Building CSV-powered tools for social sciences

csv,conf,v9 2025 in Bologna

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The médialab

The médialab is a social sciences research lab gathering:

- Researchers
- Engineers
- Designers

We have been building **Open-Source** tools geared towards social sciences & civil society at large for 10 years now!

Check out: **https://github.com/medialab/** (https://github.com/medialab/)

A CSV-shaped question

Most of our tools/research use some kind of CSV data

We love CSV so much we wrote a ♥Love Letter♥ !

https://github.com/medialab/xan/blob/master/docs/LOVE_LETTER.md

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Why though?

Because CSV is an affordable, understandable and free data format.

So much so that CSV is a data lingua franca for our research engineering work.

Affordances of tabular data (1/2)

Everybody is familiar with tabular data, at least through spreadsheets:

name	surname	age
Guillaume	Plique	35
Lucy	Miller	37
Marina	Spring	45

Affordances of tabular data (2/2)

Less so with nested or hierarchical data structures like the ones found in JSON:

```
{
  "people": [
    {
      "name": "Guillaume",
      "surname": "Plique",
      "age": 35,
      "friends": ["lucy", "marina"]
    }
  ]
}
```

CSV is simple

The specification holds in the title: **C**omma **S**eparates **V**alues!

(Everyone here knows it's a lie, sure you need to quote values with newlines and double your quotes, but you see the point...)

In any case: it can be explained to anybody in mere **minutes**.

Even more so: the format is so simple you might invent it **yourself**.

(Or should I say **discover** it)

CSV is free (1/2)

Nobody owns the CSV format.

It is and will always be a free and open collective idea.

It is so free it has **no real specification** either.

(Don't force me to rant about RFC 4180, pretty please)

It is so free some disciplines have their own CSV **dialects**:

- bioinformatics: .vcf, .gff, .gtf etc.
- web archives: .cdx etc.

CSV is free (2/2)

You don't need **proprietary** software to process/read/write CSV data.

As a cheeky counterpoint, let's open an Excel file:

```
vim data.xls
```

```
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```

CSV is just text

You can **write** it yourself, to some degree.

You can **read** it yourself, to some degree.

If I hand out some CSV to you, you should be able to understand what's going on very easily in this piece of text.

And you will probably still be able to do so it in 50 years.

CSV is a bridge

CSV can be handled by both **researchers**, **students** and **engineers** alike.

CSV is a bridge between the **spreasheet** world and the **engineering** world.

CSV is a good fit for both **tiny** & **big** data problem.

CSV creates the perfect conditions for the de facto auto-organized **interoperability** of a lot of free tools designed and maintained by many people around the world!

An ethos of sobriety

Altough not exactly a chosen one ;)

- We don't have access to powerful hardware.
- Most of our users (students, researchers, civil society) don't have access to powerful hardware neither.

What makes CSV a sober data format?

CSV is naturally succinct

1. Headers are only written once
2. Strings are optimally represented (except for quotes)
3. Numbers could be lighter, but not by much

CSV is efficient

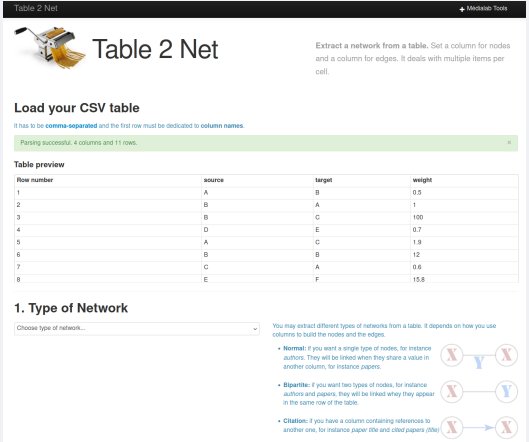
Can you reliably collect billions of tweets without databases, relying only on gigabytes of CSV data?

Sure! (At least this is what we did for years before the evil dude arrived)

CSV can be thought of as a structured append-only log format.

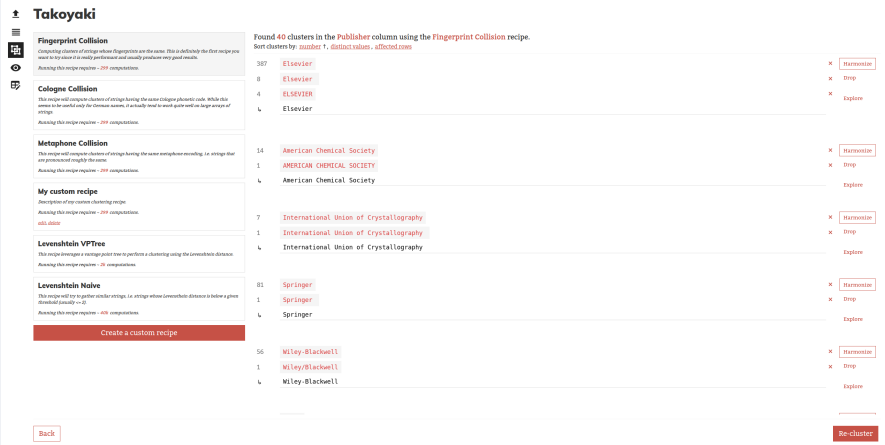
Building tools around CSV (1/5)

- Dedicated web UIs



Building tools around CSV (2/5)

Dedicated web UIs



Building tools around CSV (3/5)

Command line tools

https://github.com/medialab/minet

```
(minet) *[master][~/code/minet]$ minet fetch url -i ftest/resources/urls.csv -o report.csv --resume
```

CSV in, CSV out

Building tools around CSV (4/5)

Command line tools

https://github.com/medialab/xan

```
yomguitheral@hpelitebook:~/code/xan
[master][~/code/xan]$ xan view series.csv -l 21

Displaying 7 cols from 21 first rows of series.csv
```

-	Category	Format	Year	year-date	Units	Revenues in millions	Revenues in millions (Adjus…
0	Tape	8 - Track	1973	1973-01-01	91	489	2815.681824
1	Tape	8 - Track	1974	1974-01-01	96.7	549.2	2848.008609
2	Tape	8 - Track	1975	1975-01-01	94.6	583	2770.409498
3	Tape	8 - Track	1976	1976-01-01	106.1	678.2	3047.215772
4	Tape	8 - Track	1977	1977-01-01	127.3	811	3421.416287
5	Tape	8 - Track	1978	1978-01-01	133.6	948	3717.221411
6	Tape	8 - Track	1979	1979-01-01	102.3	684.3	2409.72569
7	Tape	8 - Track	1980	1980-01-01	85	527	1635.087852
8	Tape	8 - Track	1981	1981-01-01	50	313	880.3150825
9	Tape	8 - Track	1982	1982-01-01	13.7	36	95.37463212
10	Tape	Cassette	1973	1973-01-01	15	76	437.6110811
11	Tape	Cassette	1974	1974-01-01	15.3	87.2	432.1965598
12	Tape	Cassette	1975	1975-01-01	16.2	98.8	469.4964981
13	Tape	Cassette	1976	1976-01-01	21.8	145.7	654.6436714
14	Tape	Cassette	1977	1977-01-01	36.9	249.6	1053.003089
15	Tape	Cassette	1978	1978-01-01	61.3	449.8	1763.71961
16	Tape	Cassette	1979	1979-01-01	78.5	580.6	2044.551711
17	Tape	Cassette	1980	1980-01-01	99	705	2187.356614
18	Tape	Cassette	1981	1981-01-01	124	1062.8	2989.133769
19	Tape	Cassette	1982	1982-01-01	183.2	1384.5	3667.949394
20	Tape	Cassette	1983	1983-01-01	236.8	1810.9	4648.285756
…	…	…	…	…	…	…	…

Building tools around CSV (5/5)

Libraries

https://github.com/medialab/casanova

```
import casanova

with open("cities.csv") as input_file \
     open("enriched-cities.csv") as output_file:

  enricher = casanova.enricher(
    input_file, output_file,
    add=["pop_ratio"]
  )

  for row in enricher:
    ...
```

CSV rewards out-of-the-box engineering

Reading CSV data in reverse

Thanks to backslash-free quote escaping!

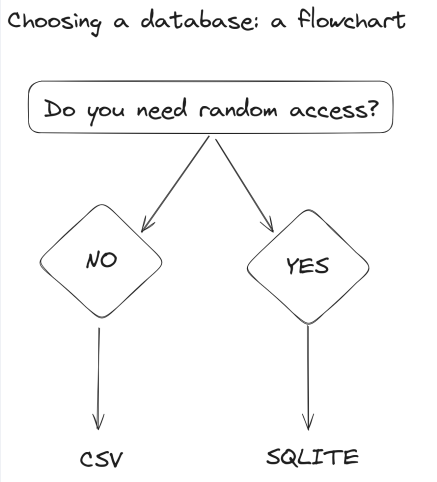
```
# Constant memory!
# Amortized linear time!
xan reverse file.csv
xan tail file.csv
```

Resuming

Thanks to reverse reading!

```
minet fetch url -i posts.csv --resume -o report.csv
```

Conclusion: always bet on CSV!



Thank you for your time !

Some CSV-relevant links:

- médialab's Open Source: https://github.com/medialab/
- Love Letter: https://github.com/medialab/xan/blob/master/docs/LOVE_LETTER.md
- xan: https://github.com/medialab/xan
- minet: https://github.com/medialab/minet
- casanova: https://github.com/medialab/casanova
- table2net: https://medialab.github.io/table2net/
- takoyaki: https://yomguithereal.github.io/takoyaki/
- pelote: https://github.com/medialab/pelote/