Reproducible Self-Publishing via PythonTEX

Introduction and Reference Slides

[github.com/TheChymera/RepSeP]

Horea Christian
[@TheChymera]

Institute for Biomedical Engineering, ETH and University of Zürich

2023-04-11

Publish From Code, Openly.

- Transparency $\longrightarrow$ verifiability.
- Reproducibility $\longrightarrow$ hackability.
- Version management support:
  - `diff` -ability.
  - `blame` -ability.

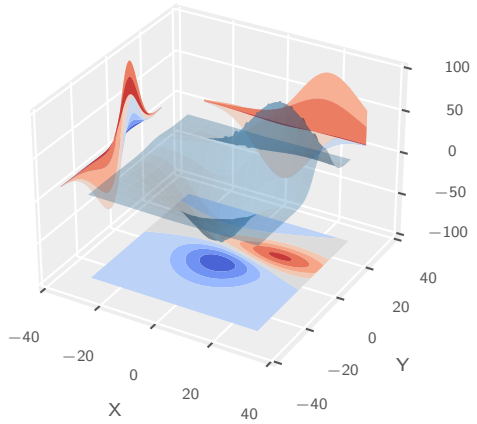
Publish in a Distributed Model, Free.

- No entry barrier $\longrightarrow$ citizen science.
- No institutional bias $\longrightarrow$ free science.
- *Less* publication bias $\longrightarrow$ honest science.
- "Direct Market Access".

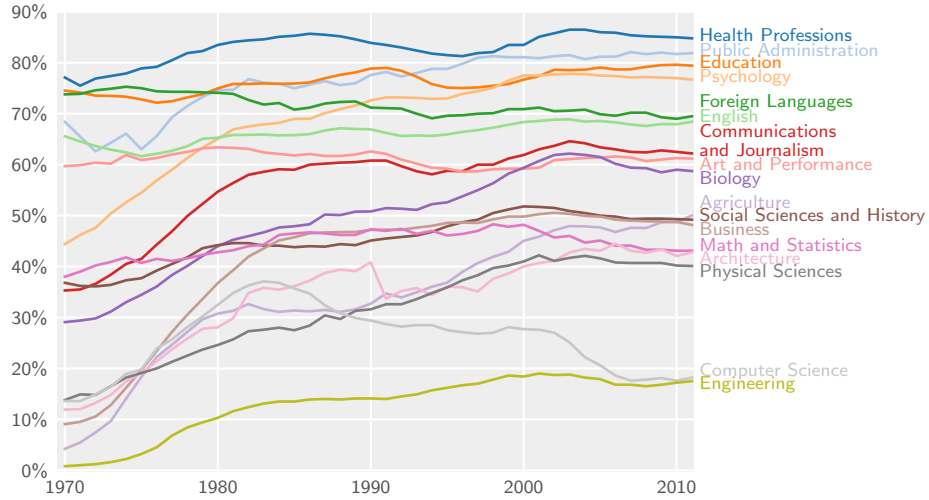
Publish, in a Presentable Format.

- Article.
- Poster.
- Slides.

("Notebooks" integrate poorly with both presentation and development.)

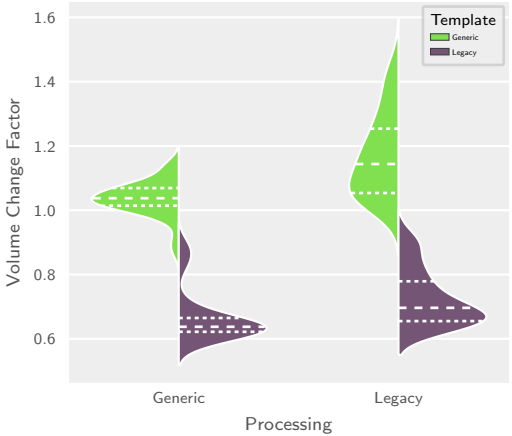


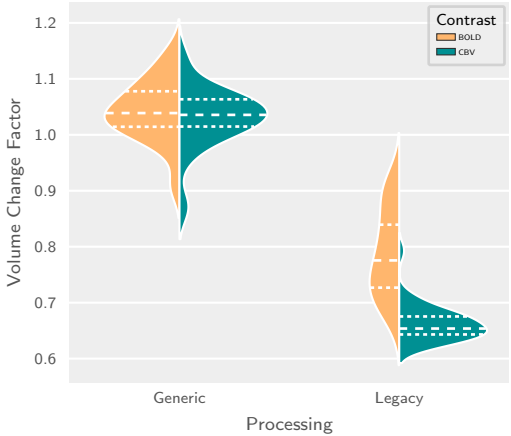
A 3D plot.



Percentage of Bachelor's degrees conferred to women in the U.S.A. by major (1970-2011).

And So Much More





Onset [s]	Duration [s]	Frequency [Hz]	Pulse Width [s]	Wavelength [nm]
333.050000	20.000000	20.000000	0.005000	488.000000
513.050000	20.000000	20.000000	0.005000	488.000000
693.050000	20.000000	20.000000	0.005000	488.000000
873.050000	20.000000	20.000000	0.005000	488.000000
1053.050000	20.000000	20.000000	0.005000	488.000000

Table: BIDS event file table.

Sometimes Less is More

$$F_{1,268} = 10.97,\ p = 0.0011$$

But Sometimes You Just Want More

- Processing Factor: $F_{1,268} = 72.8$, $p = 1.07 \times 10^{-15}$
- Template Factor: $F_{1,268} = 1333$, $p = 5.13 \times 10^{-106}$
- Processing:Template Intearction: $F_{1,268} = 10.97$, $p = 0.0011$

Typesetting the Previous Radar Plot

```
\py{
    pytex_fig('scripts/radar.py',
        label='radar',
        caption='A radar plot.',
        )
    }
```

Typesetting the Previous Table

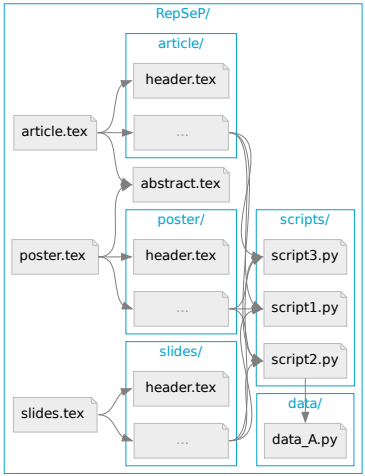
```
\py{
    pytex_tab(
        script='scripts/stim_table.py',
        label='sp',
        caption='BIDS event file table.',
        options_pre='\\centering \\resizebox{0.5\\textwidth}{!}{',
        data='data/JogB.tsv',
        options_post='}',
        )
    }
```

Typesetting the Previous Inline Statistic

```
\py{
    pytex_printonly('scripts/drs_activityANOVA.py')
    }
```

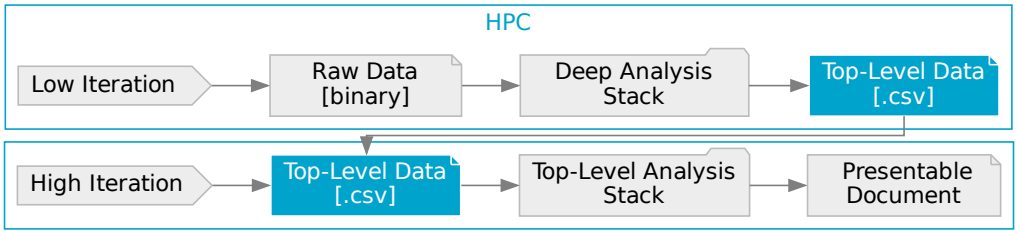
The Framework Topology

- Reduced information duplication.
- Continuous development support.



The Workflow

- Asynchronous offloading for time-consuming analysis.
- Separate packaging for deep analysis stacks.



Minimal First-Level Dependencies

```
RDEPEND="
        dev-python/matplotlib[${PYTHON_USEDEP}]
        dev-python/numpy[${PYTHON_USEDEP}]
        dev-python/pandas[${PYTHON_USEDEP}]
        dev-python/pygments[${PYTHON_USEDEP}]
        dev-python/seaborn[${PYTHON_USEDEP}]
        dev-python/statsmodels[${PYTHON_USEDEP}]
        >=dev-tex/latex-beamer-3.41
```

Following the Package Manager Standard (PMS):

- Because dependency graphs should never be managed ad hoc.

Co-Author the Reference Implementation

- The `article.tex` reference document is still in early draft.
- You can contribute, fork, and publish it however you want.

Gain the Best Exposure for Your most Underexposed Work

- Pay-for-Paywall vs. “Direct Market Access”.

Gain the Best Exposure for Your most Underexposed Work

- Pay-for-Paywall vs. “Direct Market Access”.