knocking off that big debt and you're like, wow, I still have these little dents on the side. Whereas if you're knocking off those little debts, you are able to push those aside pay those off and now you have one debt one huge debt that you can focus all your energy your time and your money and it just makes things a little easier that helps you drive the Focus drive the attention on to that one debt. Okay. Now you're motivated now, you're ready to start paying down your debts, right? That's awesome. I'm so proud of you. Now. You just need a debt payment tool, right? No worries have got that covered too. And guess what? It's free. All you have to do is visit the link that I'm going to put in the show notes click on it find it and then you'll get access to that free debt payment tool and then you'll be on your way to paying off your debt becoming debt free and living the life that you deserve. Thank you so much for listening. Thank you so much for tuning in again. Please do subscribe rate and review this podcast and I hope you all have a wonderful. and purposeful week



We are a Living Testament how effective and very powerful the debt snowball method is now the other popular method of paying down debt is the debt Avalanche.

This method is simple and as you know, I like simple the debt snowball method of paying down debt helps you significantly reduce the amount of time.

My wife and I are living examples of how effective the debt snowball method can be in becoming debt free in achieving Financial Independence Financial Freedom.

My absolute favorite way of Knocking down debt is the debt snowball.

Therefore is to pay off debts with the highest interest rates first.

Smallest debt owed.

So on this podcast, I'm going to talk to you guys and gals about how to get out of debt and my favorite method of getting out of debt.

And so today I'm going to go through the two different methods of getting out of debt and the one that my wife and I used and I will show you I will show you how to get Of dead at the very end.

In fact, I'll tell you right now just go to the link in the show notes and there's a step-by-step guide in using the same method the same way that my wife and I were able to get out of debt, you know, I am most proud of this achievement of not having any Consumer Debt to pay each month as we diligently worked to pay off.

And when I say no time talking about two three four years and that is a great feeling to have but first I want you to relax just breathe for a second whether you're looking at three thousand dollars thirty thousand dollars or three hundred thousand dollars of debt.

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My absolute favorite way of Knocking down debt is the debt snowball. Therefore is to pay off debts with the highest interest rates first. Smallest debt owed.

Next steps

- Pre-train embeddings on audio
- Train classifiers on embeddings (audio + text) using our annotated data
- Create more annotations / train classifiers on more data
- Evaluation
 - Separate analysis of the 3 criteria
- Prepare runs for TREC challenge

Questions