A Decentralized Science framework for CrunchDAO

Introduction

Reference Projects

- DeSci Nodes
- Peer Review
- Ants-Review
- PRINCIPIA: a Decentralized Peer-Review Ecosystem: paper and article
- DeSci World
- IPLD
- Radicle
- openjournals-draft-action
- inara

DeSci framework for decentralized paper writing

In the process of setting this up, document design choices and use them to populate a first paper talking about its underlying technology.

- Integrate LaTeX/Markedown + Python.
- Generate papers with github actions.
- Render paper in CrunchDAO website and build UX for easy reviews/comments/pull requests.
- Integrate ResearchRabbit or something like it;
- Integrate SciHub, libgen and others in the backend.
- Integrate knowledge graphs, once out, from Lateral

The research paper(s) V1.0: Cover the CrunchDAO investment rationale

- Start from website+documentation, 2 medium articles, CrunchDAO website.

- Study NumerAI and RocketCapital and understand differences.
- Record long technical deep talk with Jean to understand everything.
- Layer 1 vs Layer 2 in CrunchDAO
- Understand and document Udit work:
  - Barra Risk Factor Analysis;
  - Idiosyncratic Risk;
  - Risk-Adjusted Return;
  - Sharpe Ratio;
  - Spearman's rank correlation coefficient
- Digest and document "Crowdsourced Investment Research Through Tournaments" and Lopez de Prado more in general;
- How can people add different datasets?

Aggregate the scientific community

Filter these in the subsections below:

- Kind of council of elders of top crunchers: identify and engage top scientific profile from the community
- Allow elders to interact with the research paper in a DeSci way
- Orchestrate the call for signal and Cherry peek the best signals
- Work on the definition of KPIs. Some ideas:
  - Number of interaction on the paper
  - Median signal performance (Sharpe, ROI, DD)
  - Number of interaction with the podcasts.
  - Some way to evaluate the engagement of the syndacate.

NFTs

At the beginning, we gift an NFT to people we want as advisors and having one leads to being able to give a feedback on the paper. See here and here. This will allow people to join the GROUP OF COOL PEOPLE YET TO BE NAMED (Mathematical syndicate?).

The NFTs could be about stochastic processes (video+audio), and about financial models more in general.

Then we vote with tokens to decide whether the pull request on the paper is accepted or not. Voting on the papers shall become part of civil duties. How will be individual decisions be integrated into the final one? More token more power, one head one vote? Or something fancy like "A Flexible Design for Funding Public Goods". Or something like this?

What is the role of SBTs here? Decentralized Society: Finding Web3's Soul.

The outcome of the peer review changes your grade in the DAO which changes your access to the APY, Alternative idea, you stake on the pull request and if it is bad you lose.

For all this, we need IPFS + git. See here, maybe.

Social Presence (Talk with Ben for this)

- Stardust Podcast (or alternative one?) The crunch podcast ? 2 / month? Maybe call it Matteo podcast and talk about CrunchDAO. Talk about the models, talk about the results.
- LinkedIn
- Twitter
- Medium, or maybe Mirror better?
- Youtube
- Anchor

R&D finance

- The research paper(s) V1.0: Cover the CrunchDAO investment rationale
- Iterate once every 4 weeks on a new update of the paper
- KPIs
  - MM Sharpe
  - Backtest
    - MM ROI - backtest
    - MM DD - backtest
    - Competition OWEN and Spearman

Methodology

This article describes the features of the Journal of Open Source Software (Smith et al. 2018) publishing pipeline. The publishing method is similar to the model described by Krewinkel and Winkler (2017), in that Markdown is used as the input format. The author-provided files serves as the source for all generated publishing artifacts.

Statement of Need

The journal publisher, in most cases where you'd be reading this, Open Journals, maintains a detailed and helpful article on the requirements that articles must satisfy in order to be considered for publication in that journal. However, submission requirements do not help with the technical aspects of paper writing.

The process for JOSS and similar journals is different, in that the paper should be written in the lightweight markup language *Markdown*. # Markdown primer

Markdown is based on email conventions. It was developed by John Gruber and Aaron Swartz. This section provides a brief introduction to Markdown syntax. Certain details or alternatives will be omitted,

If you are already familiar with Markdown, then you may want to skip this section and continue with the description of [article metadata].

Inline markup

The markup in Markdown should be semantic, not presentations. The table below gives a small example.

Table 1: Basic inline markup and examples. ### Images

Markup	Markdown example	Rendered output
emphasis	`*this*`	*this*
strong emphasis	`**that**`	**that**
strikeout	`~~not this~~`	~~not this~~
subscript	`H~2~O`	H_2O
superscript	`Ca^2+^`	Ca^{2+}
underline	`[underline]{.ul}`	underline
small caps	`[Small Caps]{.sc}`	Small Caps
inline code	`` `return 23` ``	`return 23`

Markdown syntax for an image is that of a link, preceded by an exclamation mark `!`.

The main use of images in papers is within figures. An image is treated as a figure if

1. it has a non-empty description, which will be used as the figure label and
2. it is the only element in a paragraph, i.e., it must be surrounded by blank lines.

Images that are larger than the text area are scaled to fit the page. It can sometimes be useful to give images an explicit height and/or width, e.g. when adding an image as part of a paragraph. The Markdown `![Nyan cat](nyan-cat.png){height="9pt"}` includes the image "nyan-cat.png"  while scaling it to a height of 9 pt.

Citations

Bibliographic data should be collected in a file `paper.bib`; it should be formatted in the BibLaTeX format, although plain BibTeX is acceptable as well. All major

citation managers offer to export these formats.

Cite a bibliography entry by referencing its identifier: `[@upper1974]` will create the reference "(Upper 1974)". Omit the brackets when referring to the author as part of a sentence: "For a case study on writers block, see Upper (1974)." Please refer to the pandoc manual for additional features, including page locators, prefixes, suffixes, and suppression of author names in citations. ### Footnotes

Syntax for footnotes centers around the "caret" character `^`. The symbol is also used as a delimiter for superscript text and thereby mirrors the superscript numbers used to mark a footnote in the final text.[1]

```
Articles are published under a Creative Commons license[^1].
Software should use an OSI-approved license.

[^1]: An open license that allows reuse.
```

Note numbers do not have to be sequential, they will be reordered automatically in the publishing step. In fact, the identifier of a note can be any sequence of characters, like `[^marker]`, but may not contain whitespace characters.

The above example results in the following output:

> Articles are published under a Creative Commons license[2]. Software should use an OSI-approved license.

Lists

Bullet lists and numbered lists, a.k.a. enumerations, offer an additional method to present sequential and hierarchical information.

- apples
- citrus fruits
  - lemons
  - oranges

Enumerations start with the number of the first item. Using the the first two laws of thermodynamics as example.

0. If two systems are each in thermal equilibrium with a third, they are also in thermal equilibrium with each other.
1. In a process without transfer of matter, the change in internal energy, ΔU, of a thermodynamic system is equal to the energy gained as heat, Q, less the thermodynamic work, W, done by the system on its surroundings.

$$\Delta U = Q - W$$

Internal references

[1] Although it should be noted that some publishers prefer symbols or letters as footnote markers.

[2] An open license that allows reuse.

Markdown has no default mechanism to handle document internal references, often called "cross-references". This conflicts with goal of Open Journals is to provide authors with a seamless and pleasant writing experience. This includes convenient cross-reference generation, which is why a limited set of LaTeX commands are supported. In a nutshell, elements that were marked with `\label` and can be referenced with `\ref` and `\autoref`.

Figure 1: View of coastal dunes in a nature reserve on Sylt, an island in the North Sea. Sylt (Danish: *Slid*) is Germany's northernmost island.

Tables and figures

Tables and figures can be referenced if they are given a *label* in the caption. In pure Markdown, this can be done by adding an empty span `[]{label="floatlabel"}` to the caption. LaTeX syntax is supported as well: `\label{floatlabel}`.

Link to a float element, i.e., a table or figure, with `\ref{identifier}` or `\autoref{identifier}`, where `identifier` must be defined in the float's caption. The former command results in just the float's number, while the latter inserts the type and number of the referenced float. E.g., in this document `\autoref{proglangs}` yields "**??**", while `\ref{proglangs}` gives "**??**".

Table 2: Comparison of programming languages used in the publishing tool.

Language	Typing	Garbage Collected	Evaluation	Created
Haskell	static, strong	yes	non-strict	1990
Lua	dynamic, strong	yes	strict	1993
C	static, weak	no	strict	1972

Equations

Cross-references to equations work similar to those for floating elements. The difference is that, since captions are not supported for equations, the label must be included in the equation:

```
$$a^n + b^n = c^n \label{fermat}$$
```

Referencing, however, is identical, with `\autoref{eq:fermat}` resulting in "section ".

$$a^n + b^n = c^n$$

Authors who do not wish to include the label directly in the formula can use a Markdown span to add the label:

```
[$$a^n + b^n = c^n$$]{label="eq:fermat"}
```

Pandoc

Readers may wonder about the reasons behind some of the choices made for paper writing. Most often, the decisions were driven by radical pragmatism. For example, Markdown is not only nearly ubiquitous in the realms of software, but it can also be converted into many different output formats. The archiving standard for scientific articles is JATS, and the most popular publishing format is PDF. Open Journals has built its pipeline based on pandoc, a universal document converter that can produce both of these publishing formats – and many more.

A common method for PDF generation is to go via LaTeX. However, support for tagging – a requirement for accessible PDFs – is not readily available for LaTeX. The current method used ConTeXt, to produce tagged PDF/A-3, a format suited for archiving ("Document Management – Electronic Document File Format for Long-Term Preservation – Part 3: Use of ISO 32000-1 with Support for Embedded Files (PDF/A-3)" 2012).

References

"Document Management – Electronic Document File Format for Long-Term Preservation – Part 3: Use of ISO 32000-1 with Support for Embedded Files (PDF/A-3)." 2012. Standard. Geneva, CH: International Organization for Standardization.

Krewinkel, Albert, and Robert Winkler. 2017. "Formatting Open Science: Agilely Creating Multiple Document Formats for Academic Manuscripts with Pandoc Scholar." *PeerJ Computer Science* 3 (May): e112. https://doi.org/10.7717/peerj-cs.112.

Smith, Arfon M., Kyle E. Niemeyer, Daniel S. Katz, Lorena A. Barba, George Githinji, Melissa Gymrek, Kathryn D. Huff, et al. 2018. "Journal of Open Source Software (Joss): Design and First-Year Review." *PeerJ Computer Science* 4 (February): e147. https://doi.org/10.7717/peerj-cs.147.

Upper, D. 1974. "The Unsuccessful Self-Treatment of a Case of "Writer's Block"." *Journal of Applied Behavior Analysis* 7 (3): 497. https://doi.org/10.1901/jaba.1974.7-497a.