Can we scale open-source development by removing the need for iconic and self-sacrificing leaders?

Simon Carbonnelle

ISP seminar

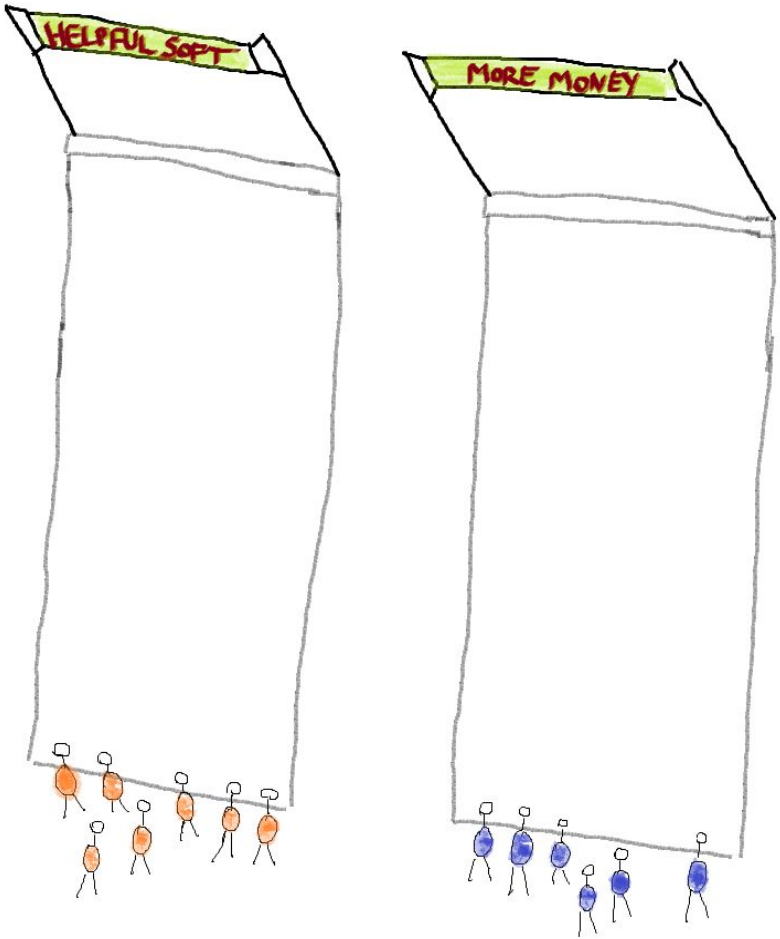
2nd of October 2019

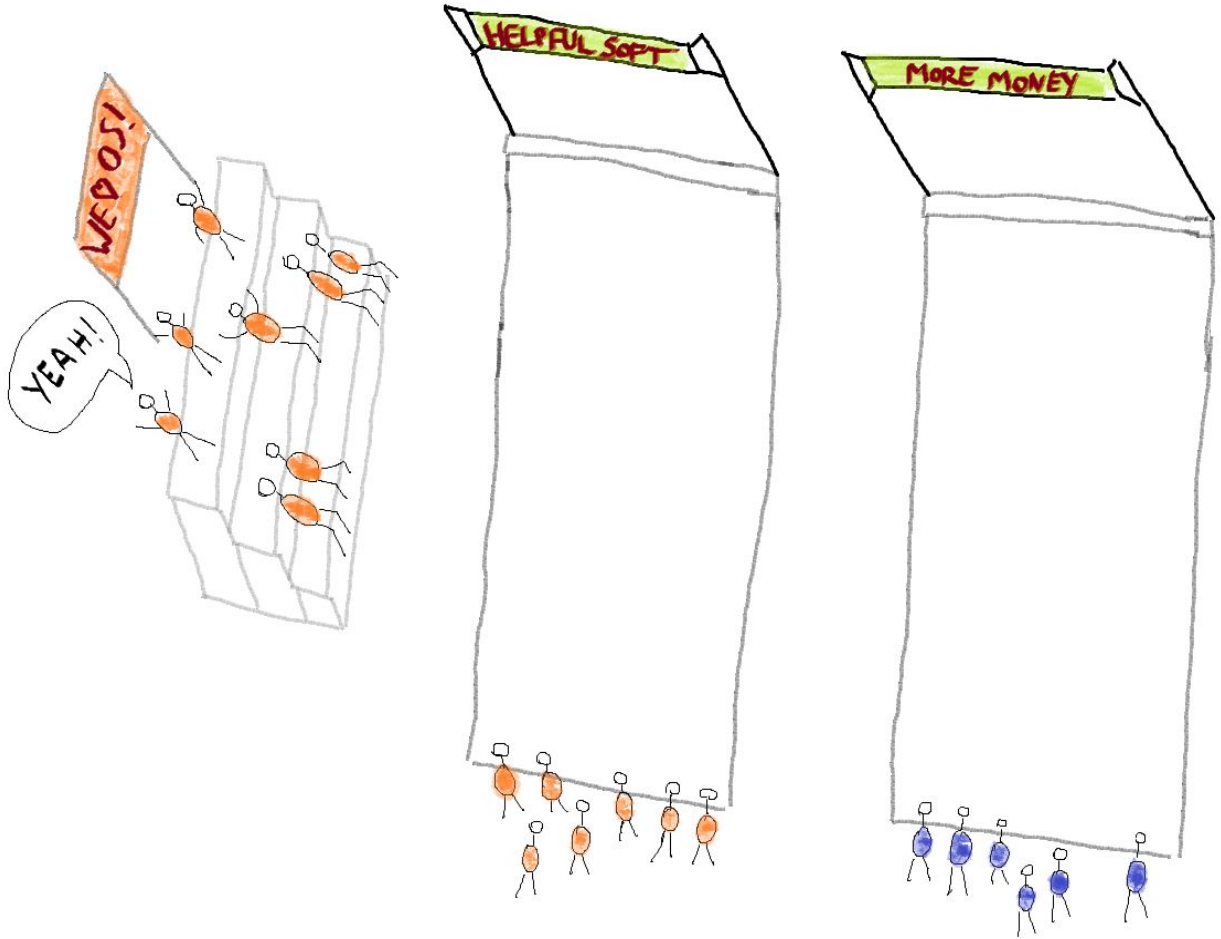
Open-source

Users have the rights to study, change, and distribute the software to anyone and for any purpose.

Proprietary

The software's publisher or another person retains intellectual property rights.


HELPFUL SOFT
MORE MONEY


WEBOS!
YEAH!
HELPFUL SOFT
MORE MONEY

WEBOS!
Oh...
HELPFUL SOFT
POUF
PAF
THAT'S NOT FOR ME...
MORE MONEY
WHAT A NICE WALK!

1. Understand the problems of open-source

2. Explore how we can rebalance forces

Why do individuals participate?

Organizational culture: the vision/values and social aspects of an organization

Open-source attracts members mainly through the cultural aspect of work.

Private sector attracts members mainly through salaries/compensations.

Which poses huge **constraints** for open-source:

- **Vision alignment or politics (Problem 1)**
  The organization needs a transparent and shared vision
- **Quality of social interactions (Problem 2)**
  Interactions between members need to be positive and stimulating

Vision alignment or politics

Examples from **open-source**

Fork off! FFmpeg project leader quits, says he's had enough with these forking AV libraries

Won't have Niedermayer to kick around anymore

By Neil McAllister in San Francisco 5 Aug 2015 at 07:01 47 SHARE ▼

"The FFmpeg development model was fairly simple: the biggest FFmpeg contributor (Michael Niedermayer, see stats) was **the "self-proclaimed" maintainer**."

"**The main complaints** I saw mentioned and remember from that time **were about the project leader**. It was all about "I do and commit whatever I want to", "I don't care about cosmetics", "I don't want to discuss with you in real life, mails are good enough". "

Result: Community splitted into two forks... frustrating contributors and users

Vision alignment or politics

Examples from **open-source**

Why Neovim is Better than Vim

15 Jan 2015

“The codebase is atrocious. The plugin API is cumbersome and restrictive. The dev community is apathetic. The benevolent dictator is averse to change.”

“Speaking of Bram Moolenaar: **His merge criteria are inscrutable**. Some patches he ignores. Some, he attacks. Others, he merges.”

Result: Community splitted into two forks…

Quality of social interactions

Examples from **open-source**

Project management at diaspora* - or: what the heck am I doing here?

Governance

[redacted] commented on May 14, 2016 — Member

I'm sorry, Senya, but this PR is absolutely wasted work. **@SuperTux88** has refactored large portions of that code already:

- SuperTux88@ `3df1fb8`
- SuperTux88@ `ebb6d0e`

There is no point in merging this and I am not going to merge this since it will cause a lot of work to rebase his work. Sorry, but you are aware of his work and you should really communicate before touching anything regarding the federation layer.

"The problem is that **the way you talk to people drive contributors away**. This is my case. And I assume that this was also the case of Jason.

You may be doing fantastic technical work, I won't judge that. But in the end, it remains that non-ore devs have to work with you to contribute. And this is my opinion on the matter : **working with you is not fun**. And this is a problem because **working for a free projet has to be fun to attract new contributors.**"

Vision alignment + social interactions

Examples from **open-source**

After governance breakdown, Node.js leaders fight for its survival

The tumultuous events this week in the Node.js community were a long time coming. Insiders tell ZDNet how the community is trying to repair — and prepare for what's to come.

By Zack Whittaker | August 25, 2017 -- 22:00 GMT (23:00 BST) | Topic: Open Source

"**Rod's behavior** was non-collaborative, consistent, and unapologetic," said Williams

The resignations followed a single event -- a **vote that failed to remove** a former director, a longstanding member of the community, from the leadership group.

Result: a **third of the technical steering committee quits**, a new fork is launched with core members

"I'm confident that **the individuals who voted on this didn't quite realize** how big of a thing this was going to be"

Vision alignment or politics

Examples from **private sector**

Inside Google's Civil War

Some employees say Google is losing touch with its "Don't be evil" motto. What happens when an empowered tech workforce rebels?

By Beth Kowitt

May 17, 2019

February 2018 PROJECT MAVEN LEAKS: Most employees **learn for the first time** that the Pentagon was using the company's A.I. to analyze drone footage.

August 2018 DRAGONFLY LEAKS: The Intercept reports that Google is working on a censored search engine in China; **it's the first time most employees are hearing of the project.**

Results: "Jack Poulson says he was the **sixth or seventh employee** to cite Dragonfly as a reason for quitting."

Out of 100.000 employees!!!

Vision alignment or politics

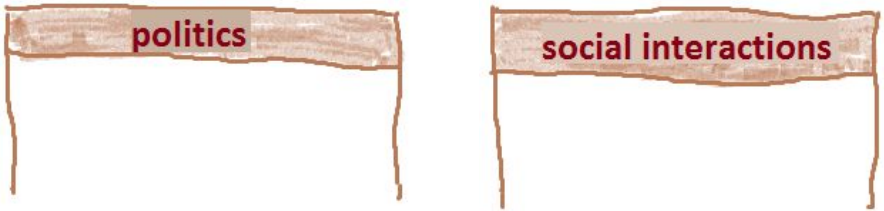
Examples from **private sector**

The New York Times

Dozens at Facebook Unite to Challenge Its 'Intolerant' Liberal Culture

"The activity is **a rare sign of organized dissent** within Facebook"

1. Understand why open-source is losing



2. Explore how we can rebalance forces

How to make use of the available workforce?

Open-source contributors are mainly hobbyists, and demand
flexible and lightweight workloads...

... but **full-timers are needed** in practice when an organization scales.

(Problem 3)

Flexible and lightweight workloads

Examples from **open-source**

Not too long ago I started an open source project called fastlane. Just a month after publishing, it had 1000+ stars on GitHub and was beginning to get used by lots of serious tech companies around the world. **Soon I was the sole maintainer of a project getting 10+ PRs/day, and spending 8+hrs/day reviewing PRs and replying to questions on GitHub**.

Flexible and lightweight workloads

Examples from **open-source**

“People who maintain the project – the coreteam – these are who are responsible for **planning, QA, code review, releases, they are the bottleneck.**”

“So **there are enough people who write code**. But it gets painfully long to get the code reviewed and merged.”

Flexible and lightweight workloads

Examples from **open-source**

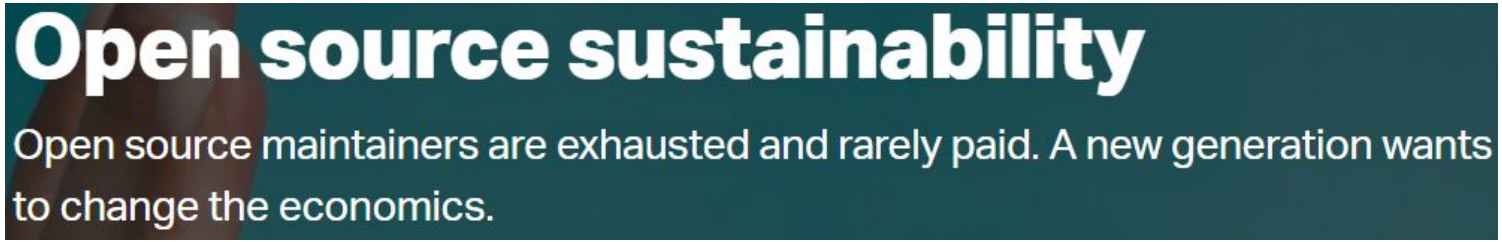
[FFmpeg-devel] FFmpegs future and resigning as leader

Michael Niedermayer michael at niedermayer.cc
Fri Jul 31 15:53:04 CEST 2015

"Indeed i fully admit **the work and pressure caused by the merges** is a main reason for my resignation."

Flexible and lightweight workloads

Examples from **open-source**



"Working day jobs, **maintainers today can struggle to find the time** to fix critical bugs, all the while facing incessant demands from users requesting free support on GitHub. **Maintainer burnout is a monstrous challenge.**"

A complete report: "*Roads and Bridges: The Unseen Labor Behind Our Digital Infrastructure*"

1. Understand why open-source is losing

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Current practical solutions

Elaborated political systems

- Technical steering committee
- Community committee/ Community Council
- Elections (representative democracy)
- Constitution
- Code of Conduct/ Social Contracts

Current practical solutions

Funding

"open your finances to your community"

"The best way for artists and creators to get sustainable income and connect with their fans"

Popular “theoretical” solutions

Towards radically different forms of organization

- Decentralization, DAO’s (blockchain-based)

“An organization represented by rules encoded as
a computer program that is transparent, controlled
by shareholders and not influenced by a central government.”

- Horizontal organizations, holacracy, sociocracy, ...

“An organizational structure with few or no levels
of middle management between staff and executives”

Not just about open-source!

Group decision making

From theory to practice?

My best guess

Tools that **increase our ability to cooperate on intellectual tasks at scale** are a crucial ingredient.

Getting better at thinking together

How? We can get there by augmenting our communication protocols with:

1) **Structure**: the relation between ideas/pieces of information is explicit
2) **Value-based feeds**: participants can share the value they confer to content

Structure

Examples

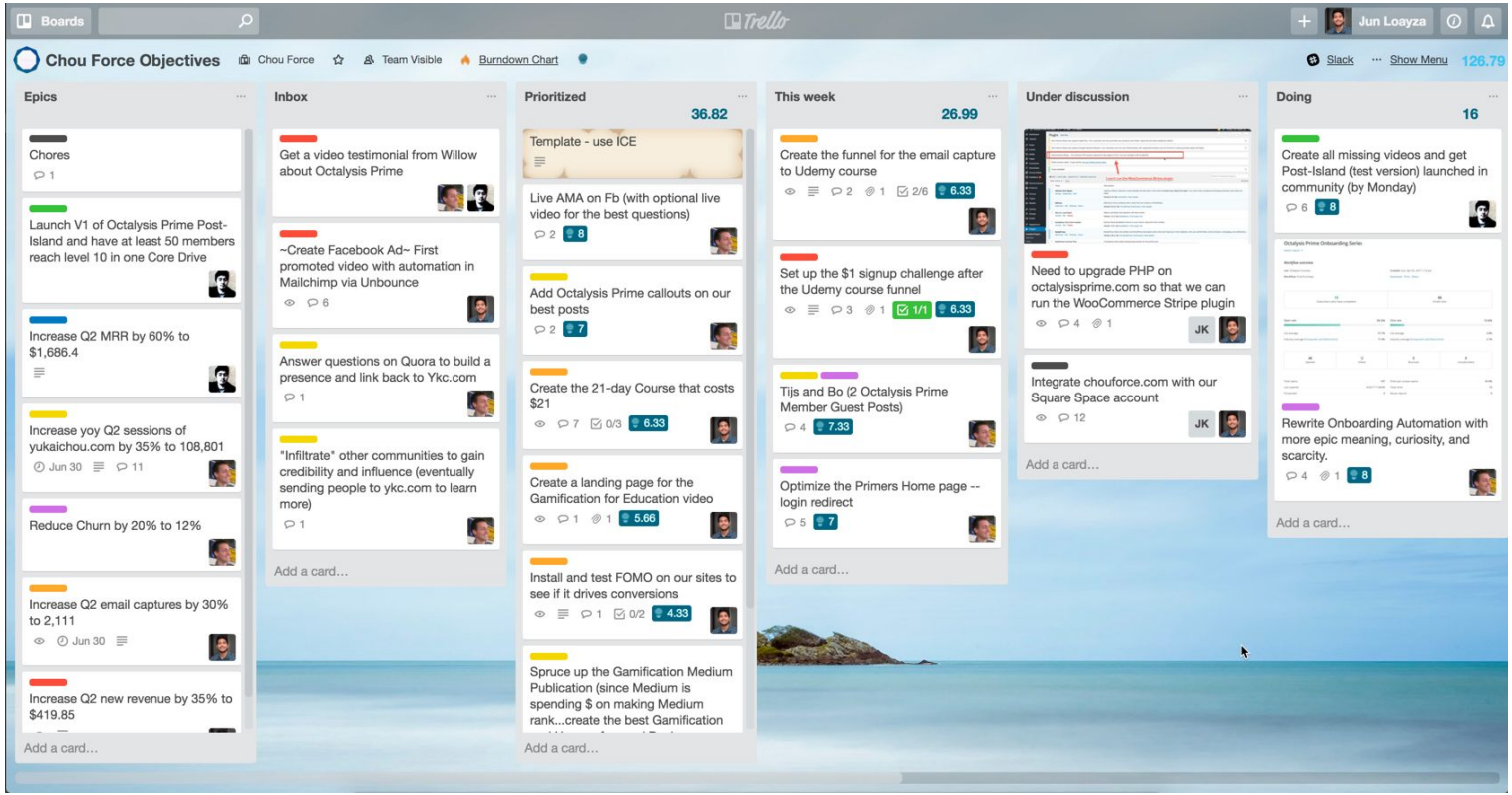
(Framadate is a nice open-source alternative)

Arranging events through e-mail is a pain…

… Doodle solves the problem by offering a **structured** way to communicate around this task

Structure

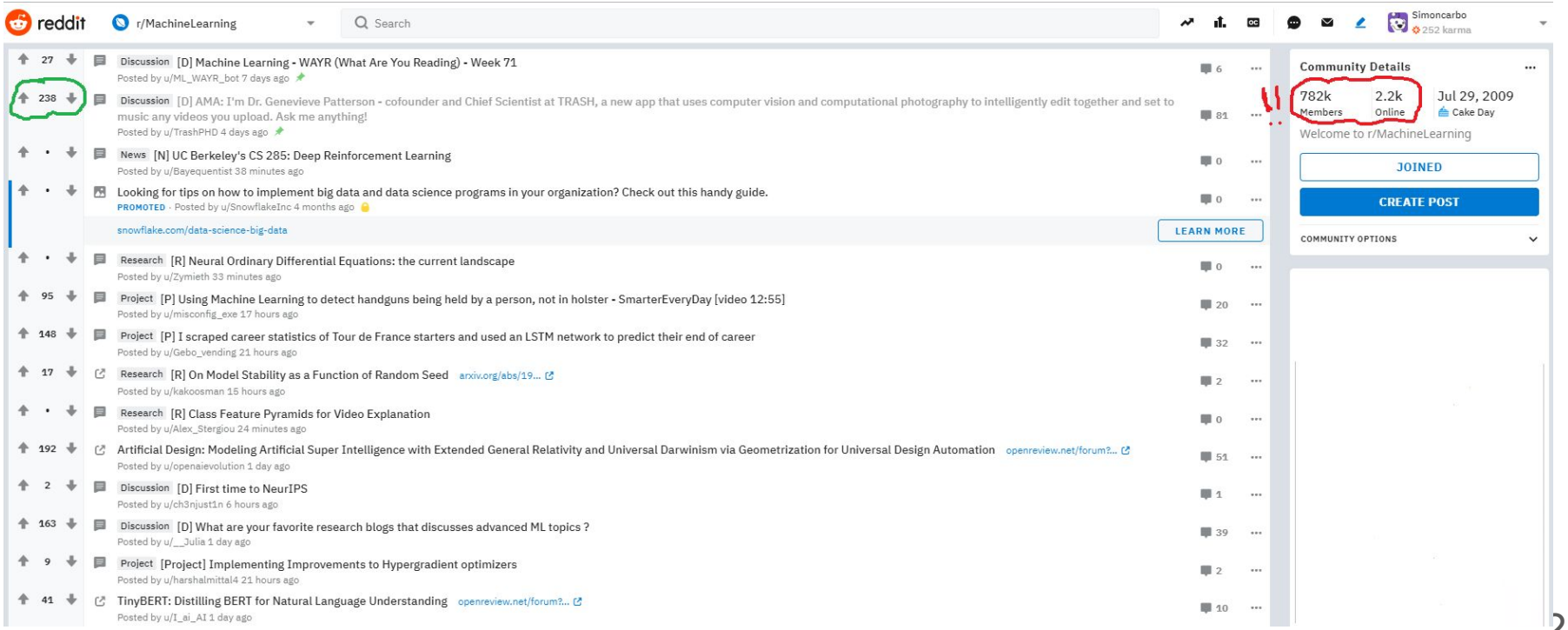
Examples



Value-based feeds

Examples

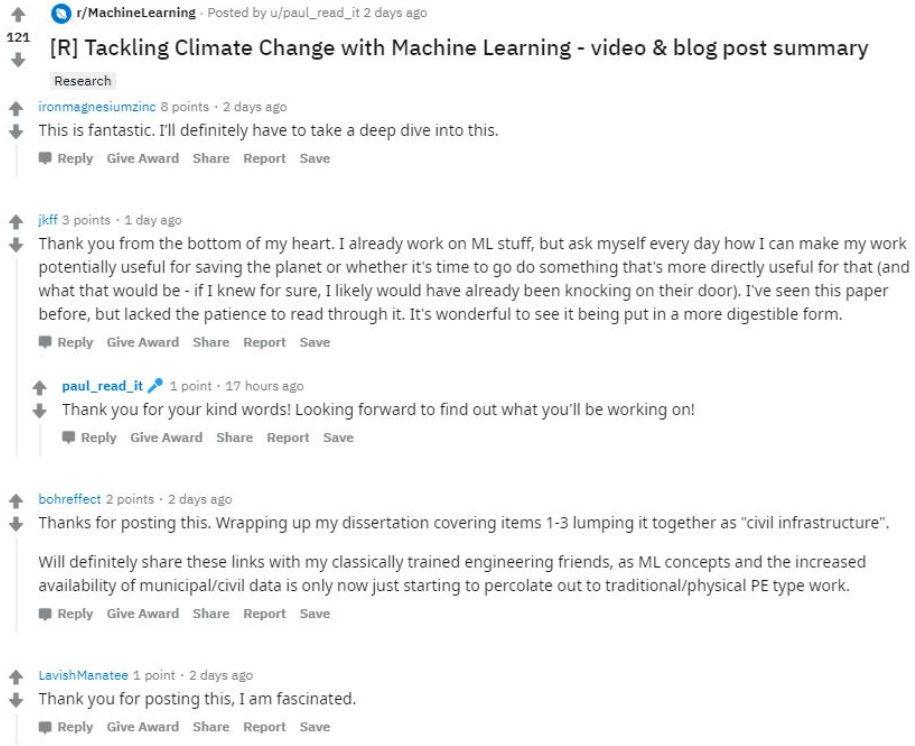
Reddit (Machine Learning community)



Value-based feeds

Examples

Reddit (Machine Learning community)

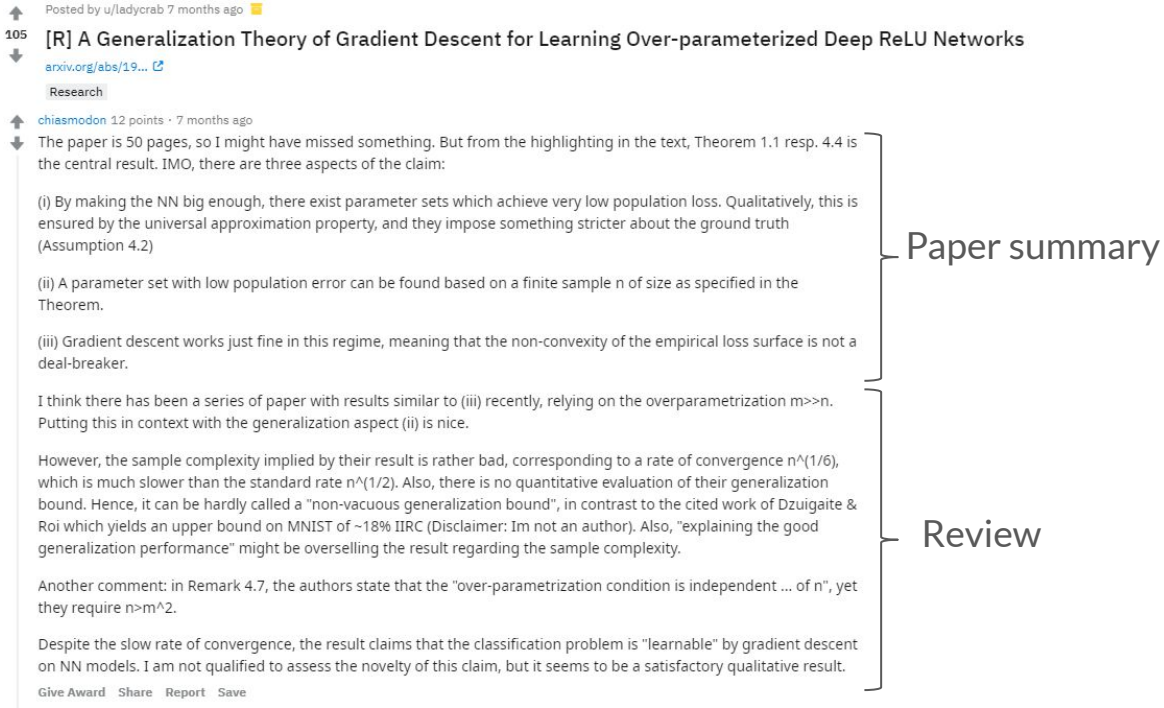


Aren't these comments beautiful? :)

Value-based feeds

Examples

Reddit (Machine Learning community)



Posted by u/ladycrab 7 months ago

105

[R] A Generalization Theory of Gradient Descent for Learning Over-parameterized Deep ReLU Networks

arxiv.org/abs/19...

Research

chiasmodon 12 points · 7 months ago

The paper is 50 pages, so I might have missed something. But from the highlighting in the text, Theorem 1.1 resp. 4.4 is the central result. IMO, there are three aspects of the claim:

(i) By making the NN big enough, there exist parameter sets which achieve very low population loss. Qualitatively, this is ensured by the universal approximation property, and they impose something stricter about the ground truth (Assumption 4.2)

(ii) A parameter set with low population error can be found based on a finite sample n of size as specified in the Theorem.

(iii) Gradient descent works just fine in this regime, meaning that the non-convexity of the empirical loss surface is not a deal-breaker.

I think there has been a series of paper with results similar to (iii) recently, relying on the overparametrization m>>n. Putting this in context with the generalization aspect (ii) is nice.

However, the sample complexity implied by their result is rather bad, corresponding to a rate of convergence n^(1/6), which is much slower than the standard rate n^(1/2). Also, there is no quantitative evaluation of their generalization bound. Hence, it can be hardly called a "non-vacuous generalization bound", in contrast to the cited work of Dzuigaite & Roi which yields an upper bound on MNIST of ~18% IIRC (Disclaimer: Im not an author). Also, "explaining the good generalization performance" might be overselling the result regarding the sample complexity.

Another comment: in Remark 4.7, the authors state that the "over-parametrization condition is independent ... of n", yet they require n>m^2.

Despite the slow rate of convergence, the result claims that the classification problem is "learnable" by gradient descent on NN models. I am not qualified to assess the novelty of this claim, but it seems to be a satisfactory qualitative result.

Give Award Share Report Save

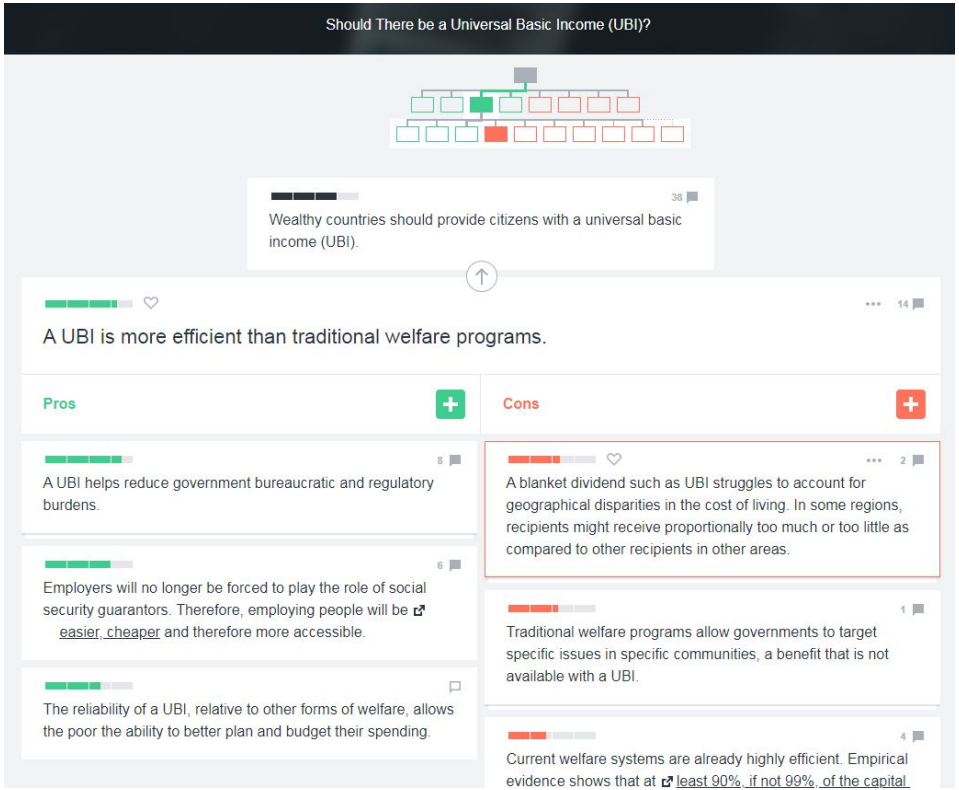
Paper summary

Review

People help each other in reviewing papers :)

Structure + value-based feeds

Examples



Kialo

A total of 2700 arguments around the UBI question…

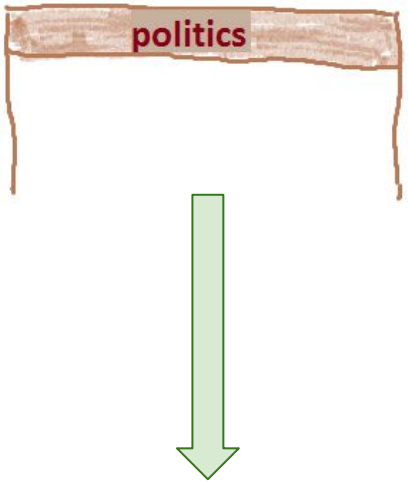
… All **hierarchically structured** and **evaluated by peers**.

How can we apply this to open-source?

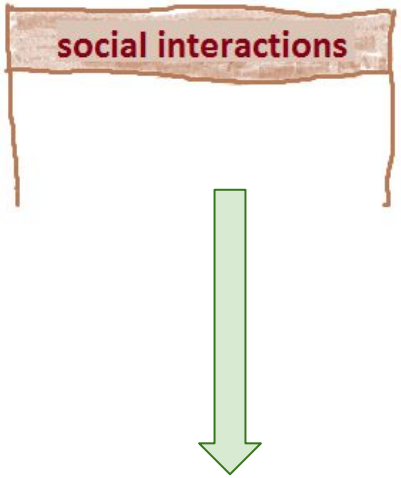
1) Transform project management in a collective task
   ➔ **all active contributors** share power to merge code through voting

2) Improve cooperation around this (intellectual) task

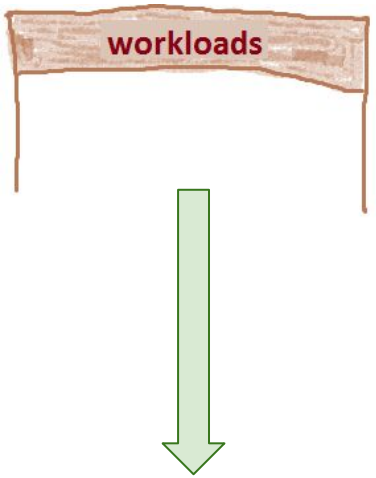
How can collaborative thinking help open-source?



Easier group decision making
Transparent deliberation

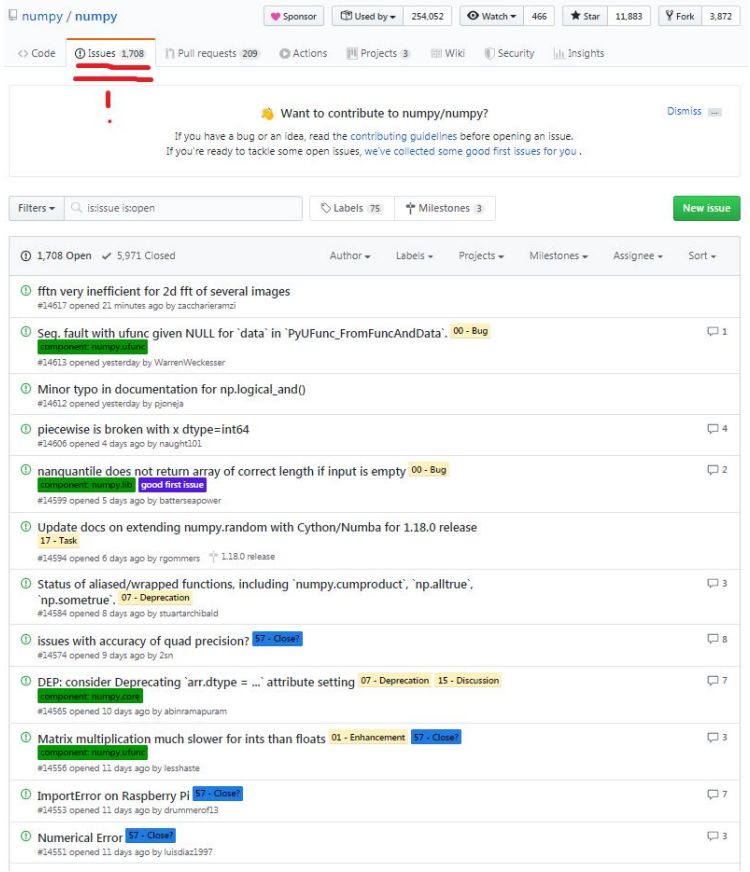


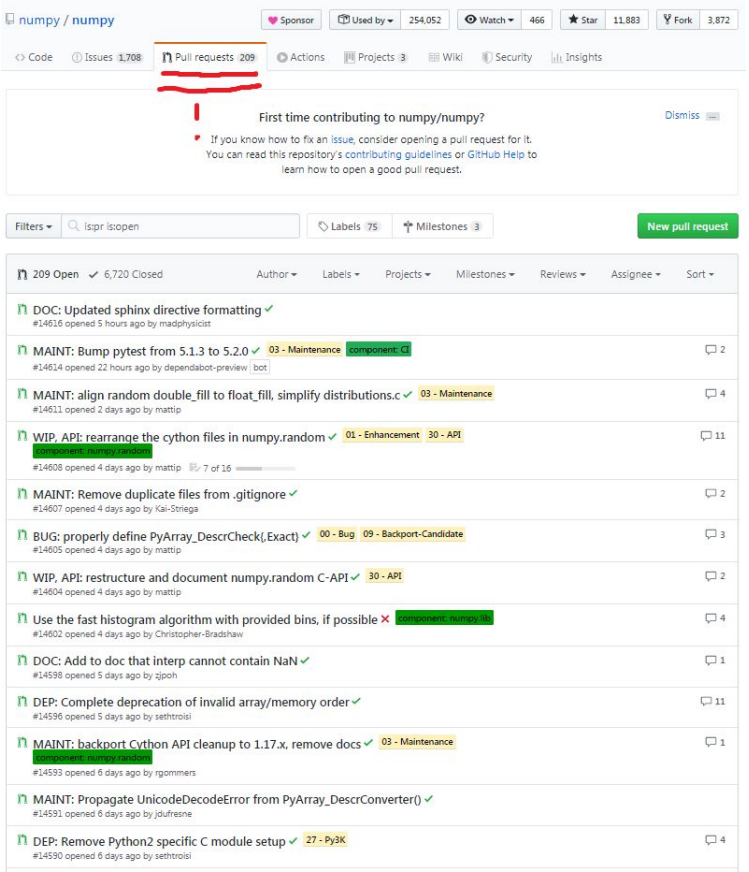
Inappropriate language can be downvoted



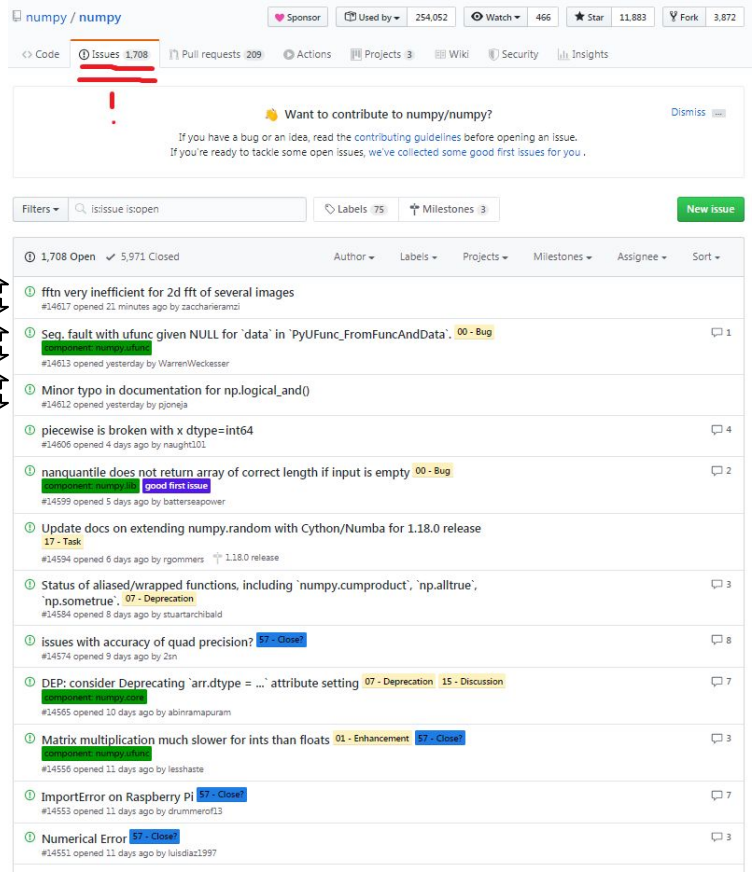
Management task can be solved collaboratively

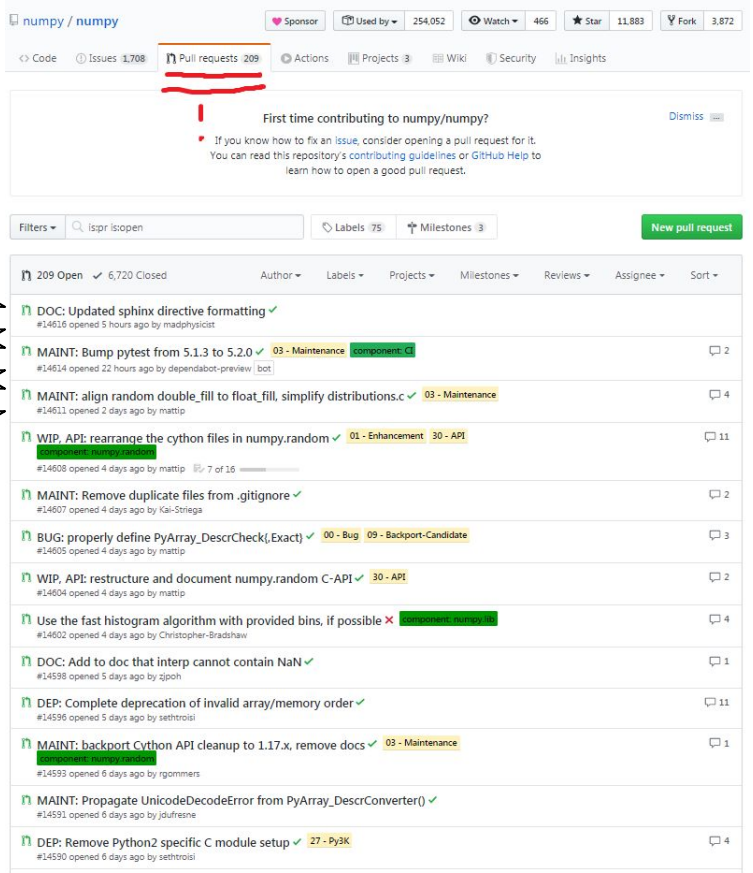
What's missing?





What's missing? Value-based feeds





What's missing? A structured way to communicate around **code understanding**

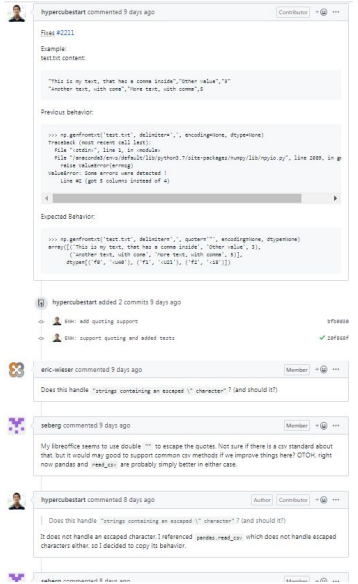
charris Merge pull request #14615 from seberg/dependabot-commit-msg ... ✔ Latest commit 8fa7b6e 11 hours ago

.circleci	Merge pull request #14356 from qwhelan/sphinx	6 days ago
.dependabot	MAINT: Add "MAINT" tag to dependabot commit msg	16 hours ago
.github	fixes links in `/.github/CONTRIBUTING.md`	2 months ago
benchmarks	add benchmark	3 months ago
branding/icons	add .gitattributes and fix line endings	9 years ago
changelog	Merge pull request #14514 from seberg/towncrier-ci	15 days ago
doc	DOC: Only list "Active" NEPs under "Meta-NEPs"	4 days ago
numpy	BLD: remove unused functions, rearrange headers (from CC=clang) (#14534)	5 days ago
tools	MAINT: Fix typo: remoge → remove	6 days ago
.appveyor.yml	BUILD: move all test dependencies to ./test_requirements.txt	last month
.codecov.yml	TST: use SciPy codecov config	9 months ago
.coveragerc	MAINT, TST: remove test-installed-numpy.py	3 months ago
.ctags.d	DEV: add ctags option file	10 months ago
.gitattributes	MAINT: Remove numpy-macosx-installer and win32build directories.	3 years ago
.gitignore	REPO: Ignore some generated files.	3 months ago
.gitmodules	Add Numpydoc as a git submodule	6 years ago
.lgtm.yml	ENH: supply our version of numpy.pxd, adjust as needed	27 days ago
.mailmap	MAINT: Post NumPy 1.17.1 update.	last month
.travis.yml	TST, MAINT: bump to OpenBLAS 0.3.7 stable	last month
INSTALL.rst.txt	DOC: add two commas, move one word	last month
LICENSE.txt	LICENSE: split license file in standard BSD 3-clause and bundled.	5 months ago
LICENSES_bundled.txt	LICENSE: update dragon4 license to MIT.	4 months ago
MANIFEST.in	MAINT: use test_requirements.txt in tox and shippable, ship it too	22 days ago
README.md	DOC: Update based on review comments	3 months ago
THANKS.txt	ENH: core: Start einsum function, add copyright notices to files	9 years ago
azure-pipelines.yml	Merge pull request #14356 from qwhelan/sphinx	6 days ago
pavement.py	DOC: update or remove outdated sourceforge links	2 months ago
pyproject.toml	DOC,MAINT: Build release notes during CircleCI step	16 days ago
pytest.ini	TST: Register markers in conftest.py.	5 months ago
runtests.py	Merge pull request #14572 from seberg/runtests-help	9 days ago
setup.py	MAINT: Add assert that git version is available. (#14548)	8 days ago
shippable.yml	BUILD: mostly restore verbose output on CI (except for pip install)	11 days ago
site.cfg.example	BLD: added libflame as a useable lapack library	5 months ago
test_requirements.txt	Bump pytest from 5.1.2 to 5.1.3	8 days ago
tox.ini	MAINT: use test_requirements.txt in tox and shippable, ship it too	22 days ago

Understanding the code & getting started

The best strategy to better understand the code base is to pick something you want to change and start reading the code to figure out how it works. When in doubt, you can ask questions on the mailing list. It is perfectly okay if your pull requests aren't perfect, the community is always happy to help. As a volunteer project, things do sometimes get dropped and it's totally fine to ping us if something has sat without a response for about two to four weeks.

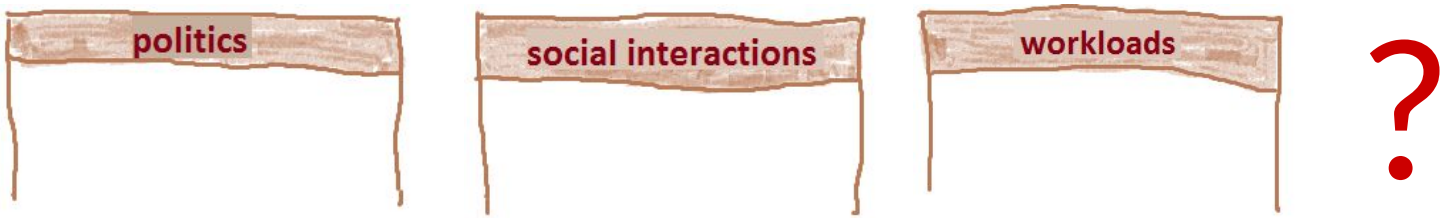
So go ahead and pick something that annoys or confuses you about numpy, experiment with the code, hang around for discussions or go through the reference documents to try to fix it. Things will fall in place and soon you'll have a pretty good understanding of the project as a whole. Good Luck!



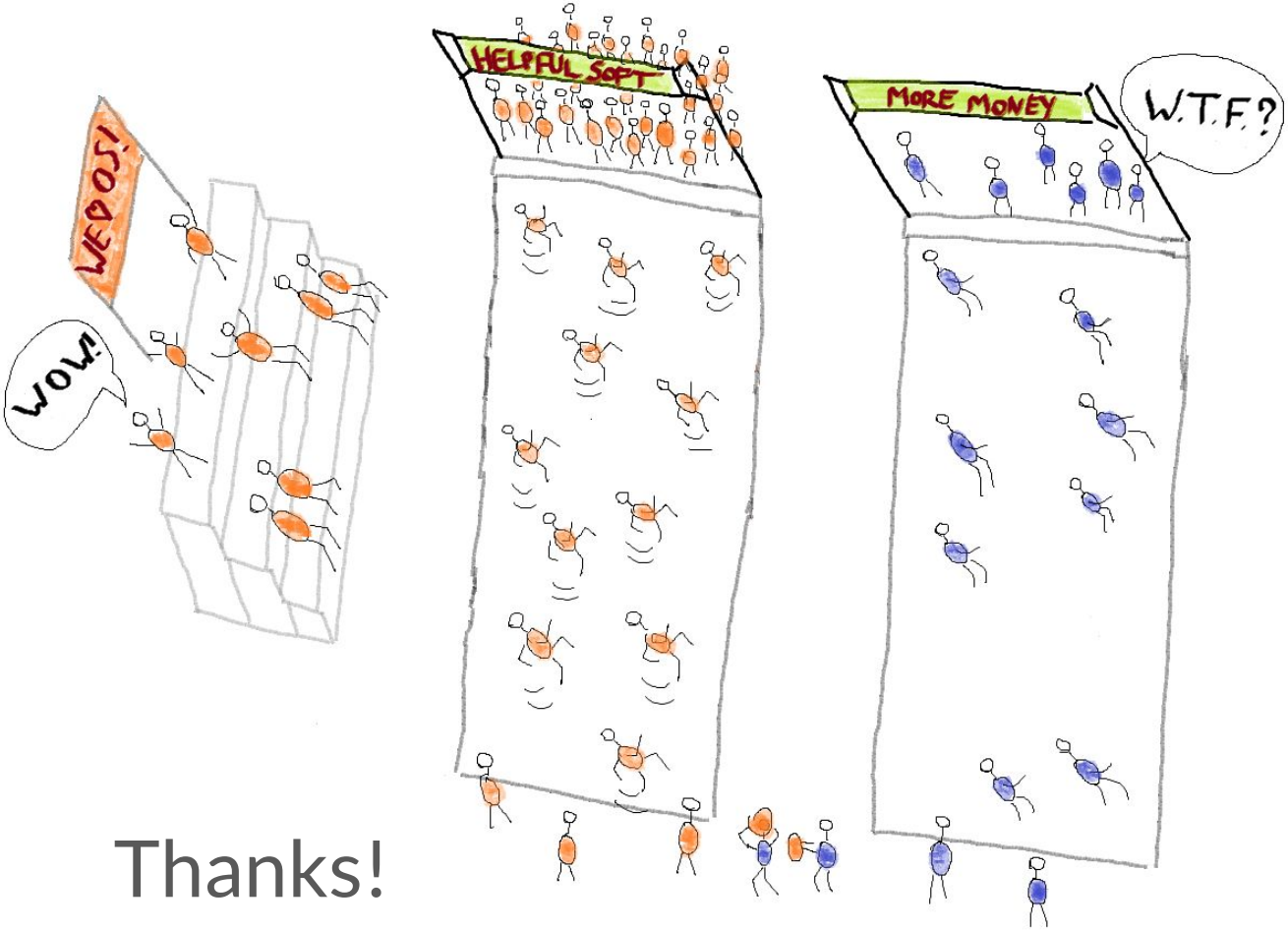
1. Understand why open-source is losing

2. Explore how we can rebalance forces

1. Understand why open-source is losing



2. Explore how we can rebalance forces



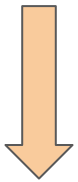
Thanks!

Thanks to...

Antoine, Arnould, Sam, Victor, Antoine,
Maxime, Anne-Sophie, Ploum,
my ex-flatmates (Mailtingpot),
my flatmates (Cul-de-Sac), my family

...for the helpful discussions!

References for further readings….



definition open-source software: https://en.wikipedia.org/wiki/Open-source_software
definition proprietary software: https://en.wikipedia.org/wiki/Proprietary_software
some logo's: https://www.flaticon.com/packs/software-development-logos

Problems of open-source

libav- ffmpeg: https://www.theregister.co.uk/2015/08/05/ffmpeg_leader_steps_down/
http://blog.pkh.me/p/13-the-ffmpeg-libav-situation.html
neovim: https://geoff.greer.fm/2015/01/15/why-neovim-is-better-than-vim/
diaspora: https://discourse.diasporafoundation.org/t/project-management-at-diaspora-or-what-the-heck-am-i-doing-here/563/8
node.js: https://www.zdnet.com/article/after-governance-breakdown-node-js-leaders-fight-for-its-survival/

google: https://fortune.com/longform/inside-googles-civil-war/
facebook: https://www.nytimes.com/2018/08/28/technology/inside-facebook-employees-political-bias.html

diaspora: https://discourse.diasporafoundation.org/t/the-core-team-a-bottleneck-of-the-diaspora-development/588
felix kraus: https://krausefx.com/blog/scaling-open-source-communities
ffmpeg: https://ffmpeg.org/pipermail/ffmpeg-devel/2015-July/176489.html
burnouts: https://techcrunch.com/2018/06/23/open-source-sustainability/
roads and bridges:
https://www.fordfoundation.org/about/library/reports-and-studies/roads-and-bridges-the-unseen-labor-behind-our-digital-infrastructure

Solutions

open source governance https://randyfay.com/content/how-do-open-source-communities-govern-themselves
patreon: https://www.patreon.com/
opencollective: https://opencollective.com/

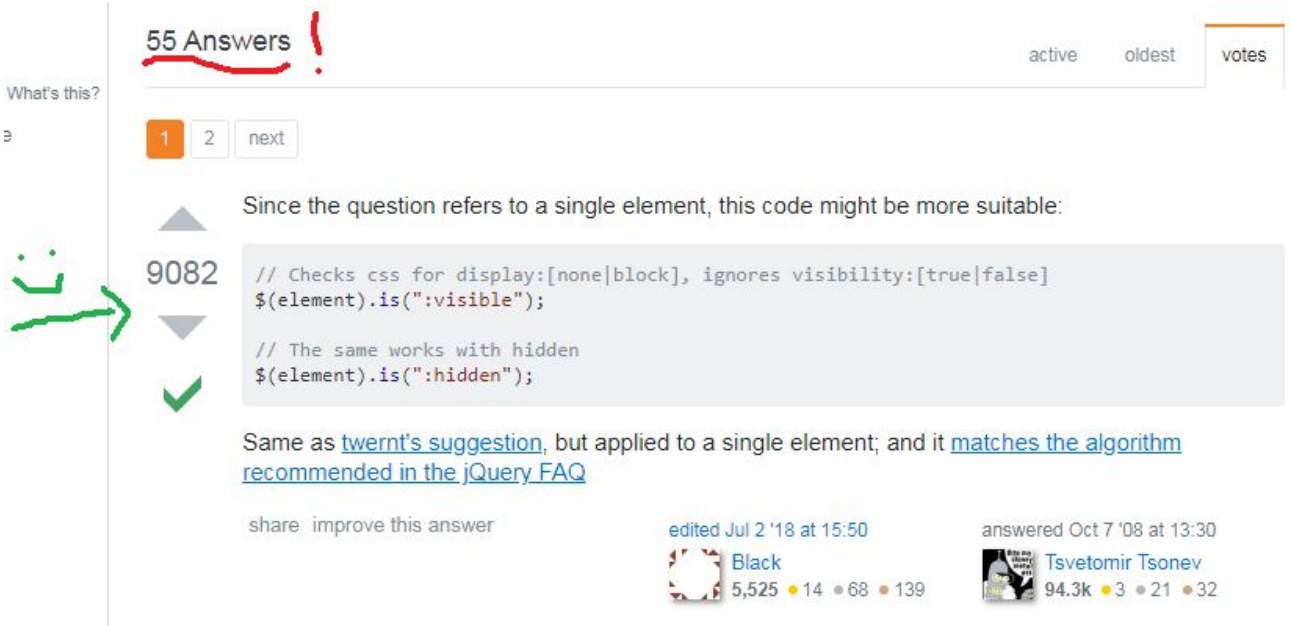
Definition DAO: https://en.wikipedia.org/wiki/Decentralized_autonomous_organization
aragon: https://aragon.org/discover
colony: https://colony.io/
daostack: https://daostack.io/
democracy.earth: https://democracy.earth/

Definition horizontal organization: https://en.wikipedia.org/wiki/Flat_organization
Reinventing organizations: https://www.reinventingorganizations.com/
Udn: http://universite-du-nous.org/

framadate: https://framadate.org/
trello: https://trello.com/
stackoverflow: https://stackoverflow.com/
reddit: https://www.reddit.com/
kialo: https://www.kialo.com/

Numpy's github: https://github.com/numpy/numpy

Value-based feeds

Examples

Stackoverflow