Build Your Own Timeline Algorithm

Davide Eynard

FOSDEM, 1 Feb 2025

BYOTA is not...

- a new algorithm
- an end-user application
- a service

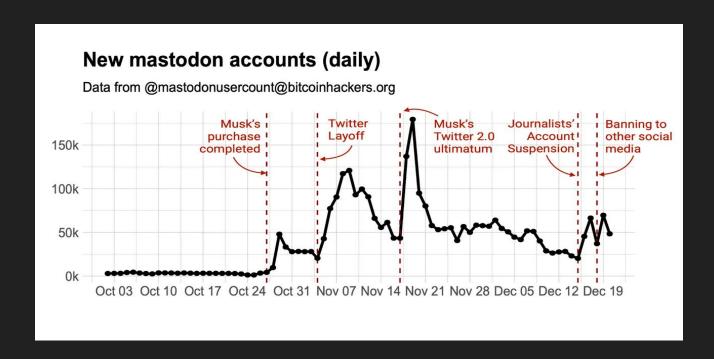
BYOTA is... a (pacifist) call for arms



How it started



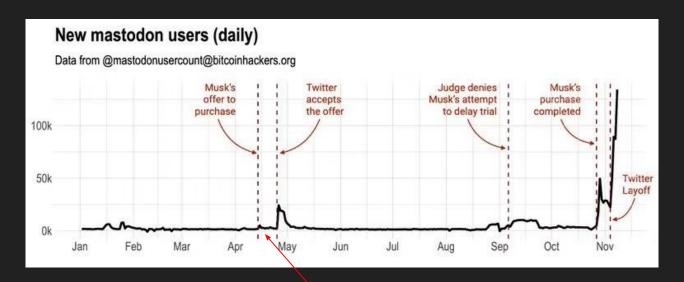
#TwitterMigration



Six months earlier...



#MyMigration



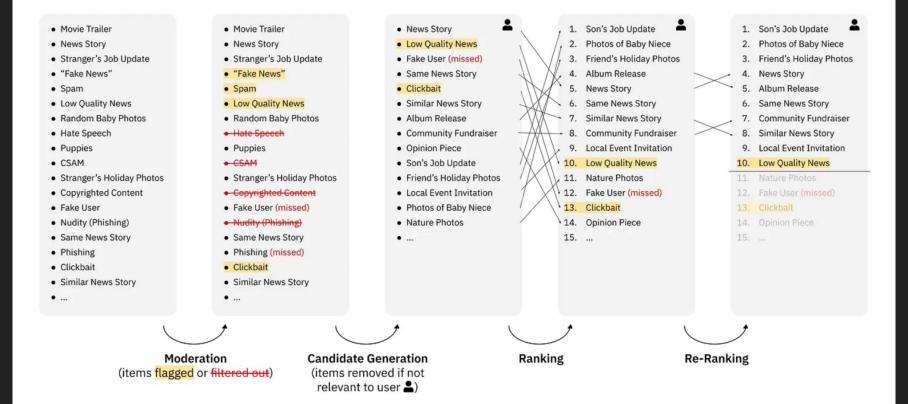


Timeline algorithms

Timeline Algorithms

Define whether and how posts appear on your timeline

Algorithm	Remove?	How
Revchron	No	Sort by datetime in ascending order
Spam / Bots	Yes	Remove post if spam / bot
Moderation	Yes/No	Remove / Downrank if post is abusive
Recommender	No	Uprank if post is more likely to receive engagement



On the shoulders of giants 💙





Philip Kreißel



Jan Lehnardt

Tootfinder

Opt-in global Mastodon full text search. Join the index!

Search...

Search

Full text search on Mastodon

Imagine searching any post on Mastodon. This is now possible - at least for the posts of users who opt in.

Tootfinder indexes all public posts of consenting users and makes them searchable for 3 months. If you want to be part of it, join the index.



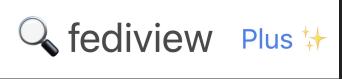
Matthias Bürcher

Mastodon Digest

Sourced from your timeline over the past 12 hours

Here are some popular posts you may have missed:

Matt Hodges



Adam Hill

Problems of timeline algorithms

Choose one or more of:

- Biased
- Not transparent
- Complete lack of control
- Not privacy preserving
- Huge computational cost
- Require deep ML knowledge
- Cannot be run locally

Also true for search & recommendations!

Breaking the assumptions

Choose one or more of:

- Biased
- Not transparent
- Complete lack of control
- Not privacy preserving
- Huge computational cost
- Require deep ML knowledge
- Cannot be run locally

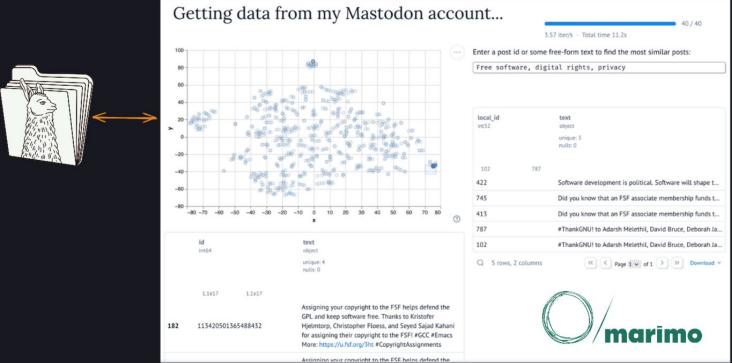
- → Open, substitutable models
- → Clear, simple methods
- → Make code available / easy to run
- → Don't share personal data
- → Use lighter models
- → Out-of-the-box embeddings
- → Build it so it runs locally :-)

Also true for search & recommendations!

→ All the above work here too!

BYOTA

Architecture





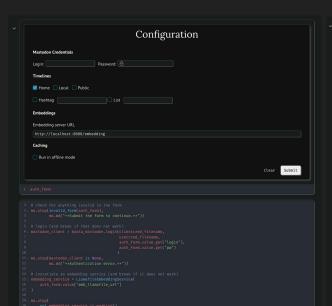


<u>Llamafile</u>

- Single-file LLMs language models
 - o sentence-transformers/all-MiniLM-L6-v2 (code/papers, training data)
- 100% local
- Optimized to run on slower hardware
- Used to calculate status embeddings

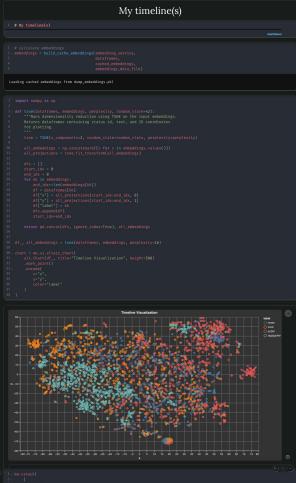
<u>marimo</u>

- Reactive notebook for Python
- Sharable as an app



carring a tamelines, disc(fs) Latering in (free, 'tises'): Latering = (free, 'tises'): Getting data from my Mastodon account...

```
| new | new
```



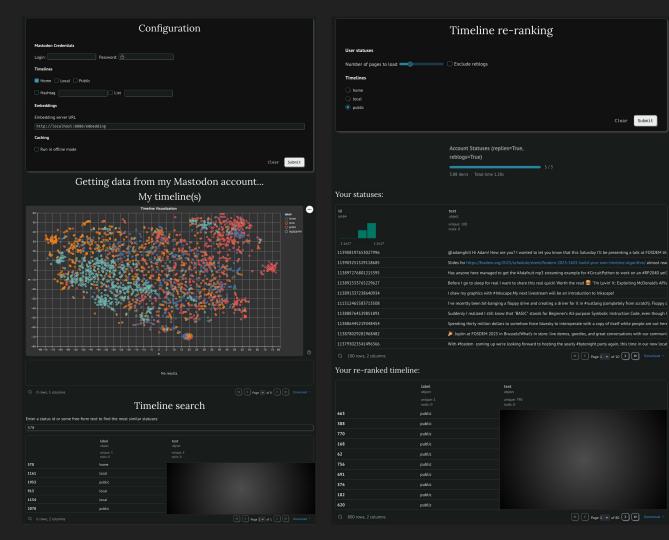


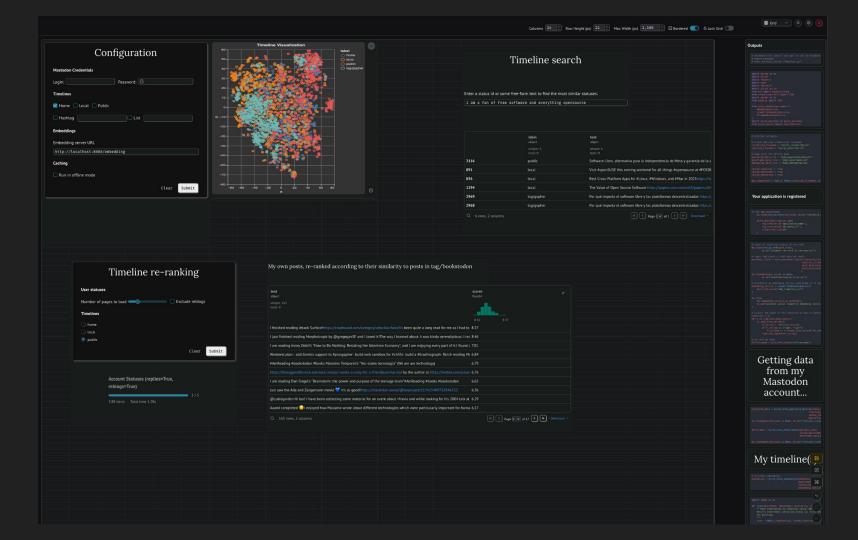




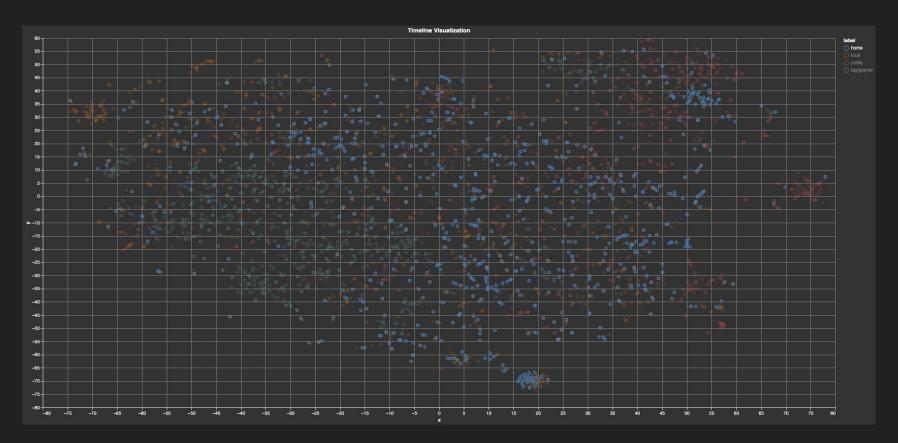


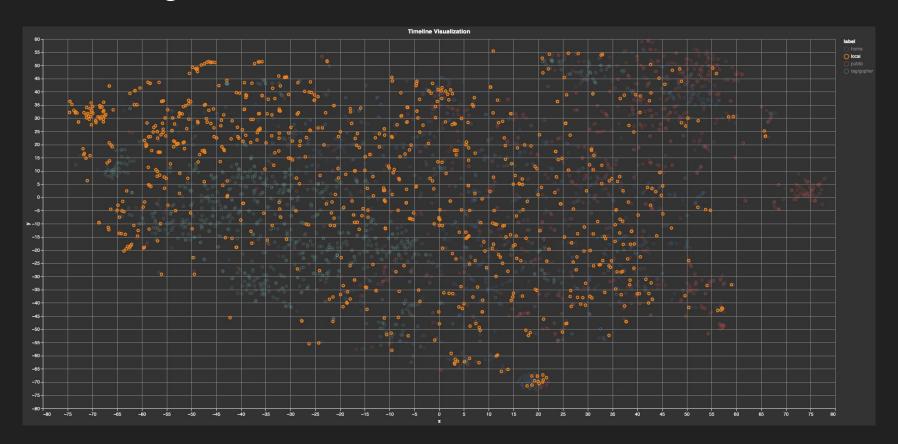
Your statuses:

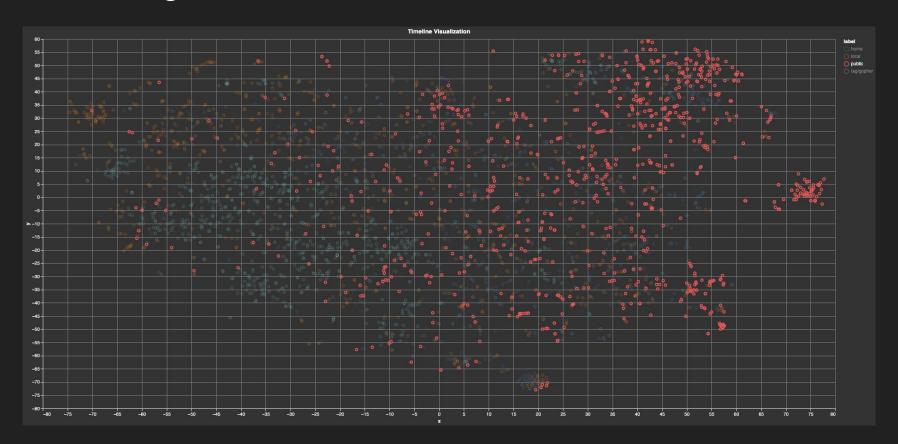


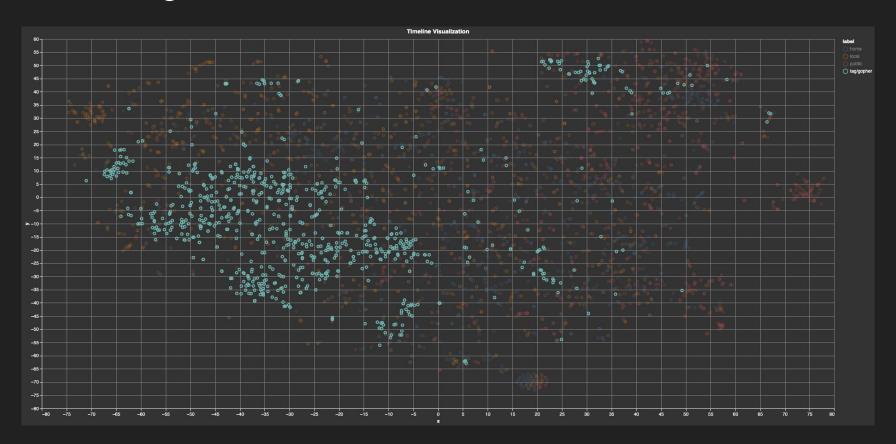


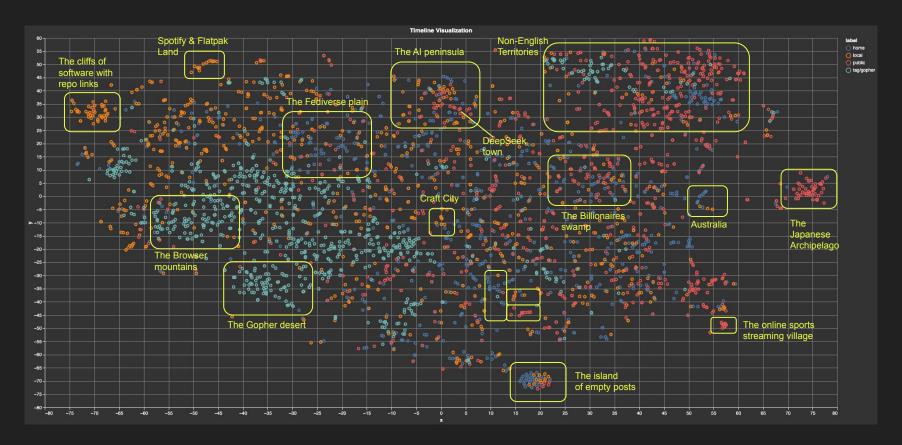
BYOTA in practice

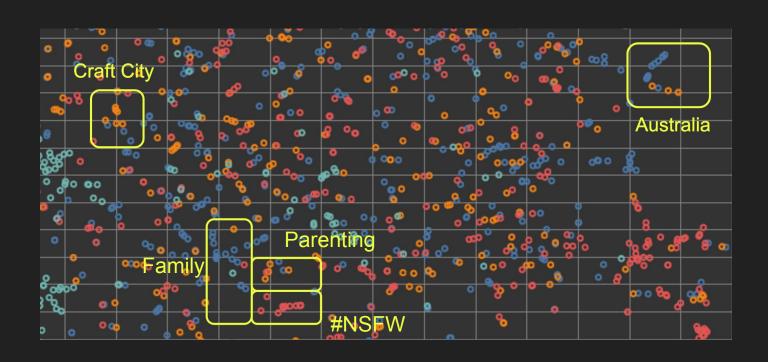










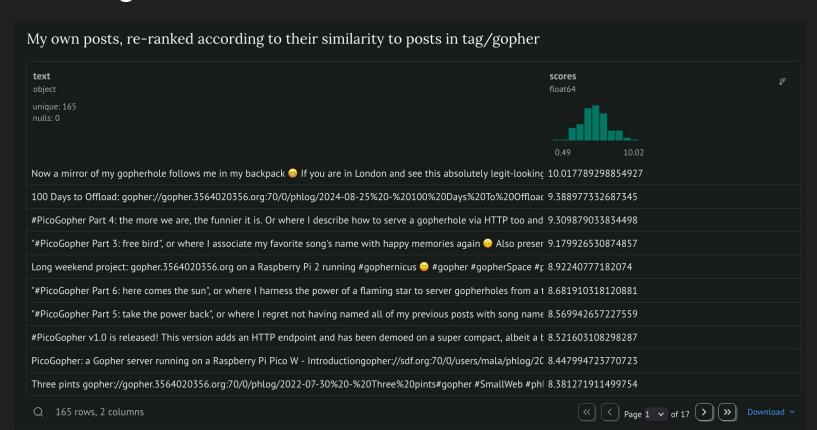


Semantic search

6 rows, 2 columns

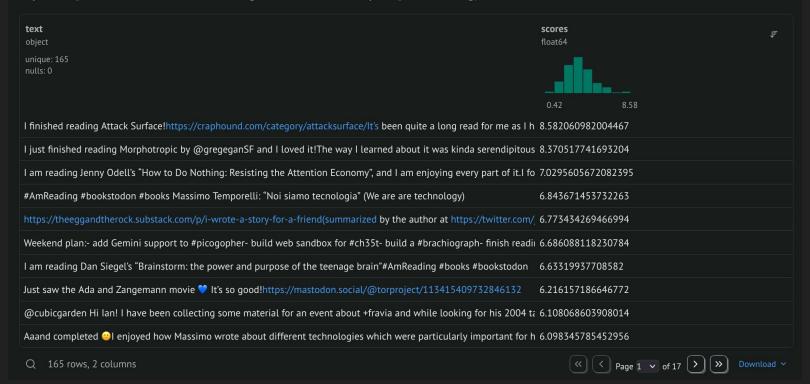
Enter a status id or some free-form text to find the most similar statuses: I am a fan of free software and everything opensource label text unique: 3 unique: 6 nulls: 0 nulls: 0 2116 public Software Libre, alternativa para la independencia de Meta y garantía de la soberanía digitalhttps://c 891 local Visit #openSUSE this coming weekend for all things #opensource at #FOSDEM. Don't miss out. #ope 856 local Best Cross-Platform Apps for #Linux, #Windows, and #Mac in 2025https://www.tecmint.com/cross-r The Value of Open Source Software https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4693148 # 1294 local Por qué importa el software libre y las plataformas descentralizadas https://kolektiva.media/w/mRH 2969 tag/gopher 2968 tag/gopher Por qué importa el software libre y las plataformas descentralizadas https://kolektiva.media/w/mRH Page 1 v of 1 >>>> Download v

Re-ranking



Re-ranking

My own posts, re-ranked according to their similarity to posts in tag/bookstodon



What about performance?

From bert to llama, time to embed 800 statuses

				2016 MB Pro		2024 M3 Max	
Model Name	Architecture	Size	Params	llamafiler 0.9.0	ollama 0.5.7	llamafiler 0.9.0	ollama 0.5.7
all-MiniLM-L6-v2.F16	bert	46 MB	22.6M	52	42	21	11
nomic-embed-text-v1.5	nomic-bert	274MB	137M	280	302	26	15
mxbai-embed-large-v1-f16	bert	670MB	334M	586	715	35	24
e5-mistral-7b-instruct	llama	5GB	7.11B	-	:-	193	126

How local is this?

- Embedding servers (llamafile, ollama) run locally

```
(base) mala@Davides-MacBook-Pro byota % curl http://localhost:11434/api/embed -d '{
       "model": "all-minilm",
       "input": "There is a crack in everything, that`s how the light gets in"
 {"model":"all-minilm","embeddings":[[-0.020688692,-0.044162404,0.103413254,0.054647904,0.015244463,-0.06494531,0.04424154,0.025882239,0.010728781,0.05
 289739,0.063623264,-0.018333575,-0.039952043,-0.010457686,0.01835603,-0.014461786,-0.048471212,-0.10302953,-0.04449307,-0.033806648,0.043435317,-0.055
35696, -0.08392212, -0.069332235, -0.1140092, 0.094958186, -0.004860086, -0.035971902, 0.0064314394, -0.011037193, -0.0042981366, 0.057368666, -0.07753447, 0.0582
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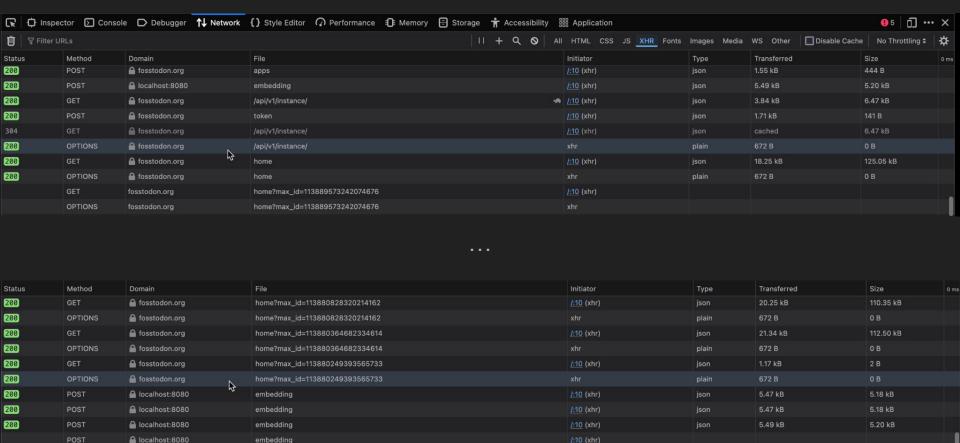
How local is this?

- Marimo wasm runs in your browser

Downloaded data:

Status	Method	Domain	File	Initiator	Туре	Transferred	Size
200		atest-files.pythonhosted.org	marimo_base-0.10.17-py3-none-any.whl	/:10 (fetch)			666.91 kB
200		files.pythonhosted.org	Markdown-3.6-py3-none-any.whl	<u>/:10</u> (fetch)	octet-stream	cached	105.38 kB
200		a cdn.jsdelivr.net		/:10 (fetch)			1.12 MB
200		files.pythonhosted.org	pymdown_extensions-10.8.1-py3-none-any.whl	<u>/:10</u> (fetch)		cached	250.83 kB
200			PyYAML-6.0.2-cp312-cp312-pyodide_2024_0_wasm32.whl	<u>/:10</u> (fetch)		cached	502.84 kB
200		a cdn.jsdelivr.net	altair-5.4.1-py3-none-any.whl		wasm	cached	5.45 MB
	GET		typing_extensions-4.11.0-py3-none-any.whl	fetch	wasm	31.83 kB (raced)	140.47 kB
	GET		Jinja2-3.1.3-py3-none-any.whl	fetch	wasm	111.43 kB (raced)	494.18 kB
200		☐ cdn.jsdelivr.net	MarkupSafe-2.1.5-cp312-cp312-pyodide_2024_0_wasm32.whl				31.67 kB
200			jsonschema-4.21.1-py3-none-any.whl	fetch		cached	279.58 kB

. . .



What next?

Next steps

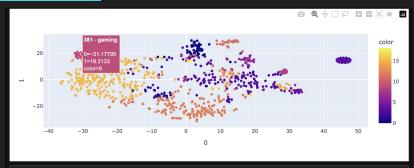
- Grow as a tool where people can experiment with timeline algorithms
- Model comparison
- New approaches (e.g. clustering, classification)
- Protocols, not platforms

Thank you!

Modular

cardiffnlp/tweet-topic-base-multilingual

robertastodon



from scipy import spatial •••

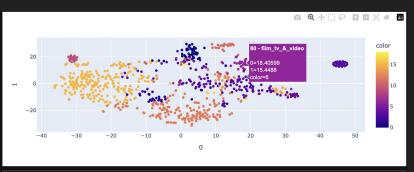
113886398592689487:0kay that's it! In done with the first release version of my pixel 2D platformer game :blobcatti red: 9 unique levels-50 cats to rescue- 9 achievements & 10 leaderboards- 4 enemy types- over 50 different enemiesground- & wall sliding- loads moreixlaton on in-app purchases, no ads, no tracking and free in all stores It's gonna take a bit for review, I submitted them at the same time. Let's make it a race :apple_inc: :google:

113886568457272726:@vga256 @rek hey vga! It just so happens that we released a 'version of Oquonie that runs on that tin y little virtual machine with the hope that it will allow the game to live on! It's playable on near everything with a screen and a d-pad.Have fun with Turye :uxn: https://hundredrabbits.itch.jo/qouonie

113888689487472937:Sono arrivate le mie copie di Squeaky, il nuovo gioco della linea fluffy.Per ora i disegni di questa linea di giochi family sono tutti miei.Ho dato un'occhiata alle regole della modalità di gioco base e nel video provo a sintetizzarle. Spero di aver capito bene e non aver detto delle sciocchezze.GateOnGames David Spada #tartamani #tartaac celerato #squeaky #gjochidatavolo #scoiattoli #arraffonihttps://youtu.be/dkQMyewCkVo7si=Bgli58uUDzc73fpQ

113890702677157519:I made crossroad logic. Now I can make more interesting tracks designs.Some update under-the-hood.Cu rrently 3198 bytes#ASM #GameDev #MSDOS

113888400837563608:1'm still working on the game editor for my #Amiga game called #TheGate .I've started today to work on the script editor, it's the window on the right and it's a bit horrible right now, but it's a starter. The idea is to fill the Left column with the available commands and to use the right column for the script editing. I'm unsure if I've to add styled text (for the keywords) or not... maybe I'll add it at a later point if really needed. Btw, yes, the project is still eative! :amiga:



from scipy import spatial ...

113890179350397455:56.4 percent of my external viewers on YouTube come from Mastodon.12.9 percent are from Bluesky.5.1 percent are from Facebook.This is where it's at!♥♠♥

113883393289219428:I first heard about the #CriterionChallenge on here yesterday. Now I've put my list together for 202
5 - https://blog.tomasino.org/criterion-challenge-2025/So many movies to see!

113882416617046810: officially entering pre-production for my video series about the #Fediverse "THANK YOU for encour gaing me to do this. It feels really energizing "I'm often thinking about this brilliand upto by filmmaker Ava Duvern ay: "If your dream is only about you, it's too small. "My dream / lofty goal: for everyone to know about the #Fediverse and why / how to join it.Striving to create an easy to follow, persuasive video explainer.P.S.: I changed my bio 39 (I'm no longer a "filmmaker on histur")

113887011963722410:how have i never heard of this film until now https://www.youtube.com/watch?v=vnoHSnJsy6Q#movies #fi

113887415867547783:"The film? Oh it's a fairly new film. Yeah it came out in... okay, it's 12 years old. It's not a ver y new film, actually."What the fuck is time, and can it stop please?