



Tweet Recommender

Building a tweet content-recommender with NLP

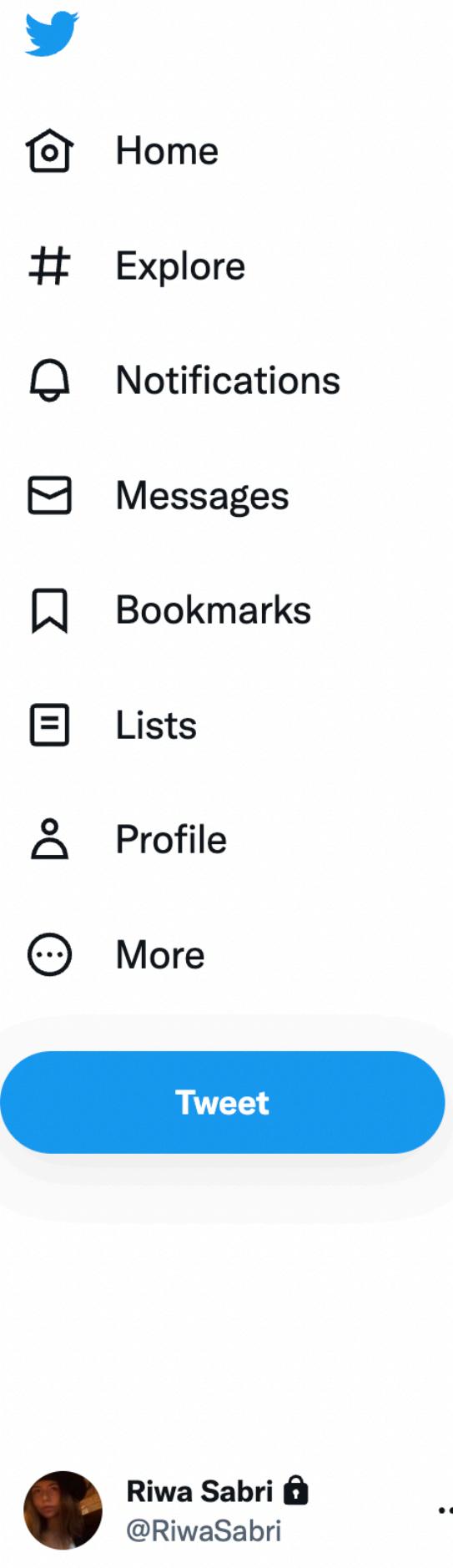
Riwa Sabri

October 2022

SECTION

Background

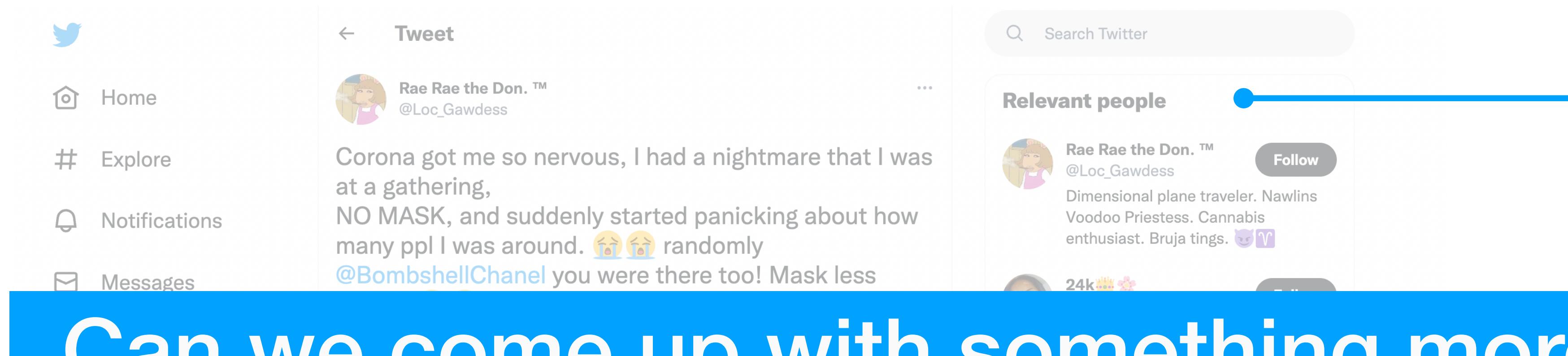
Current State : ‘Relevant people’ doesn’t recommend new users or content



This image shows the same Twitter mobile interface as above, but with a different focus. The 'Relevant people' section is highlighted, showing suggestions for users based on the tweet. It lists @Loc_Gawdess (@RaeRaeTheDonTM) and @BombshellChanel (@24k). Below this is the 'What's happening' section, which displays trending news items: "India national news · Yesterday More than 130 people died in India bridge collapse" (with a small image thumbnail), "Trending in Manhattan Central Park 3,953 Tweets", "Trending in New York Buffalo Bills 7,011 Tweets", and a news item from Daily Mail Online (@DailyMailOnline) about Kim Kardashian's costume party. A 'Messages' button is visible at the bottom right.

When a user clicks on a tweet the ‘Relevant people’ section recommends the **author of the tweet** as well as any **user mentioned in the tweet**.

Current State : ‘Relevant people’ doesn’t recommend new users or content



The image shows a screenshot of the Twitter mobile application. On the left, a sidebar menu includes Home, Explore, Notifications, and Messages. The main feed displays a tweet from user @Loc_Gawdess:

Rae Rae the Don.™
@Loc_Gawdess

Corona got me so nervous, I had a nightmare that I was at a gathering,
NO MASK, and suddenly started panicking about how many ppl I was around. 😭😭 randomly
@BombshellChanel you were there too! Mask less

To the right of the feed, a 'Relevant people' sidebar is visible, featuring a search bar and a list of recommended users, starting with the author of the tweet:

Relevant people

Rae Rae the Don.™
@Loc_Gawdess

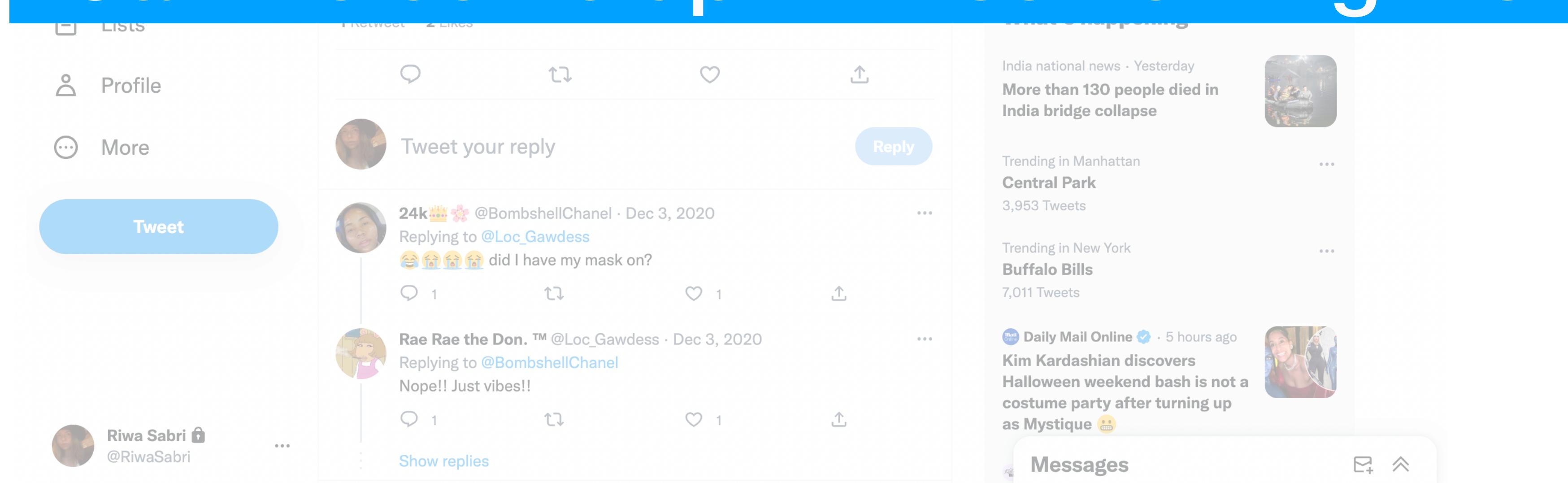
Dimensional plane traveler. Nawlins Voodoo Priestess. Cannabis enthusiast. Bruja tings. 🌸VV

Follow

24k 🎉

A blue callout box highlights the 'Relevant people' section with the text: "When a user clicks on a tweet the 'Relevant people' section recommends the **author of the tweet** as well as any **user mentioned in the tweet**".

Can we come up with something more engaging?



The image shows a continuation of the Twitter feed. A reply thread has started from user @BombshellChanel:

24k 🎉 @BombshellChanel · Dec 3, 2020
Replies to @Loc_Gawdess
did I have my mask on?
1 reply

Rae Rae the Don.™ @Loc_Gawdess · Dec 3, 2020
Replies to @BombshellChanel
Nope!! Just vibes!!
1 reply

On the right side of the screen, a sidebar displays trending news items:

India national news · Yesterday
More than 130 people died in India bridge collapse

Trending in Manhattan
Central Park
3,953 Tweets

Trending in New York
Buffalo Bills
7,011 Tweets

Daily Mail Online 🇬🇧 · 5 hours ago
Kim Kardashian discovers Halloween weekend bash is not a costume party after turning up as Mystique 😱

Messages

Goal: Build a tweet content recommender to allow users to discover new similar content

Leverage NLP to replace the ‘Relevant people’ section with a content recommender that would recommend **3 similar tweets** to a given tweet **based on content**.

This would allow users to explore relevant tweets, **expanding reach** beyond the tweet and its author.



Rae Rae the Don. ™
@Loc_Gawdess

...

Corona got me so nervous, I had a nightmare that I was at a gathering,
NO MASK, and suddenly started panicking about how many ppl I was around. 😱😱 randomly
@BombshellChanel you were there too! Mask less dab!!!! 😭😭

4:43 PM · Dec 3, 2020 · Twitter for iPhone

Example Recommender Input

Data: Scraped from twitter using snscreape

I decided to work on two different datasets to understand how tools and treatment are similar/differ between two separate datasets

Dataset 1 : People's Nightmares



Example tweet

Dataset 2 : Caviar App Complaints

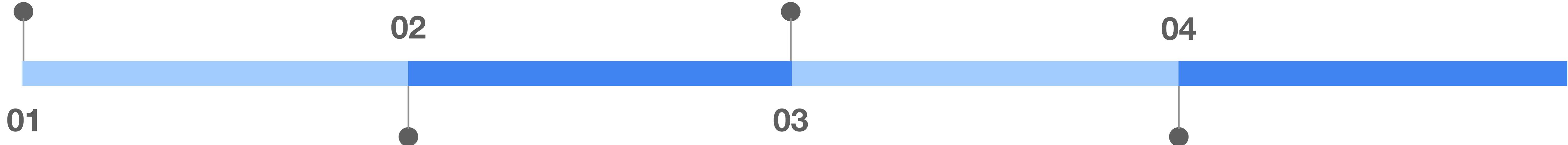


Example tweet

Methodology

Scraping the tweets

Tools: snscreape



SECTION

Pre-Processing

Pre-Processing Steps

	Removed mentions, hashtags, emoji, non alpha char, hyperlinks	Removed Stopwords	Lemmatization	Removed Adjectives	Custom Stopwords
Nightmare Dataset	✓	✓	✓	✓	Dream lexicon: nightmare,dream,wake...
Caviar Dataset	✓	✓	✓	✗	Caviar, doordash

An example tweet before and after Pre-Processing

Nightmares Dataset Tweet

Caviar Dataset Tweet

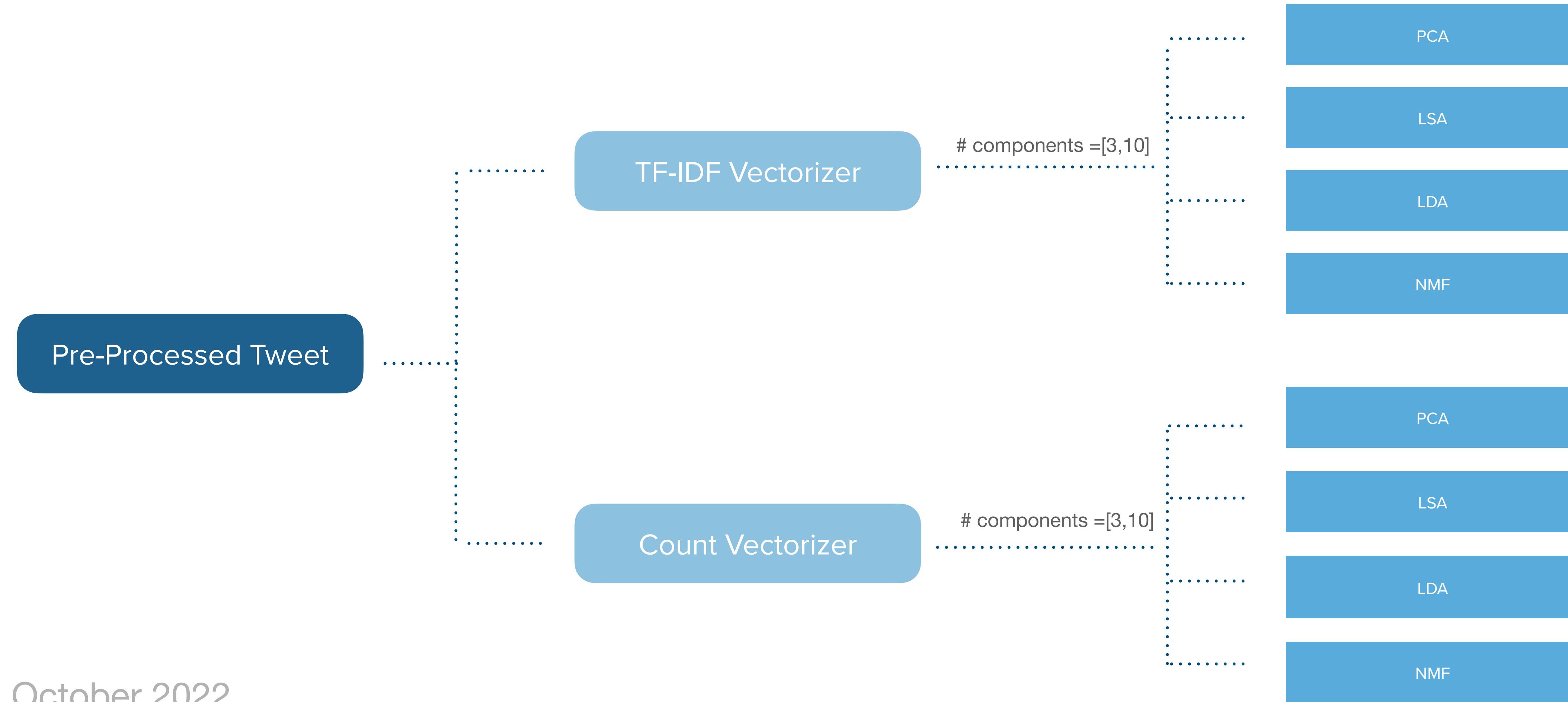
	Before Pre-Processing	After Pre-Processing
	<p>Corona got me so nervous, I had a nightmare that I was at a gathering,\nNO MASK, and suddenly started panicking about how many ppl I was around. 😭😭 randomly @BombshellChanel you were there too!</p> <p>Mask less dab!!!! 😂😂</p>	<p>corona get gathering mask suddenly start panic ppl mask dab</p>
	<p>@CaviarSupport do you have any support for your customers? I spent \$300 on food from a restaurant that doesn't seem to exist. Should I just dispute my charge?</p>	<p>support customer spend food restaurant not exist dispute charge</p>

SECTION

Dimensionality Reduction + Cosine Similarity

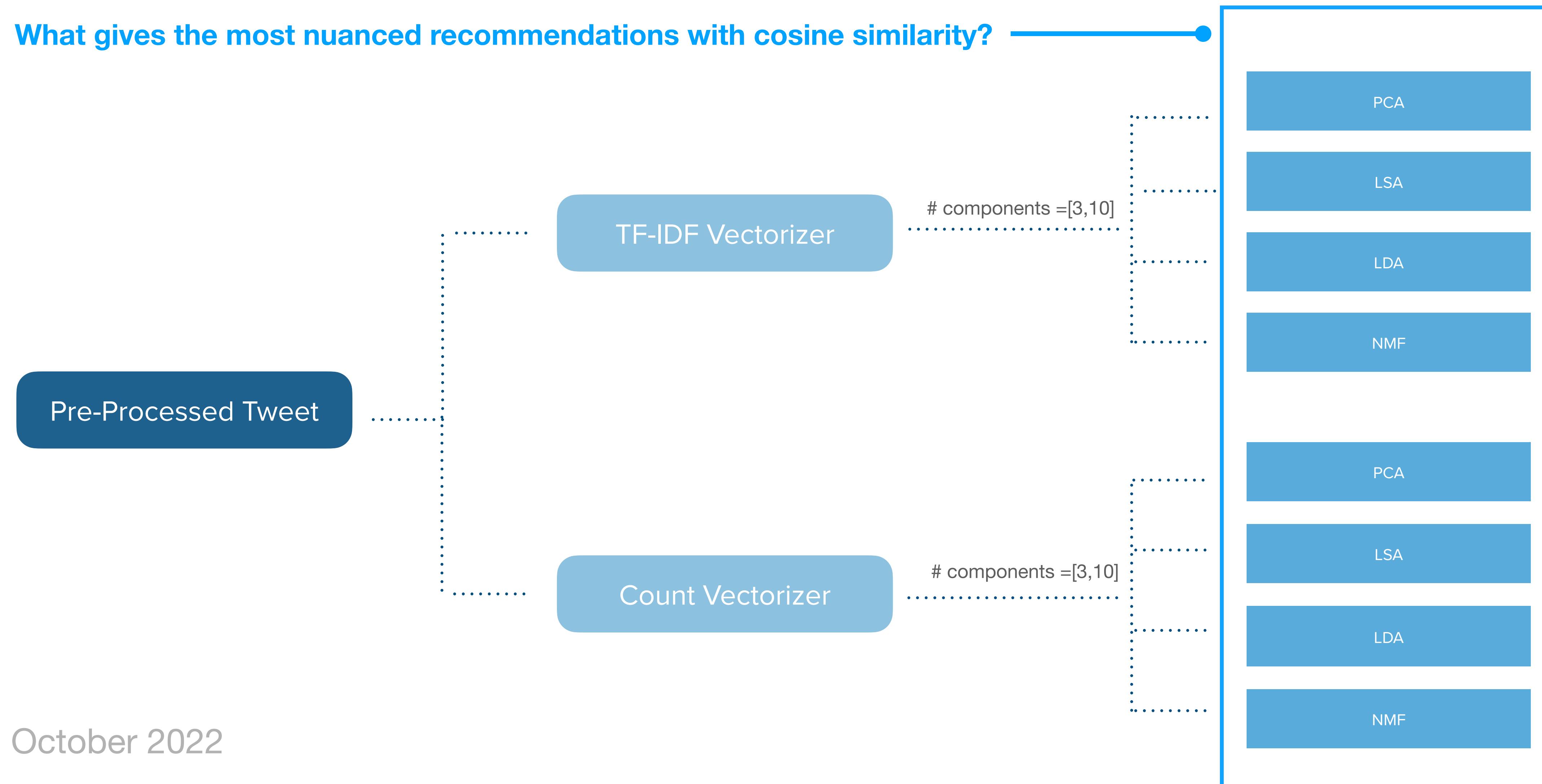
Dimensionality Reduction Workflow

I tested out two Vectorizer in combination with a range of components and different dimensionality reduction techniques to determine the best output.



Dimensionality Reduction: Criteria for Selection

What gives the most nuanced recommendations with cosine similarity?



NMF(5) yields the best topics for the Nightmares Dataset

TF-IDF + NMF with n_components=5 yield the best results topic wise

Topic	Top Words
Missing an Exam	school, high, class, start, teacher, exam
No Mask in a Crowd	mask, wear, forget, people, store, public
Vivid Dreams	scary, friend, real, house, shit, weird
Being Late for Work	work, job, stress, late, customer, wake
Junko Enoshima	play, junko, enoshima, dangle, rope, game

NMF(8) yields the best topics for the Caviar Dataset

TF-IDF + NMF with n_components=8 yield the best results topic wise

Topic	Top Words
Order not received, cancelling	order, place, cancel, receive, issue
Account Deactivated	account, email, support, deactivate, contact
App not Working	app, work, website, log, site
Needing Help from Support	help, need, restaurant, business, work
Bad Customer Support	service, customer, bad, experience, support
Late Driver	food, deliver, driver, minute, arrive
Charged a wrong fee	delivery, restaurant, fee, charge, free
Code not working	time, issue, work, code, guy

However PCA works better than NMF for recommender

Final Input in Recommender:

Nightmare Dataset

Pre-Processed Tweet

+

Count Vectorizer

+

5 components PCA

Caviar Dataset

Pre-Processed Tweet

+

TF-IDF Vectorizer

+

8 components PCA

SECTION

Demo



Home



Search Twitter

Home

Explore

Notifications 5

Messages

Bookmarks

Lists

Profile

More

Tweet



Riwa Sabri
@RiwaSabri



What's happening?



Tweet



rachelmerc'er @rachelmerc'er · 3h

...

Absolutely love the latest @OceanSprayInc work by Orchard. Simple. Attention Grabbing. Built off of a beloved product truth.



youtube.com
Ocean Spray® | Power Your Holidays™
#oceanspray



4



Rae Rae the Don. ™ @Loc_Gawdess · Dec 3, 2020

...

Corona got me so nervous, I had a nightmare that I was at a gathering, NO MASK, and suddenly started panicking about how many ppl I was around. 😭😭 randomly @BombshellChanel you were there too! Mask less dab!!!! 😂😂



2



1



2



Aisha @aishamadeit · 5h

...

Replying to @aishamadeit

addiction is a motherfucker, anyway here is him playing blue in green by miles davis



soundcloud.com

Blue In Green

song written by Miles Davis off his album Kind of Blue.

What's happening

World news · 1 hour ago



Death toll rising after stampede during Halloween festivities in Seoul, South Korea

Trending with Itaewon, Seoul

#SpiritHallowMeme

Halloween Starts Now. Share your favorite Spirit Meme.

↗ Promoted by Spirit Halloween



Business Insider · October 27, 2022

The era of quiet quitting is already over

Trending

Jewish Space Lasers

1,352 Tweets



Businessweek: Rea... · Yesterday

When Netflix and HBO turned on each other, they forged a new era of television

Show more

Who to follow

Messages



Screen 1 : Zoomed In Recommendations

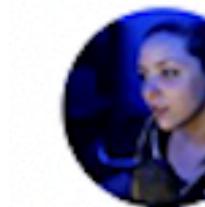


Rae Rae the Don.™
@Loc_Gawdess

...
Corona got me so nervous, I had a nightmare that I was at a gathering,
NO MASK, and suddenly started panicking about how many ppl I was around. 🏙️随机
@BombshellChanel you were there too! Mask less dab!!!! 😂😂

4:43 PM · Dec 3, 2020 · Twitter for iPhone

1 Retweet 2 Likes



Elaine ✨ @elaineryanart · Aug 6, 2020

...

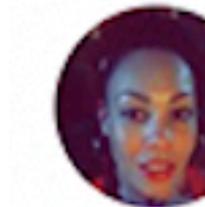
I had a dream I went to a store without a mask on and I started panicking because I was worried about myself and everyone else there.

Usually, I can will my dreams to shift but I couldn't.

Thanks for the super weirdly specific nightmare, 2020



1



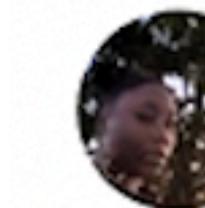
LiteBrite @cntr_of_attn68 · Oct 22, 2020

...

So last night it finally happened. I had a nightmare about being in a crowded place and I couldn't find my mask. I started having trouble breathing and I didn't know if it was #TheRona or I was suffocated by the crowd 😱



1



alyssa @_loveajh · Nov 20, 2020

...

had a dream i was at walmart without a mask and i was just....breathing so uncomfortably close to the air and woke up SWEATING. i had a NIGHTMARE about not wearing a mask.



1



Screen 2 : Zoomed In Recommendations



I had a dream I went to a store without a mask on and I started panicking because I was worried about myself and everyone else there.

Usually, I can will my dreams to shift but I couldn't.

Thanks for the super weirdly specific nightmare, 2020

12:54 PM · Aug 6, 2020 · Twitter Web App

13 Likes

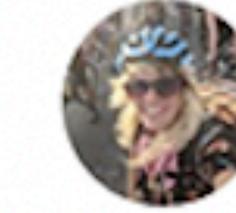


naiche lizzette 🌸 @naichelizzette · Sep 17, 2020

last night I had a nightmare that I forgot to wear my mask and started to cry about it on the train while everyone coughed on me.



...



Lycra Buzzkill 🦸‍♂️ @risahustad · Oct 7, 2020

Sometimes I lie awake at night worried about whether I'm a good person, but last night I had a nightmare that I forgot to wear a mask in a convenience store and I felt awful.



...



Time Traveler from 1967 @paulrpotts · Nov 19, 2020

I had a nightmare that I was in some public meeting or something, and I was without a mask, while everyone else was masked up. I was frantically looking for a mask.



...

Screen 3 : Zoomed In Recommendations



naiche lizzette 🌸
@naichelizzette

last night I had a nightmare that I forgot to wear my mask and started to cry about it on the train while everyone coughed on me.

11:06 AM · Sep 17, 2020 · Twitter for iPhone

1 Like



スピードランwinter的炎頭隊長 @Mari0wOM0rden · Nov 26, 2020

...

Did you guys know that I had a nightmare yesterday? It was like: I just forgot about the mask, and then everyone died... Nobody was here.. Only darkness... But thank God that's a nightmare!



Public Universal Frenemy @LanaQuinnAurora · Nov 21, 2020

...

I shit you not, last night I had a "going to class with no pants on" style of nightmare but it was about going to the store and forgetting to wear my mask 😳😳😳



Majestic Dumpster Garden... @plantsandpoe... · Nov 27, 2020

...

I had a nightmare I was eating in a crowded restaurant with no masks and T*ump showed up and was lecturing everyone about how great he is or whatever. STRESS. But I woke up and saw Adam had gone out and got donuts so overall today's off to a good start.



Other examples: back to school nightmares

Tweet



牛市 @4cowsmoo · Nov 1, 2020

I had a nightmare about a homework assignment from highschool. Its been like 10 years and I still can't escape school dreams.

1 6

Recommended Tweets - Top 3



arlene @divinidadfemme · Nov 30, 2020

i had a nightmare about returning to middle school 😭😭 stop-

...



The Mayor of the 'YAWK @trainNwheels · Nov 8, 2020

Talk about a nightmare, I had a dream last night that I was taking an AP Euro test in high school.

...



zZToastie @zZToastie · Oct 9, 2020

Of course I had a nightmare about taking a math test in school...

1 3 67

Other examples : Caviar App is down

Tweet



theythemsbian @lollipop_bandit · Aug 23

@CaviarSupport Your app and your site are both down for me. I have an order in process and I have no idea if it's on its way no way to check and no way to contact Help.

1

1

1

1

Recommended Tweets - Top 3

@CaviarSupport I got a notification that if I updated your app I'd get \$10 off my order. So I did it and now it says I'm not eligible. Can you please help?



Rebecca Levine @Abecarey · May 14, 2020

@CaviarSupport order has not arrived and I'm locked out of app help!



Adam K. @Duece430 · Nov 21, 2018

@CaviarSupport Trying to confirm an order that was made 30 min ago, in-app chat not working, please help



Conclusion: Next Steps

- Continue testing different text pre-processing strategies and assess effect on recommender
- It would be interesting to compare this to collaborative filtering
- You can find more recommender examples in the appendix

Thank you

Appendix

Nightmares Dataset : going out without a mask

Tweet



naiche lizzette 🌸 @naichelizzette · Sep 17, 2020

last night I had a nightmare that I forgot to wear my mask and started to cry about it on the train while everyone coughed on me.

...

1 reply · 1 retweet · 1 like · 1 share

Recommended Tweets - Top 3



Majestic🌟Dumpster🗑️Garden... @plantsandpoe... · Nov 27, 2020

I had a nightmare I was eating in a crowded restaurant with no masks and T*ump showed up and was lecturing everyone about how great he is or whatever. STRESS. But I woke up and saw Adam had gone out and got donuts so overall today's off to a good start.

...

1 reply · 1 retweet · 4 likes · 1 share



Elaine✨ @elaineryanart · Aug 6, 2020

I had a dream I went to a store without a mask on and I started panicking because I was worried about myself and everyone else there.

Usually, I can will my dreams to shift but I couldn't.

...

1 reply · 1 retweet · 13 likes · 1 share

Thanks for the super weirdly specific nightmare, 2020

...

1 reply · 1 retweet · 13 likes · 1 share



Public Universal Frenemy @LanaQuinnAurora · Nov 21, 2020

I shit you not, last night I had a "going to class with no pants on" style of nightmare but it was about going to the store and forgetting to wear my mask 😳😳😳

...

2 replies · 2 retweets · 2 likes · 1 share

Caviar Dataset : Where is my order?

Tweet

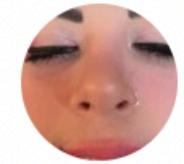


LC @laurawrdeadly · Sep 18

@Caviar @CaviarSupport Hi, our driver has been driving further and further away and hasn't even picked up the order. They've been driving around for 40 minutes and we can't get your chat support to cancel and reorder for us.

...

Recommended Tweets - Top 3



the low-cal calzone zone @cheridensucks · Jun 19, 2021

@DoorDash @Caviar @DoorDash_Help I've been waiting for a dasher to be assigned to my Caviar order for more than an hour and a half and have been waiting for a support agent for over 15 minutes what's up?

2

1

1

1

...



Munda @Moonduhhh · Mar 4, 2016

@CaviarSupport ordered fastbite 40 minutes ago and the courier is nowhere near my apt. You're also not responding to texts. Convenient.

1

1

1

1

...



D0ntueva @D0ntueva · Jul 17, 2020

@CaviarSupport comon guys. Ordered 3hrs a go. No food, no status, can't get a refund because support has been silent for 2hrs?

1

1

1

1

...