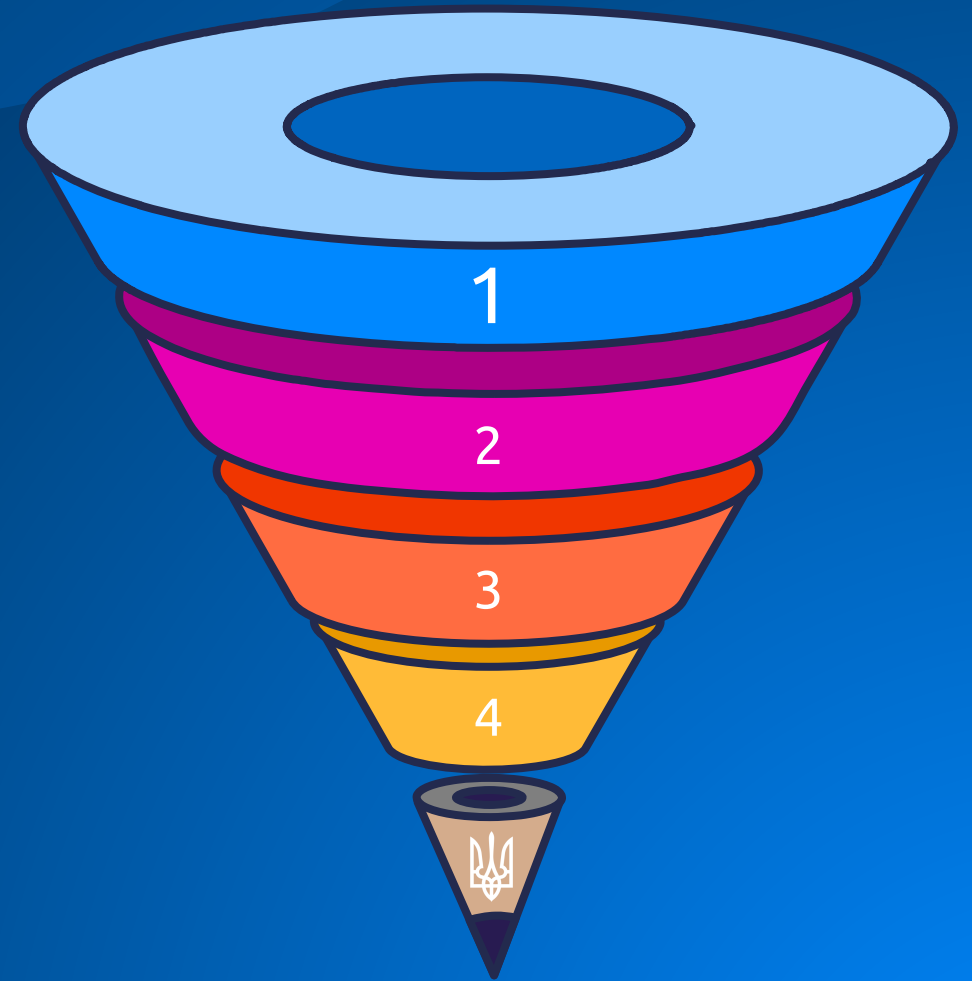


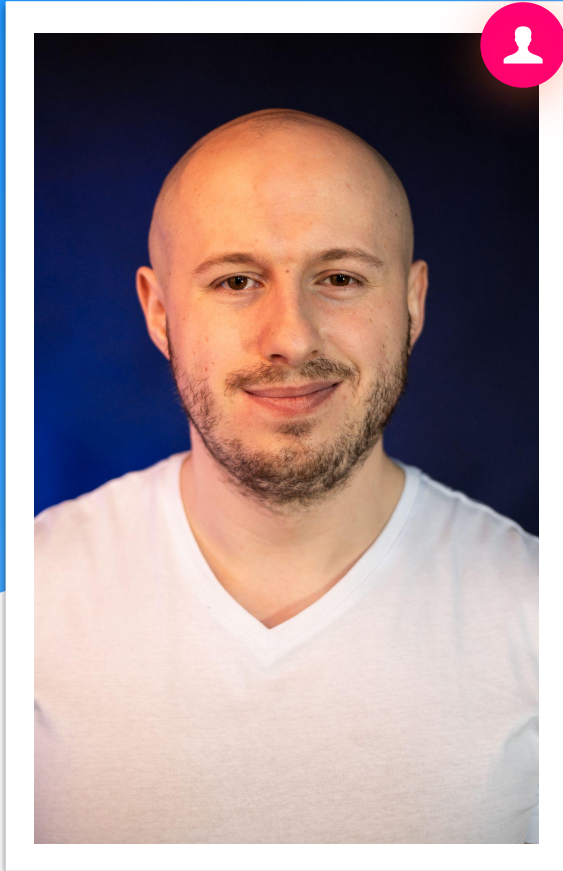
Data mining:// from a bomb shelter

How to use data extraction and statistics to find the best time to work, sleep, and live during the war in Ukraine.

What you could learn from this talk (if you don't know it yet)

01. How to parse Telegram channels.
02. How to organize parsed messages into data.
03. How to get insights from this data.
04. How to animate anything with matplotlib.

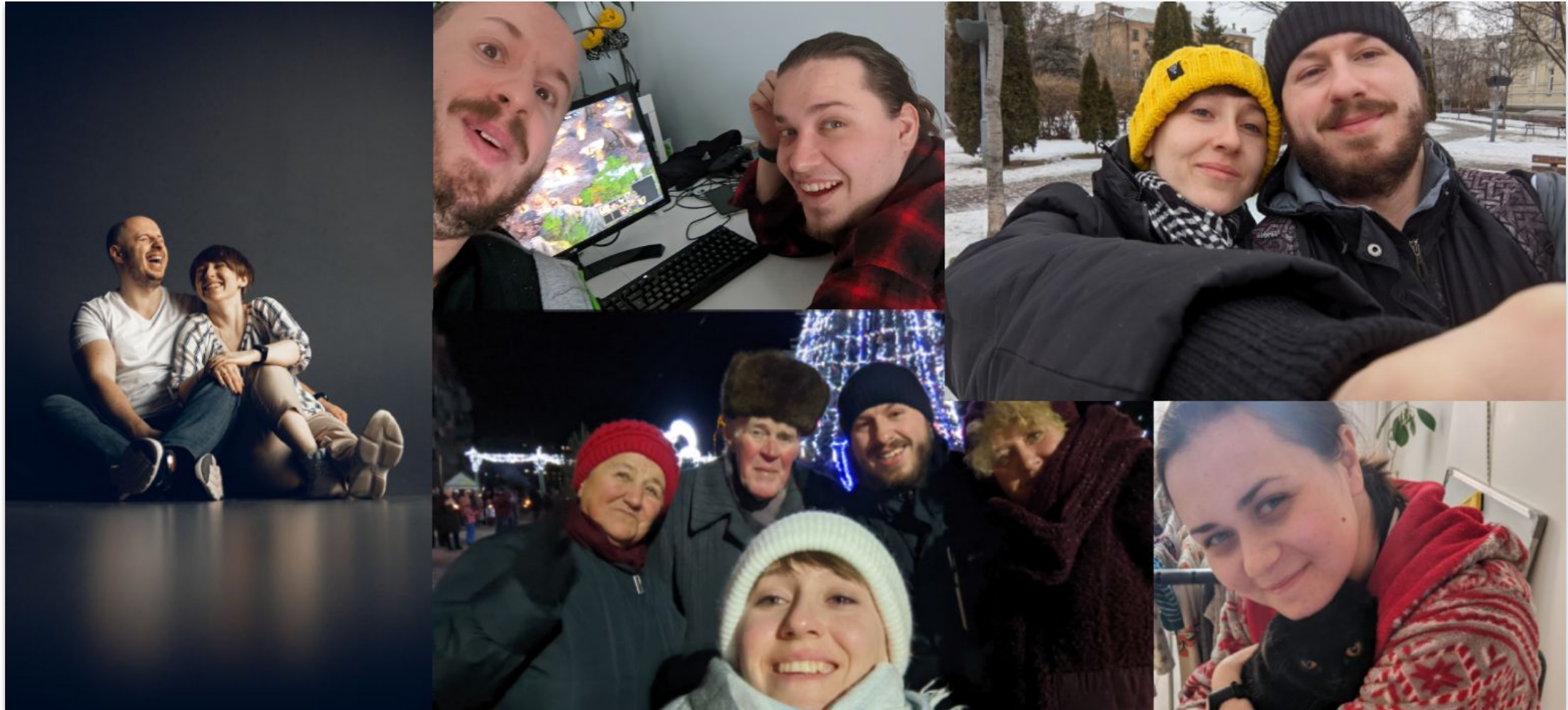




Hi, I'm Alex Lebedev

- > Software Engineer in Hotjar.
- > 7+ years as full-time programmer (including 3 years in Zyte).
- > 7+ years in Digital Marketing as Analyst/Manager.
- > 7+ months of fundraising and volunteering in Ukraine.

Today, I will tell you how we went from this

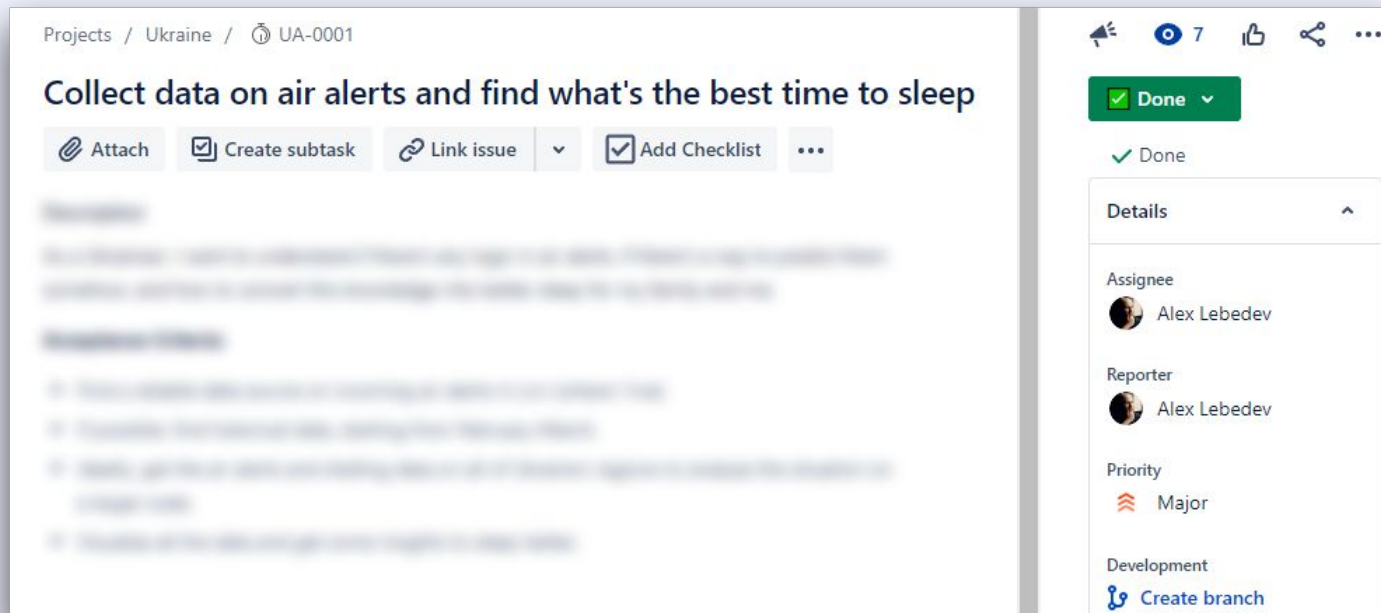


To this, in just a couple of days, and how it's going

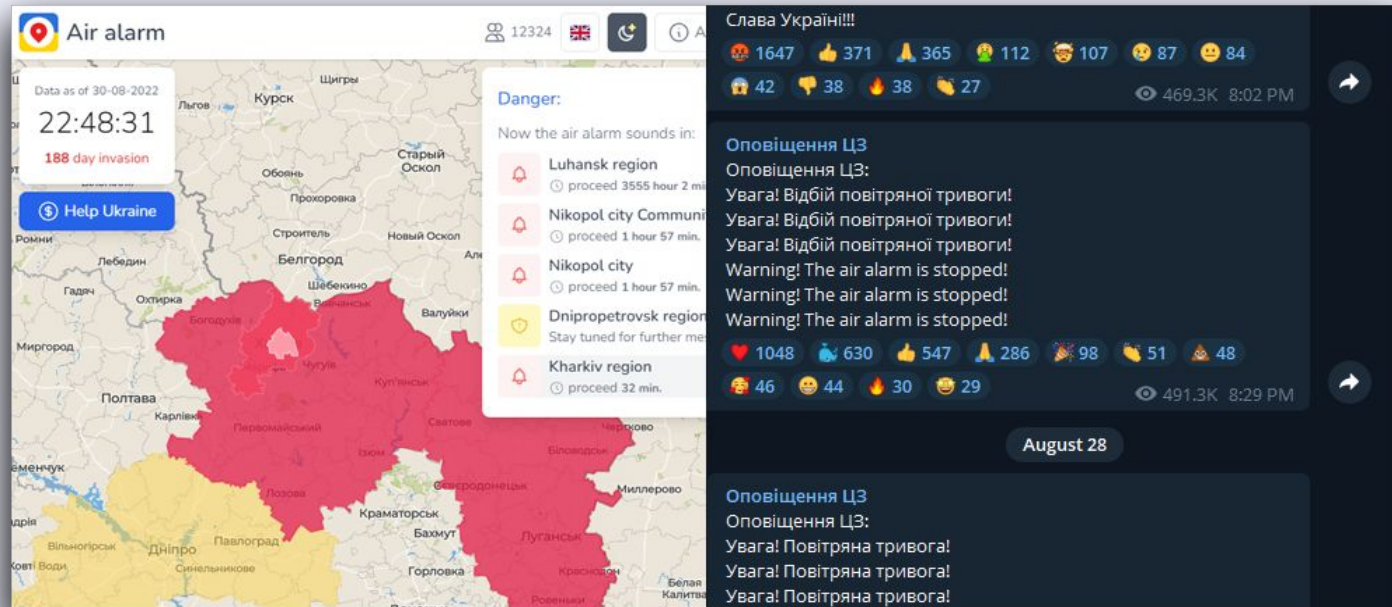


Step 1: Calm down and define the task

1

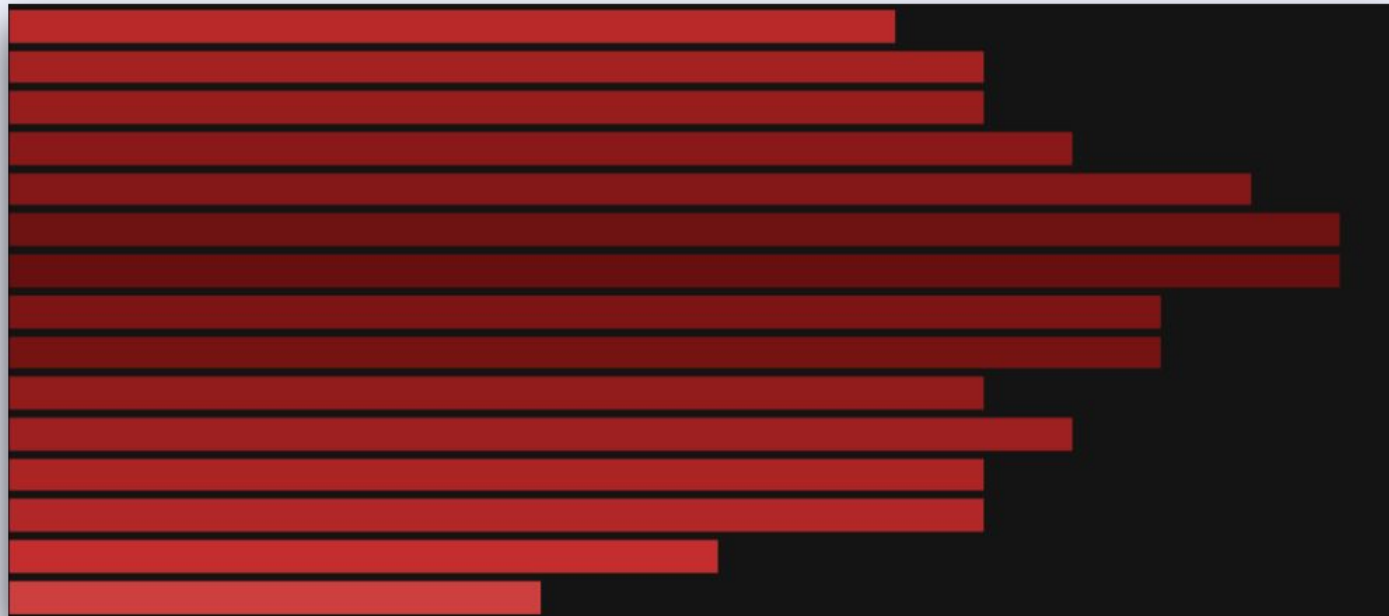


Step 2: Collect all the required data



Step 3: Visualize and analyze the data

3



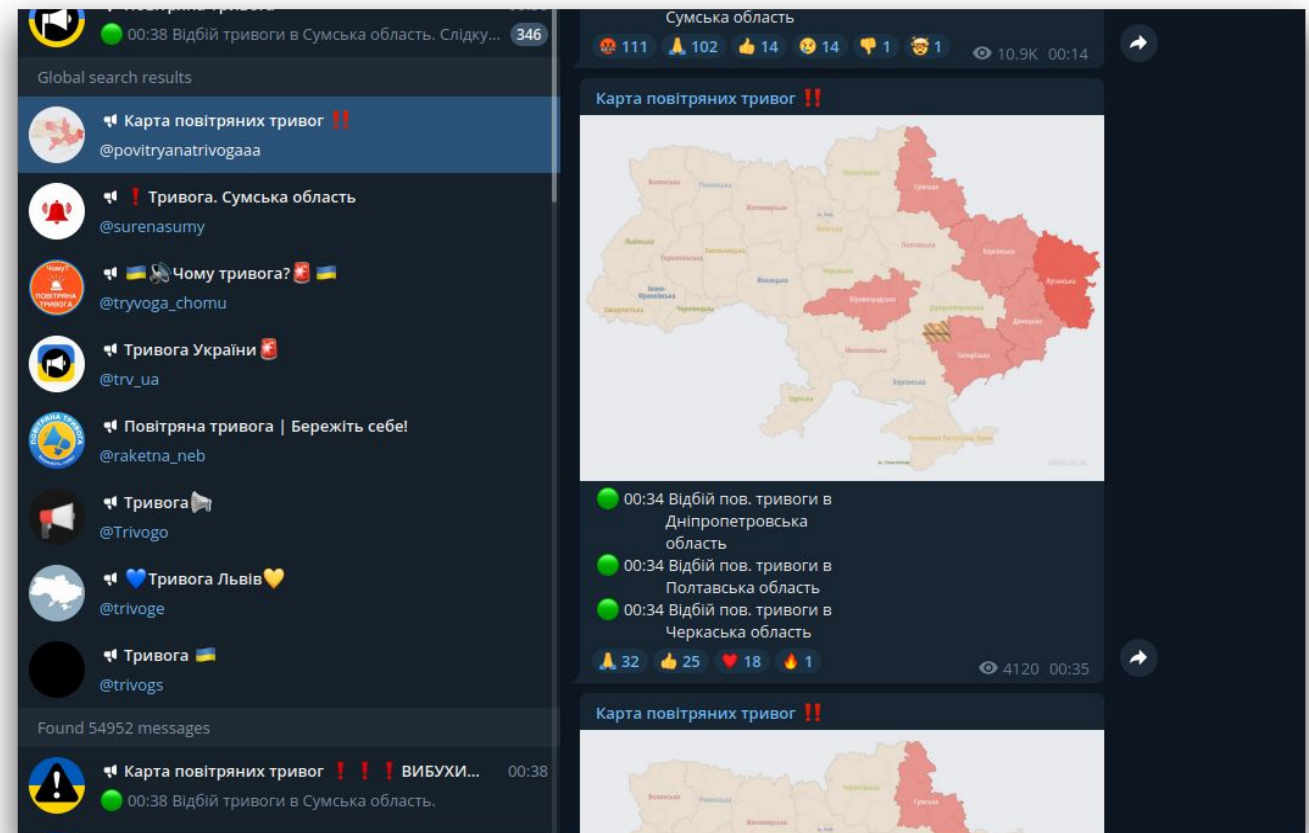
#opensource

Want to get a closer look at the code?

<https://github.com/sortafreel/dmbm>

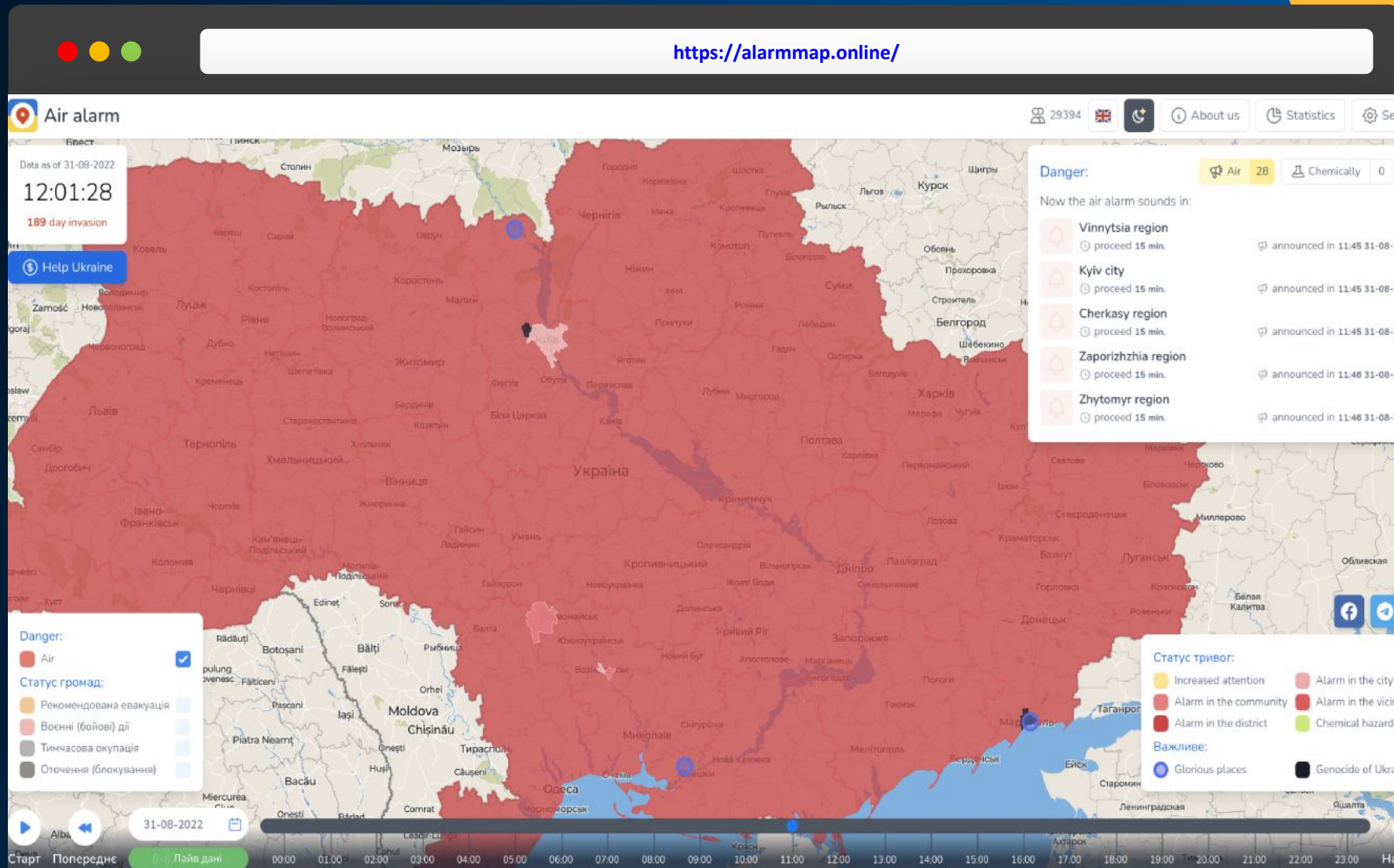
How air alerts and shelling are announced?

- > Most cities have **powerful sirens** installed.
- > Towns have own **Telegram channels**.
- > **Android/iOS apps** with loud notifications.
- > **Alarm maps** that show alerts in real-time.



Alarm maps

The fastest way to understand what's happening in Ukraine right now.



Where all of them get the data?

Ukrainian army

They monitor the rockets and bomb carrier plane launches.

> I'm not in the army, so I don't have access to the data.

Reposting

Local Telegram channels repost from official apps.

> The way to go, historical data, but it could be a bit chaotic.

API

Created after months, by the top home security company.

> The easiest way, but my access request was denied.



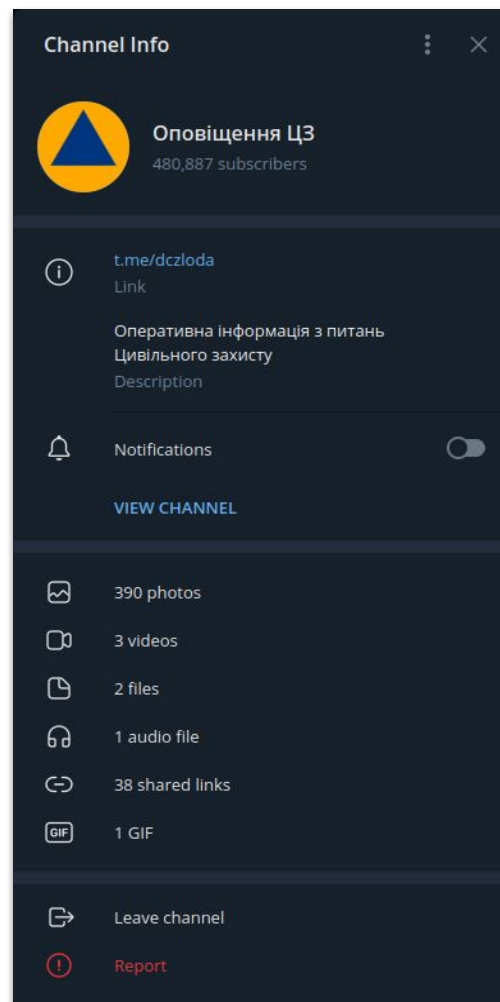
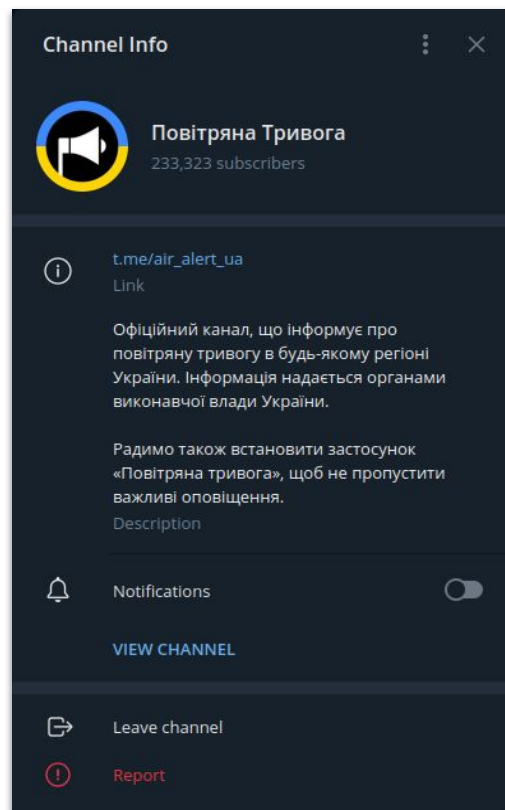
Where I get the data?

Air Alert

Includes data on **all the regions**.

Stable format of messages.

Historical data from **March 13th**.



Civil Protection Notifications

Includes data on the **Lviv region**.

Stable enough format of messages.

Historical data from **February 25th** (the second day of the war).

How I get the data?

Python library

I used the **Telethon** library as it allows to extract any data (users, messages, etc.) from any amount of channels.

```
from telethon import TelegramClient
from telethon.tl.types import Message

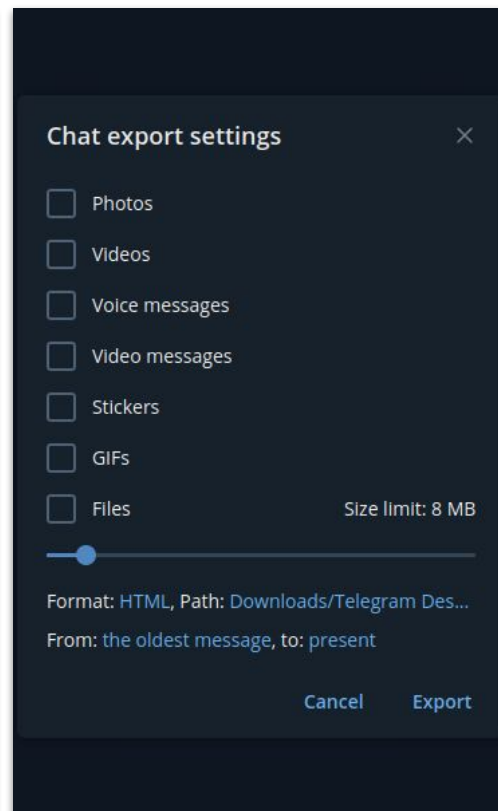
WAR_START = datetime(2022, 2, 24, 0, 0, 0)

async def collect_messages(channel_id):
    # Fill Telegram cache
    await client.get_dialogs()
    # Get the required channel data
    alerts_channel = await client.get_channel(channel_id)
    async for post in client.iter_messages(alerts_channel, limit=100):
        if isinstance(post.message, Message):
            continue
        if post.date < WAR_START:
            break
        MESSAGES.append(prepare_message(post))

client = TelegramClient("name", int(C), int(S))
with client:
    client.loop.run_until_complete(collect_messages(channel_id))
```

Manual export

Built-in export tool (right top corner, "Export chat history" on desktop). Allows to extract chat history of any channel.



How the process looks like?

1. **An air alert starts**, with loud sirens and mobile app notifications.
2. We pick up emergency backpacks and **run to the shelter**.
3. At the same time, my remote Ubuntu server **checks channels every 5 minutes**.
4. All the alerts that are not collected yet - are **added to the remote DB**.
5. An air alert ends, I get back home, **export data and analyze it**.

We got the data, what's next?

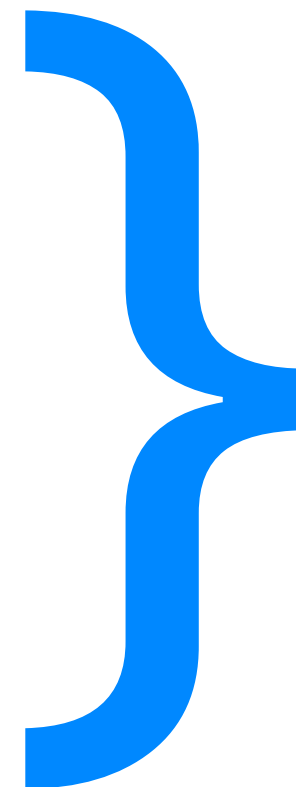
- > We need to **filter messages** (news, local authorities, etc).
- > Then, organize them into **actual alarms** (start, end, duration).
- > Next, **assign a region** to each alarm (to avoid overlap and to get local stats).
- > After that, we're **ready to go** (to build charts and get insights).

	datetime	message
270	2022-05-04 19:11:49	Увага! Повітряна тривога!\nУвага! Повітряна тривога!\nУвага! По...
269	2022-05-04 19:48:31	Оповіщення ЦЗ:\nУвага! Відбій повітряної тривоги!\nУвага! Відбі...
268	2022-05-04 19:48:34	Оповіщення ЦЗ:\nУвага! Відбій повітряної тривоги!\nУвага! Відбі...
267	2022-05-05 00:27:45	Увага! Повітряна тривога!\nУвага! Повітряна тривога!\nУвага! По...
266	2022-05-05 00:27:48	Увага! Повітряна тривога!\nУвага! Повітряна тривога!\nУвага! По...
265	2022-05-05 01:27:53	Оповіщення ЦЗ:\nУвага! Відбій повітряної тривоги!\nУвага! Відбі...
264	2022-05-05 01:27:56	Оповіщення ЦЗ:\nУвага! Відбій повітряної тривоги!\nУвага! Відбі...
263	2022-05-05 07:07:50	Увага! Повітряна тривога!\nУвага! Повітряна тривога!\nУвага! По...
262	2022-05-05 07:07:52	Увага! Повітряна тривога!\nУвага! Повітряна тривога!\nУвага! По...
261	2022-05-05 08:07:24	Оповіщення ЦЗ:\nУвага! Відбій повітряної тривоги!\nУвага! Відбі...
260	2022-05-05 08:07:26	Оповіщення ЦЗ:\nУвага! Відбій повітряної тривоги!\nУвага! Відбі...
259	2022-05-05 08:07:43	Будьте пильні, адже ворог працює на інформаційному фронті. \n\n...
258	2022-05-05 17:16:34	Увага! Повітряна тривога!\nУвага! Повітряна тривога!\nУвага! По...
257	2022-05-05 17:16:36	Увага! Повітряна тривога!\nУвага! Повітряна тривога!\nУвага! По...
256	2022-05-05 18:05:20	Оповіщення ЦЗ:\nУвага! Відбій повітряної тривоги!\nУвага! Відбі...
255	2022-05-05 18:05:23	Оповіщення ЦЗ:\nУвага! Відбій повітряної тривоги!\nУвага! Відбі...
254	2022-05-07 10:52:13	Увага! Повітряна тривога!\nУвага! Повітряна тривога!\nУвага! По...
253	2022-05-07 10:52:16	Увага! Повітряна тривога!\nУвага! Повітряна тривога!\nУвага! По...
252	2022-05-07 12:39:09	Оповіщення ЦЗ:\nУвага! Відбій повітряної тривоги!\nУвага! Відбі...
251	2022-05-07 12:39:13	Оповіщення ЦЗ:\nУвага! Відбій повітряної тривоги!\nУвага! Відбі...
250	2022-05-07 23:07:03	Увага! Повітряна тривога!\nУвага! Повітряна тривога!\nУвага! По...
249	2022-05-07 23:07:06	Увага! Повітряна тривога!\nУвага! Повітряна тривога!\nУвага! По...
248	2022-05-07 23:37:47	Оповіщення ЦЗ:\nУвага! Відбій повітряної тривоги!\nУвага! Відбі...
247	2022-05-07 23:37:54	Оповіщення ЦЗ:\nУвага! Відбій повітряної тривоги!\nУвага! Відбі...

Let's start with Lviv, the region where I live

One of the calmest regions. That's why I can work and participate in the Extraction Summit.

- > 800+ km to the border with Russia.
- > 50+ km to the border with Poland.
- > Up to 800k-1kk current population.
- > The most touristic city of Ukraine (highly recommend to visit after Ukrainian victory).



So, how often are air alerts in Lviv?

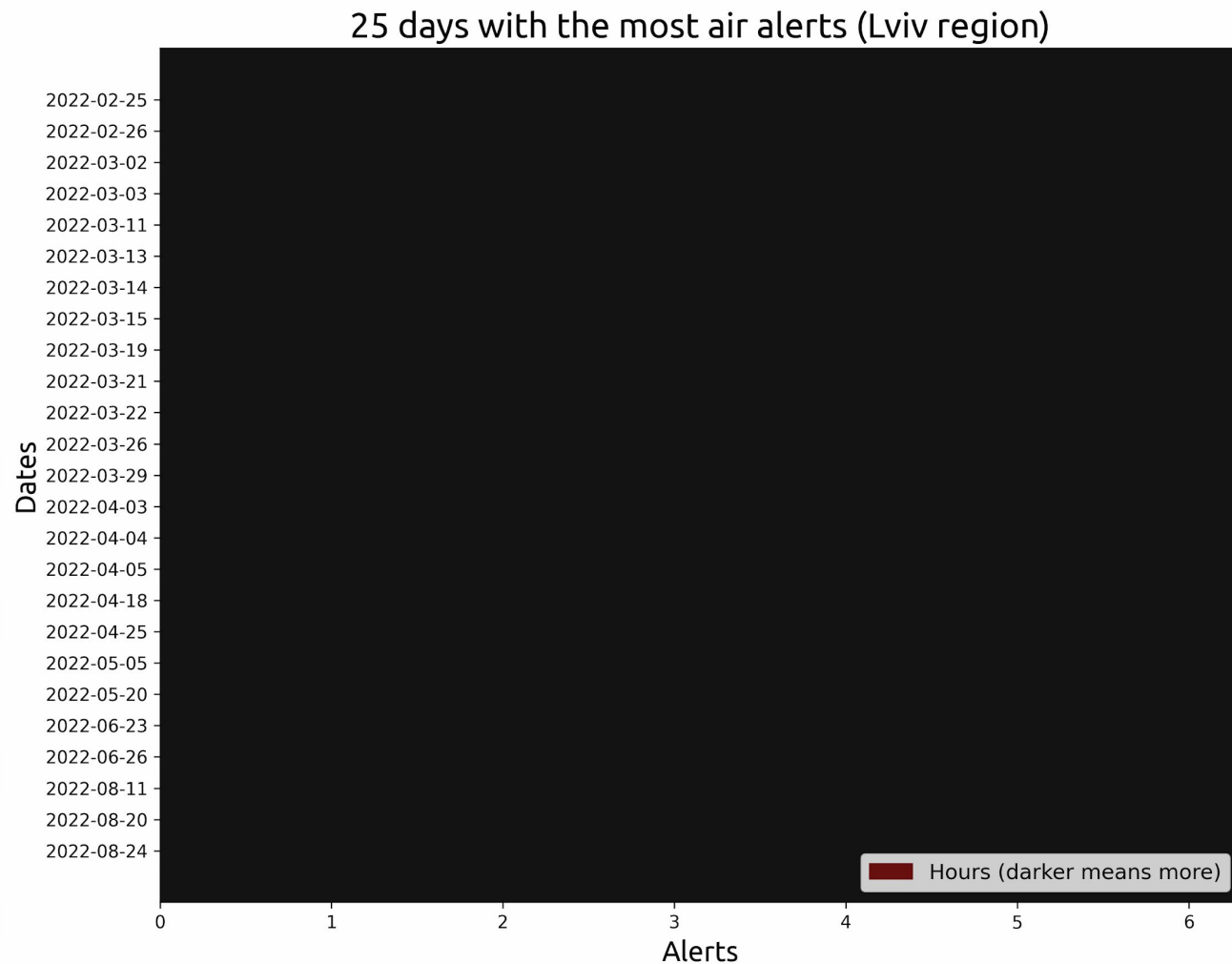
Often enough. But we're far from the frontline, and bombed only with expensive long-range rockets.

0.97 Average alerts per day

0.94 Hours per day in bomb shelters

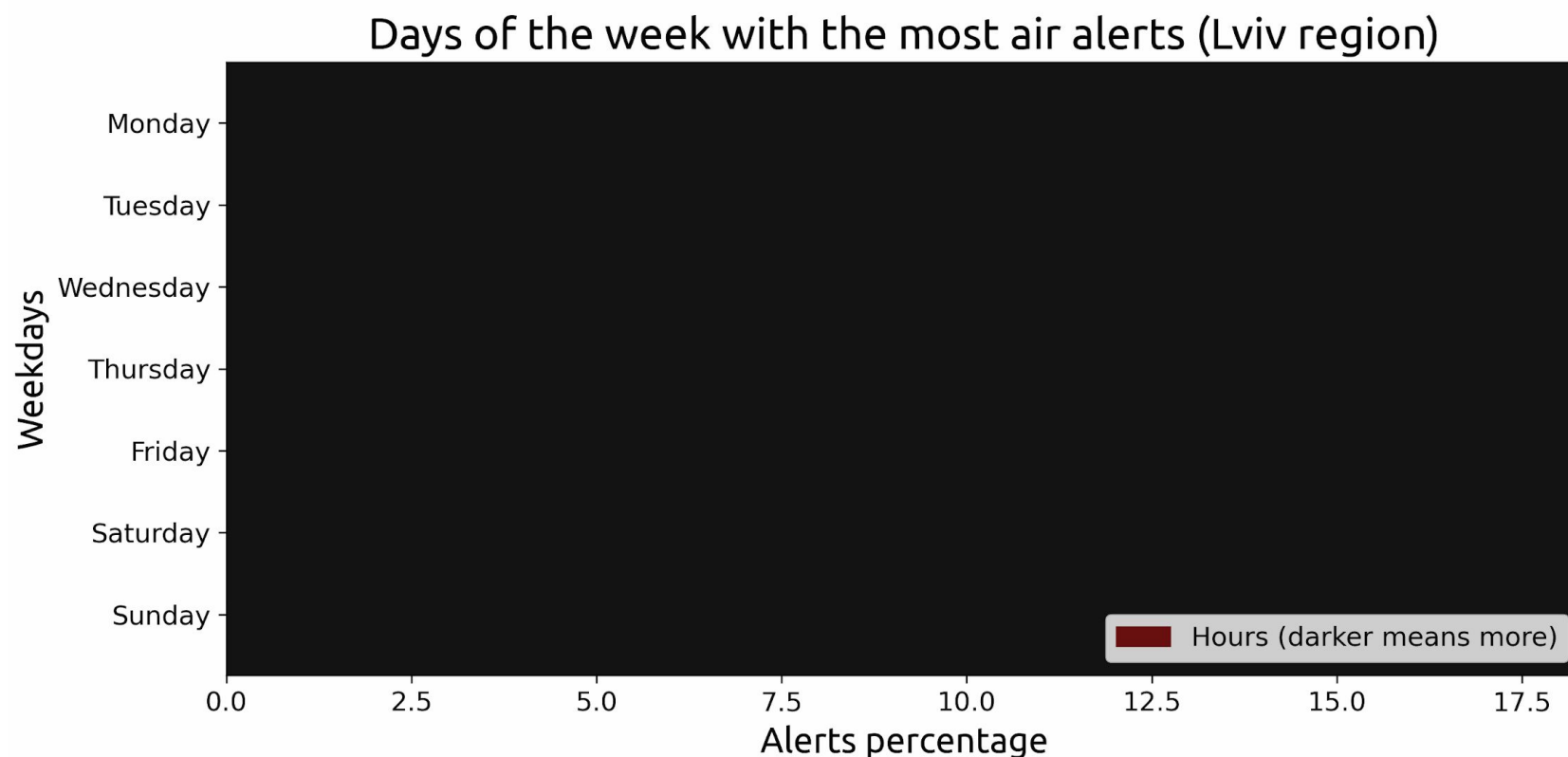
195 Alerts from 25.02.2022 to 14.09.2022

189 Hours spent in bomb shelters



Are there any patterns?

In a way. Two parameters to monitor are the **number of alerts** and the **duration of alerts**.
For example, Sunday usually has fewer alerts than Thursday, but they are longer. And Friday is the calmest day.



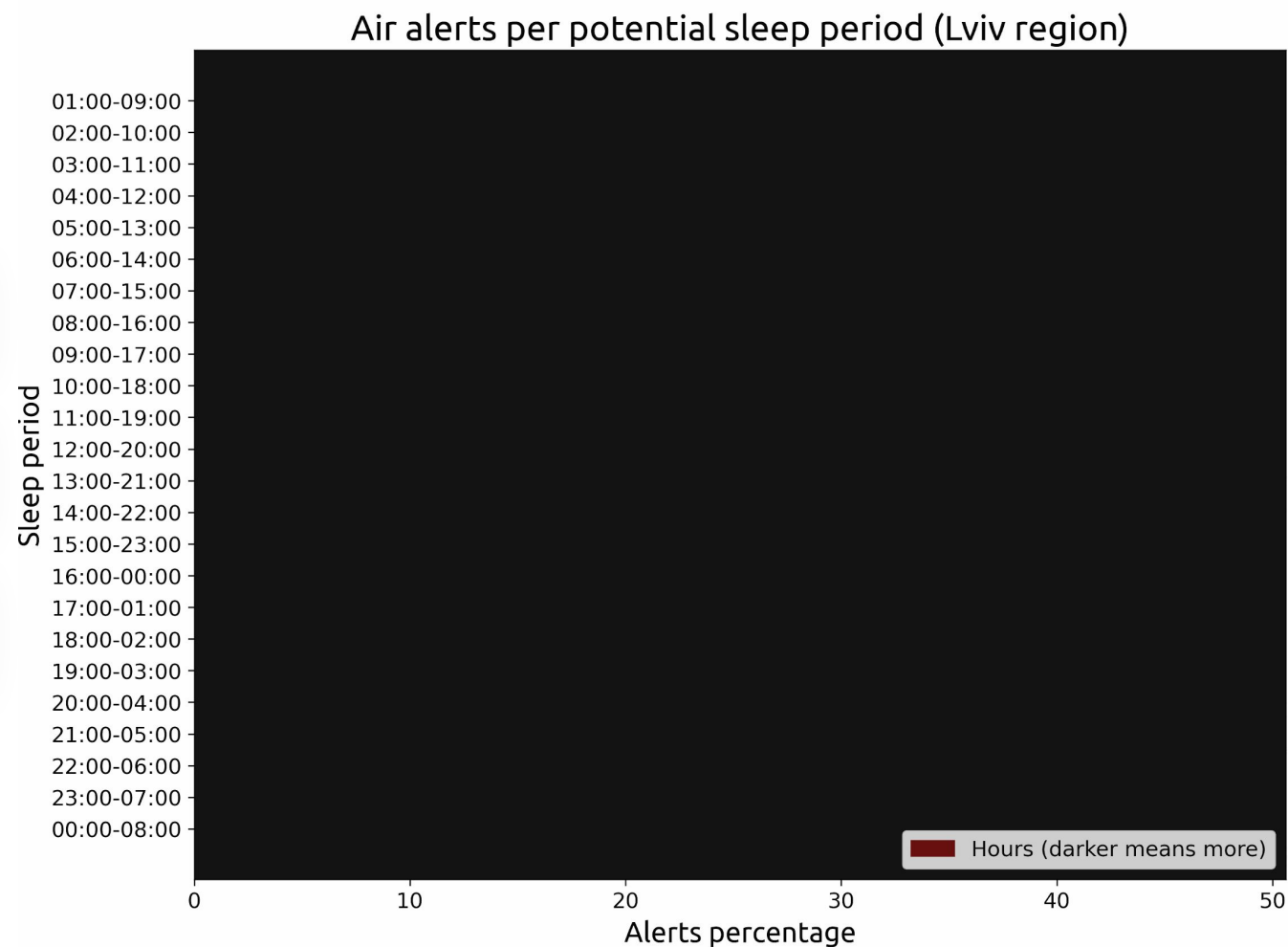
What about sleep?

If we group hours into 8-hour segments, it's clear enough what periods to pick to get the most sleep.

23:00-10:00 The least amount of alerts.

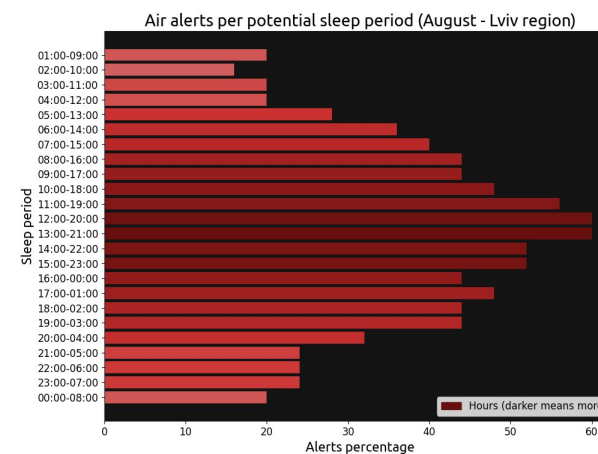
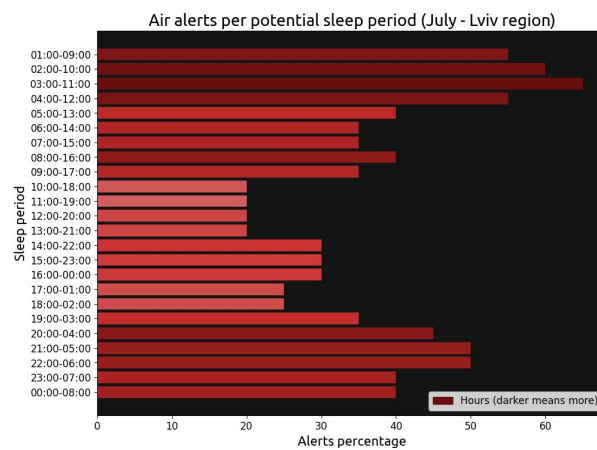
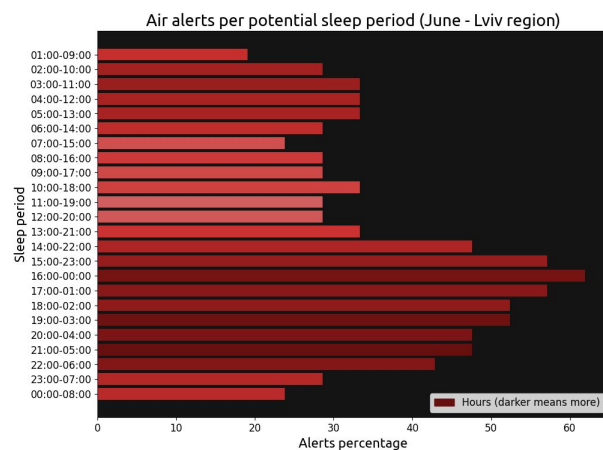
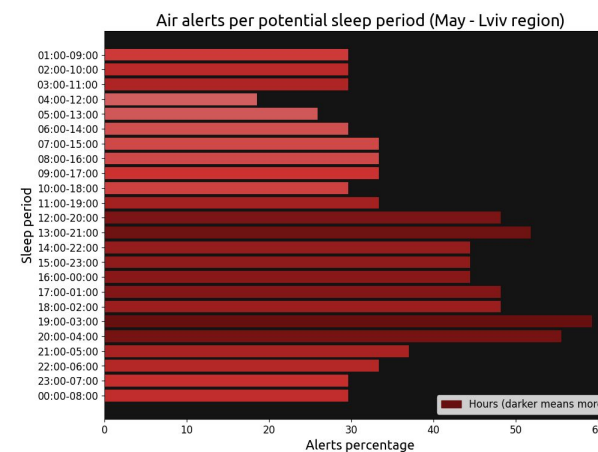
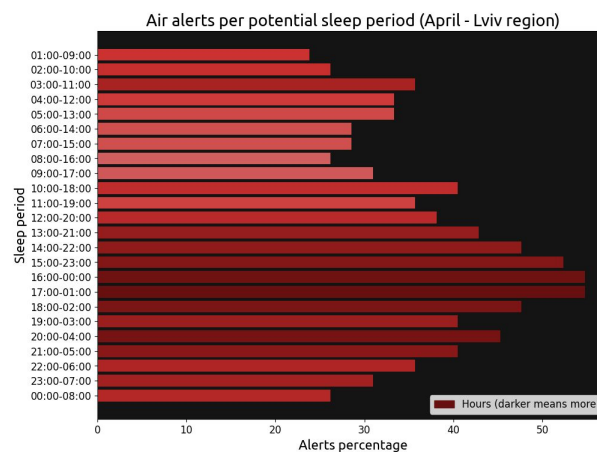
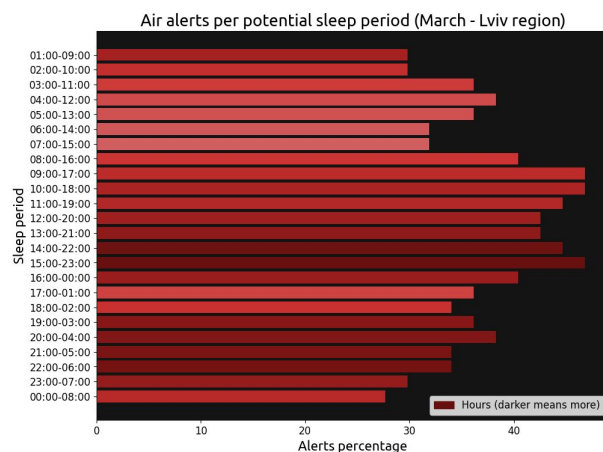
04:00-15:00 A bit more alerts, but they're shorter

14:00-01:00 The worst possible time to sleep



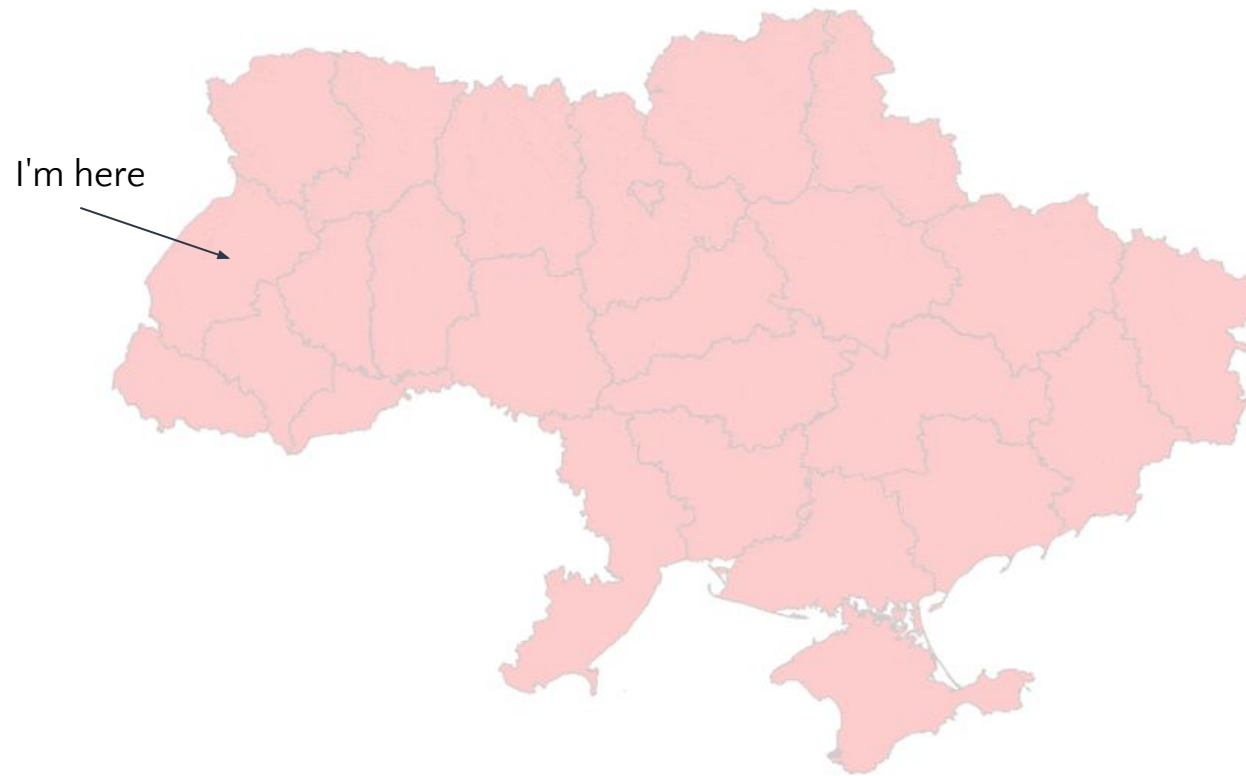
Are there any patterns?

If we monitor the last 6 months, the pattern is similar enough. It's mainly affected by the **Russian ability to use long-range rockets** and the **night/day schedule of artillery teams**.



But what's happening in other regions?

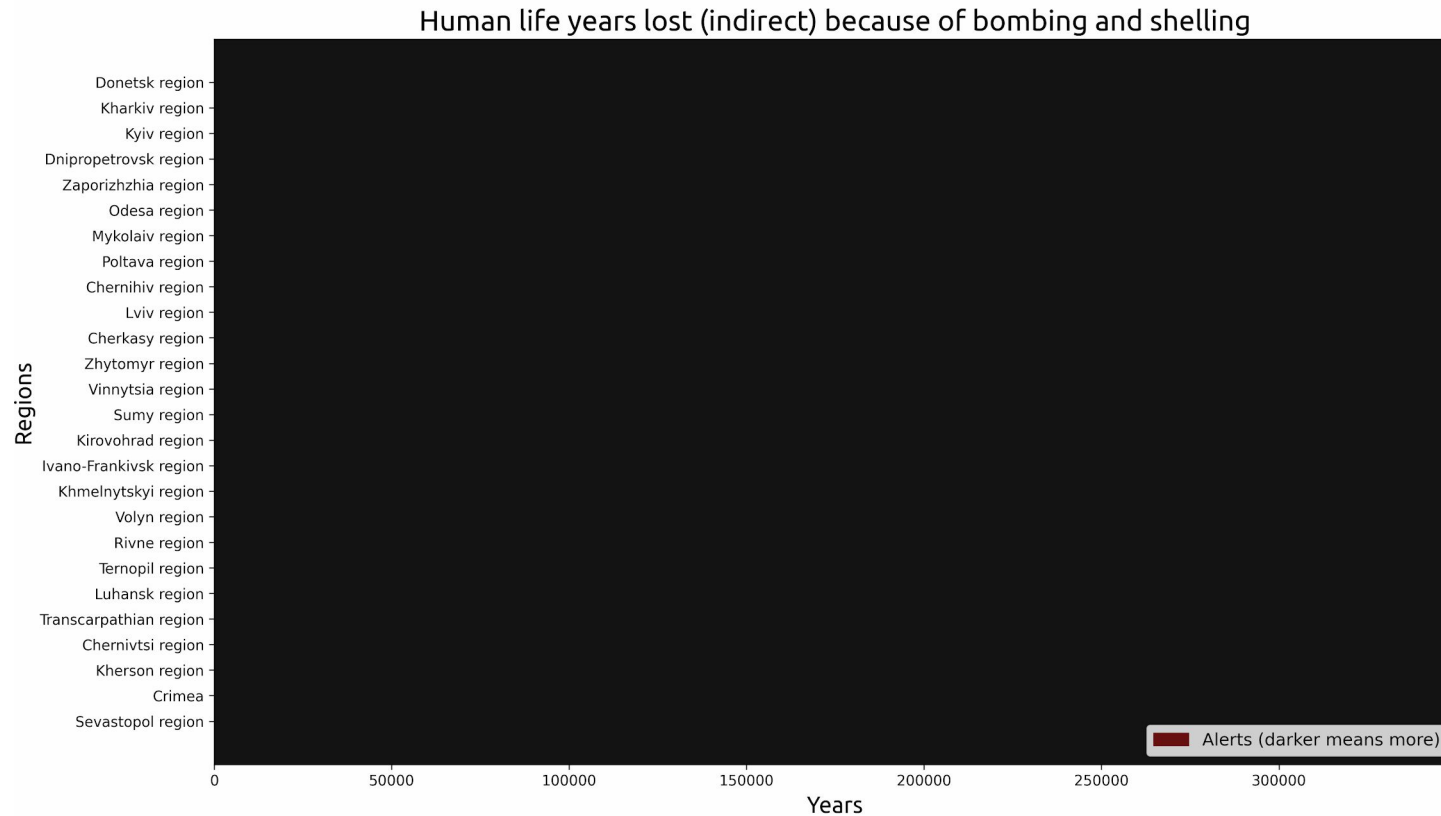
Dynamic from day 1. The darker the color - the more alerts.



So, let's do a bit of live-coding?

The most important bar chart

The grim reality of the war is that rockets don't just kill people. They also kill the time of the ones who survived.



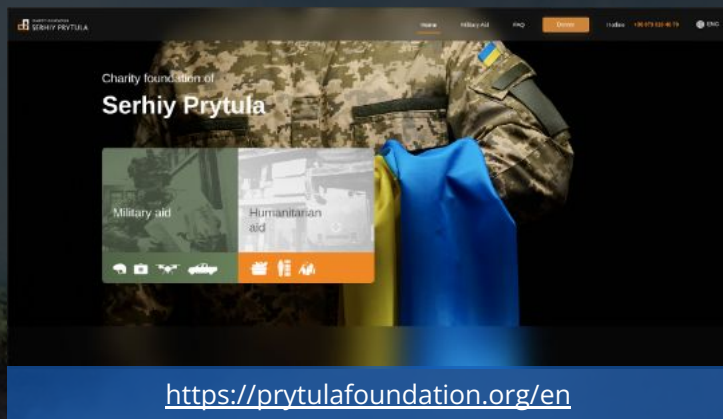
1.9 million Years spent in bomb shelters

=

26000 Lifetimes that never happened

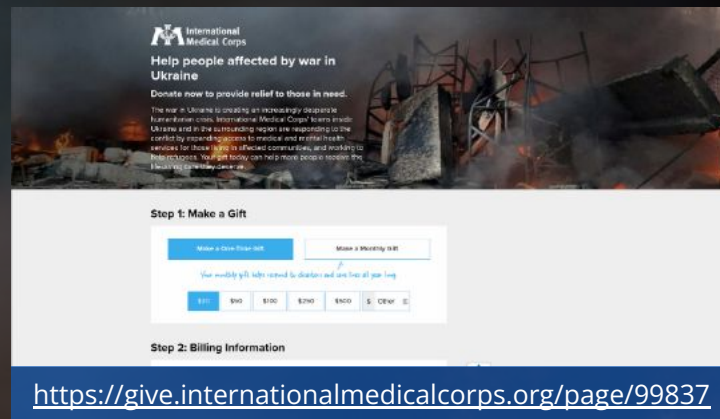
Donations

Humanitarian and Military aid, if you want to help to stop the war



Charity foundation of Serhiy Prytula

- The foundation I donate to the most.
- Regular reports on Twitter and Facebook.



International Medical Corps

- Confirmed and measurable presence in “hot” parts of Ukraine.



MFA of Ukraine

- Repository of charity foundations.
- Ukrainian news in English.

Since the start of the war, my wife and I donated **€7500+** out of our own pocket

THANK YOU

