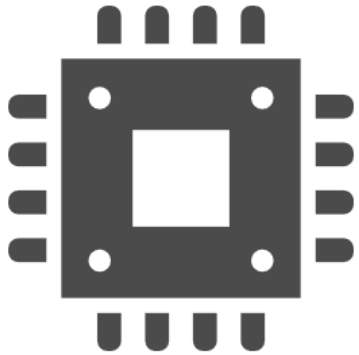
4840-1054: Media Computing in Practice (Summer 2022)



April 6, 2022
Yusuke Matsui

Information

Instructor

- Yusuke Matsui https://yusukematsui.me

Dates

- Wednesday, 2nd period (10:25 - 12:10)

Location:

- Zoom (See ITC-LMS for the Zoom URL)

This lecture is given by the Department of Information and Communication Engineering, Graduate School of Information Science and Technology. However, it is open to any graduate student of the University of Tokyo.

Web: https://media-comp.github.io/2022/

Media Computing in Practice (2022)

Search Media Computing in Practice (2022)

Home

Computational resouces

4840-1054: Media Computing in Practice (Summer 2022)

Overview

This lecture will be given in seminar-style. Students will read, implement, and present a recent paper. The code must be publicly available as a GitHub repository. In addition, students will update other students' repositories using Pull Requests.

- Instructor: Yusuke Matsui.
- Dates: Wednesday, 2nd period (10:25 - 12:10)
- Location: Zoom (see ITC-LMS for the zoom URL)

Goal

- Learn about recent research in the multimedia field (including but not limited to CV, NLP, ML, etc.)

Web: https://media-comp.github.io/2022/

This site uses Just the Docs, a

Schedule

Date	Contents	Presented by	Slides	Repository
April 6, 2022	Guidance	Yusuke Matsui	here	2022-matmul
April 13, 2022				
April 20, 2022				
April 27, 2022				
May 11, 2022				
May 18, 2022				
May 25, 2022				
June 8, 2022				
June 15, 2022				
June 22, 2022				
June 29, 2022				
July 6, 2022				
July 13, 2022	(invited talk)			

Goal

- Learn about **recent research in the multimedia field** (including but not limited to CV, NLP, ML, etc.)
- Learn how to publish your research through the **release of source code**
- Learn modern software development through the experience of **modifying other students' source code** using Pull Request

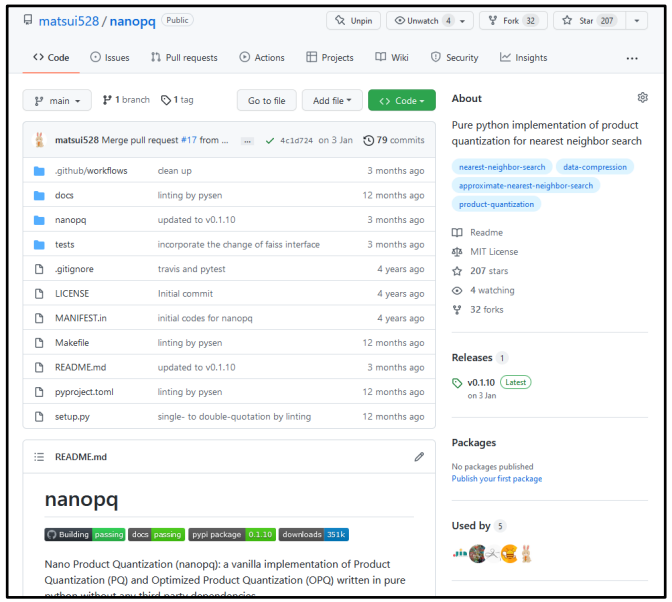
Prerequisites

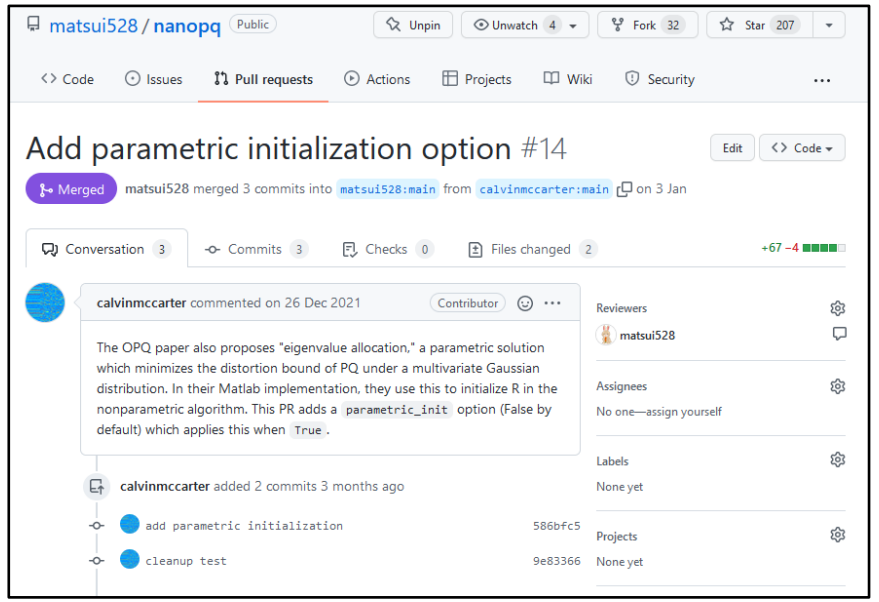
- Coding skill to reproduce existing work

- How to use Git/GitHub

- GitHub account
  - ✓ Your GitHub Account name will be public.
  - ✓ If you don't like it, please create a new account.

Seminar & hands-on style





Step 1:

- Read a paper
- Code it
- Summarize it
- Present it

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- Create a repository for the code
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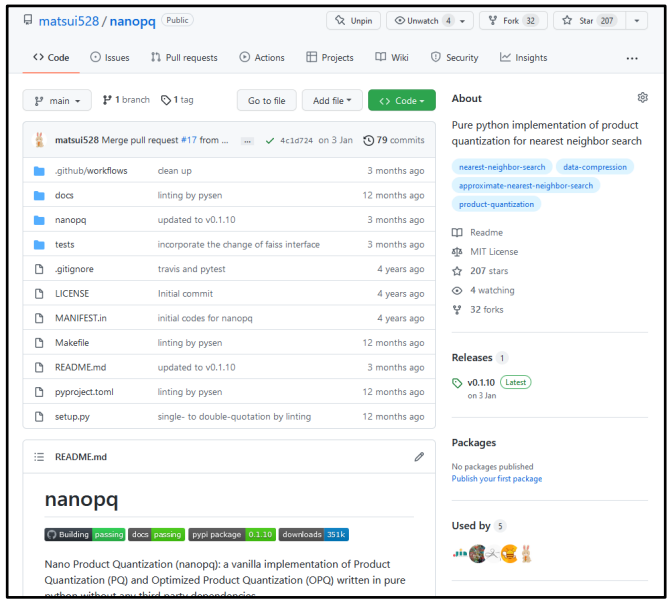
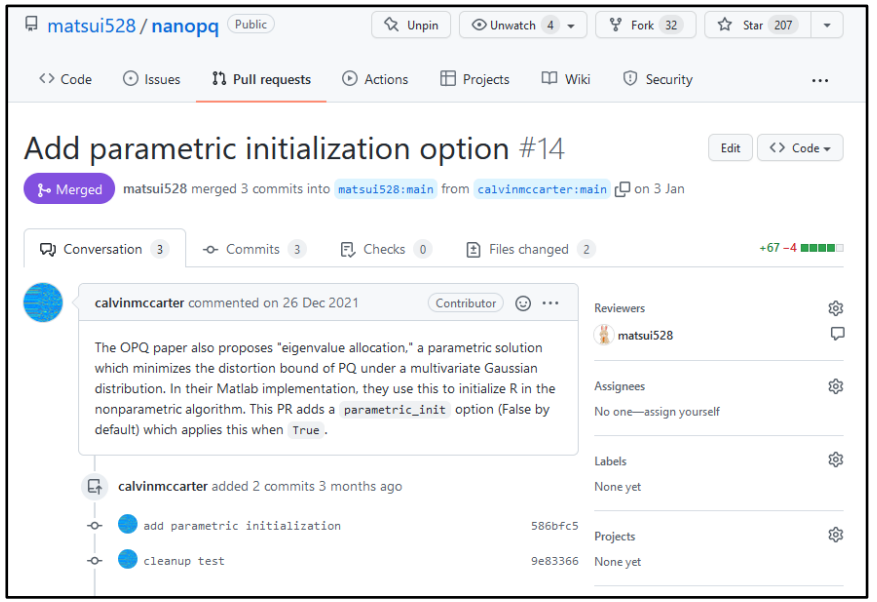
Seminar & hands-on style





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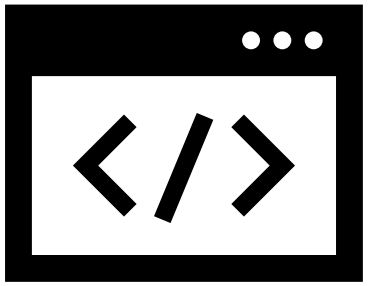
Step 1:

- Read a paper
- Summarize it
- Code it
- Present it

- Pick up your favorite paper in your field
- Any research field **w/ coding** is acceptable
  - Ok: CV, NLP, ML, CG, HPC, Audio, OS, DB, Network, PL, …
  - No: Pure theory w/o coding. Hardware.
- Don’t select a paper from your lab

Step 1:

- Read a paper
- Summarize it
- Code it
- Present it



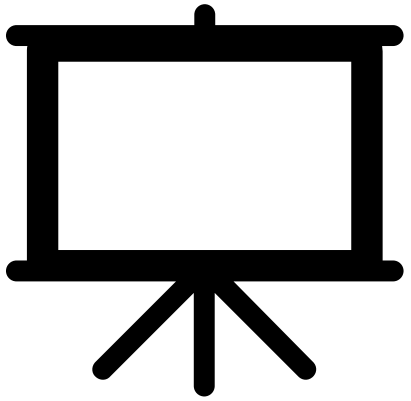
- Implement the proposed method in the paper
  - ✓ (mandatory) reimplement the method
  - ✓ (good) benchmark it, improve it, …
- If the official code is available, it'd be better to implement it yourself and compare it with the official one
- Don't rely too heavily on existing frameworks

- Any programming language is acceptable: C/C++, python, MATLAB, Julia, …
- Recommended OS: Ubuntu

Step 1:

- Read a paper
- Summarize it
- Code it
- Present it

- Make slides
  - ✓ Explain the original method in the paper
  - ✓ Explain what you've done (ingenuity in implementing the method, benchmark result, etc.)
  - ✓ The slides will be **publicly available**
- Prepare X min presentation
  - ✓ Include self-introduction
  - ✓ Explain carefully and visually
  - ✓ Assume that **the audience is high school students** and **knows nothing about your area.**



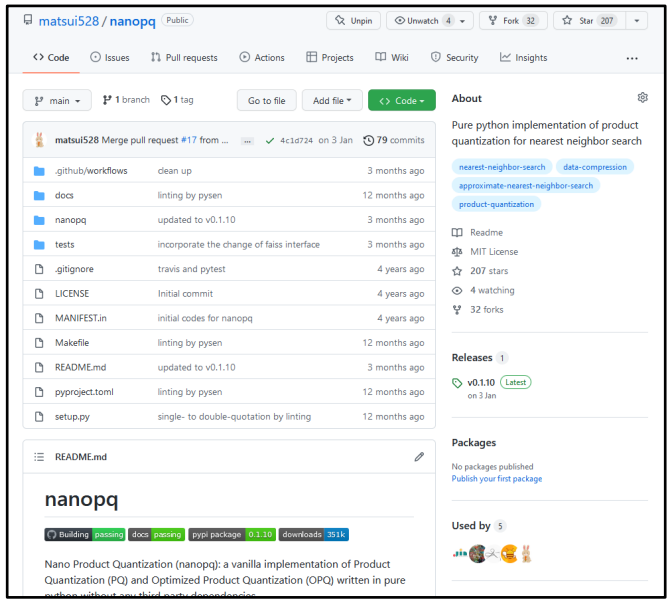
Step 1:

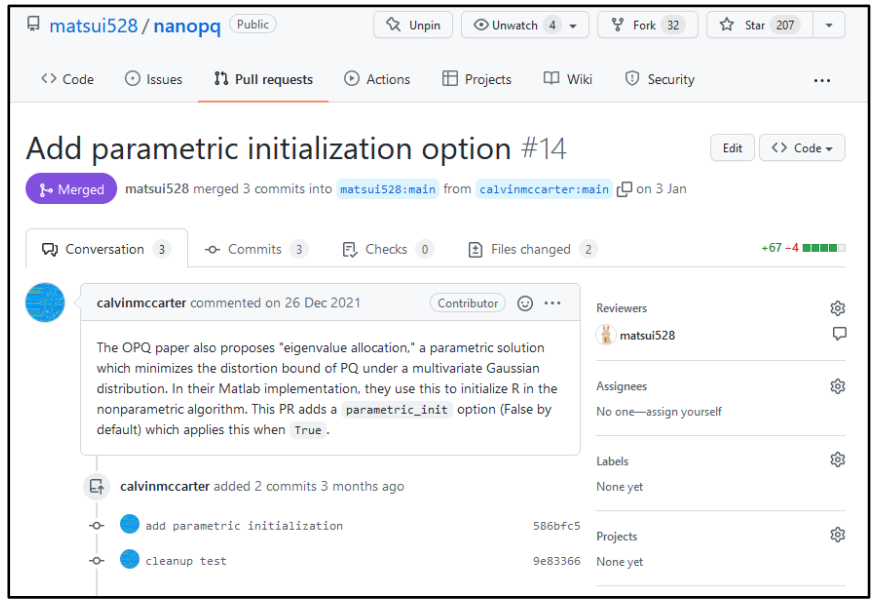
- Read a paper
- Summarize it
- Code it
- Present it

- During the lecture, present what you've done
  - ✓ 3 - 4 students are expected to present in each lecture

- Good presentation is…
  - ✓ After listening to the presentation, the audience will gain **one new piece of knowledge**.

Seminar & hands-on style





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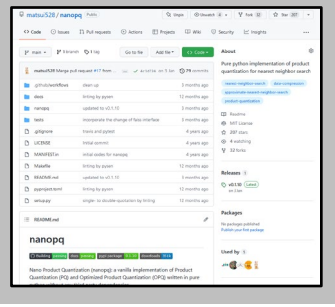


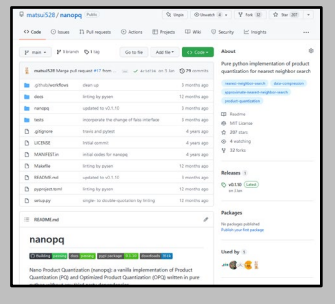
- I will give you a **public** repository
- Upload the source code you wrote

- Reproducibility is a key
  - ✓ You should maintain your repo such that **other students can run it and reproduce the result**

- Follow the basic structure of the repository

Step 2:

- Create a repository for the code
- Make the repository publicly available



- Repositories must be located under media-comp organization
  https://github.com/media-comp

- Example of python repository (skeleton code)
  - ✓ https://github.com/media-comp/2022-matmul

media-comp / 2022-matmul Private

Unwatch 1 | Fork 0 | Star 0

Code | Issues | Pull requests | Actions | Projects | Wiki | Security | Insights | Settings

➢ The repo name should be "2022-XXX"
➢ Let me know "XXX"

main | 1 branch | 0 tags | Go to file | Add file | Code

matsui528 Create bench_ci.yml 9a48668 10 minutes ago 5 commits

➢ Write CI for testing

.github/workflows	Create bench_ci.yml	
.gitignore	Initial commit	2 days ago
README.md	Update README.md	
bench.py	delete time	12 minutes ago
requirements.txt	initial commit	20 minutes ago
simple_matmul.py	delete time	12 minutes ago

➢ Write README.md

README.md

2022-matmul

Reimplementation of the matrix multiplication proposed in the following paper: XYZ et al., "Simple Matrix Multiplication", IEEE XXX, 2022.

Prerequisites

- You need to install Python 3.8+

About

No description, website, or topics provided.

Readme
0 stars
1 watching
0 forks

Releases

No releases published
Create a new release

Packages

No packages published
Publish your first package

Languages

Python 100.0%

README.md

2022-matmul

Reimplementation of the matrix multiplication proposed in the following paper: XYZ et al., "Simple Matrix Multiplication", IEEE XXX, 2022.

Prerequisites

- You need to install Python 3.8+
- Install the required packages by:

```
pip install -r requirements.txt
```

How to run

```
python bench.py
```

You will obtain the result:

```
7.867813110351562e-06 sec
Error: 0
```

➢ Explain the original paper

➢ Write how to setup

➢ Write how to run

➢ For ML, write the both training and testing codes if possible

main ▾ 2022-matmul / simple_matmul.py / <> Jump to ▾ Go to file ···

matsui528 delete time — Latest commit 14e5979 18 minutes ago — History

1 contributor

15 lines (11 sloc) | 367 Bytes — Raw | Blame

```python
import numpy as np


def f(A, B):
    """
    Given two matrices A and B, compute their matrix-product, AB.

    Args:
        A (np.ndarray): The first matrix,
        B (np.ndarray): The second matrix. B.shape[0] must be identical to A.shape[1]

    Returns:
        C (np.ndarray): The matrix-product AB. shape = (A.shape[0], B.shape[1])
    """
    return A @ B
```

- Write docstring
- Explain your code carefully

main ▾ **2022-matmul** / .github / workflows / **bench_ci.yml**

View runs | Go to file | ...

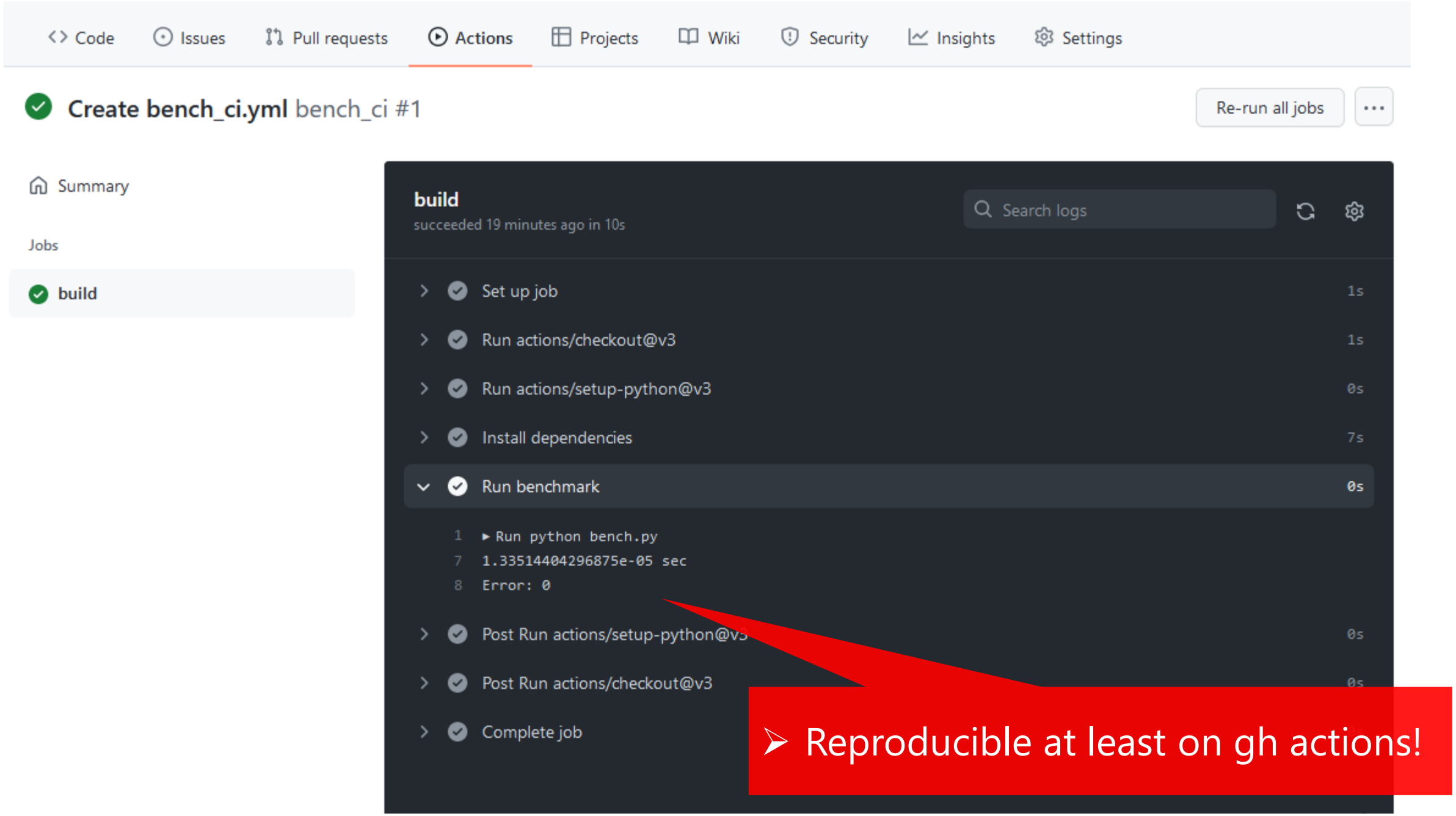
matsui528 Create bench_ci.yml ✓ Latest commit 9a48ff8 17 minutes ago **History**

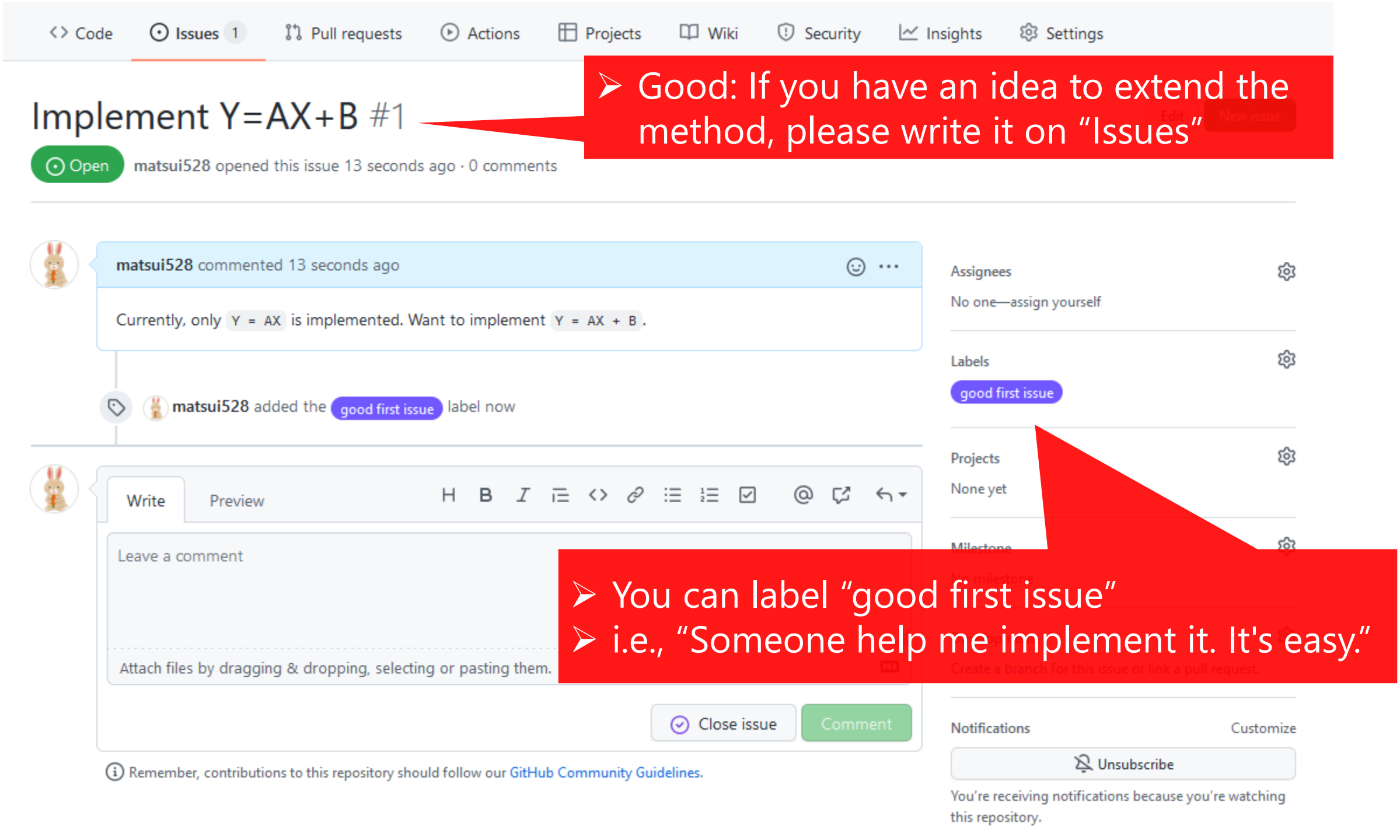
1 contributor

17 lines (14 sloc) | 299 Bytes | Raw | Blame

```yaml
name: bench_ci

on: [push]

jobs:
  build:
    runs-on: ubuntu-latest

    steps:
    - uses: actions/checkout@v3
    - uses: actions/setup-python@v3
    - name: Install dependencies
      run: |
        pip install -r requirements.txt
    - name: Run benchmark
      run: |
        python bench.py
```

- Write CI
- The code should be tested by GitHub Actions
- Not necessarily run the full benchmark on CI (e.g., GPUs are not available on gh actions)


Code
Issues
Pull requests
Actions
Projects
Wiki
Security
Insights
Settings
Create bench_ci.yml bench_ci #1
Re-run all jobs
Summary
Jobs
build
build
succeeded 19 minutes ago in 10s
Search logs
Set up job 1s
Run actions/checkout@v3 1s
Run actions/setup-python@v3 0s
Install dependencies 7s
Run benchmark 0s
1 ▶ Run python bench.py
7 1.33514404296875e-05 sec
8 Error: 0
Post Run actions/setup-python@v3 0s
Post Run actions/checkout@v3 0s
Complete job
➢ Reproducible at least on gh actions!


Code
Issues 1
Pull requests
Actions
Projects
Wiki
Security
Insights
Settings
Implement Y=AX+B #1
Open
matsui528 opened this issue 13 seconds ago · 0 comments
matsui528 commented 13 seconds ago
Currently, only Y = AX is implemented. Want to implement Y = AX + B.
matsui528 added the good first issue label now
Write
Preview
Leave a comment
Attach files by dragging & dropping, selecting or pasting them.
Close issue
Comment
Remember, contributions to this repository should follow our GitHub Community Guidelines.
Assignees
No one—assign yourself
Labels
good first issue
Projects
None yet
Notifications
Customize
Unsubscribe
You're receiving notifications because you're watching this repository.
➢ Good: If you have an idea to extend the method, please write it on “Issues”
➢ You can label “good first issue”
➢ i.e., “Someone help me implement it. It's easy.”

Code Issues 2 Pull requests Actions Projects Wiki Security Insights Settings

Windows support #2

Edit New issue

Open matsui528 opened this issue now · 0 comments

matsui528 commented now

I haven't tested the code on windows. It's appreciated to write windows CI.

matsui528 added the help wanted label now

Write Preview

Leave a comment

Attach files by dragging & dropping, selecting or pasting them.

Close issue Comment

Remember, contributions to this repository should follow our GitHub Community Guidelines.

Assignees

No one—assign yourself

Labels

help wanted

Projects

None yet

Milestone

No milestone

Development

Create a branch for this issue or link a pull request.

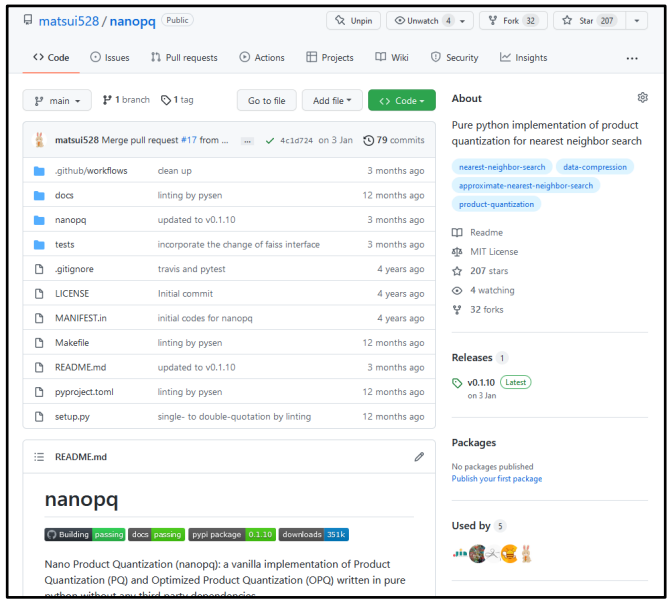
Notifications Customize

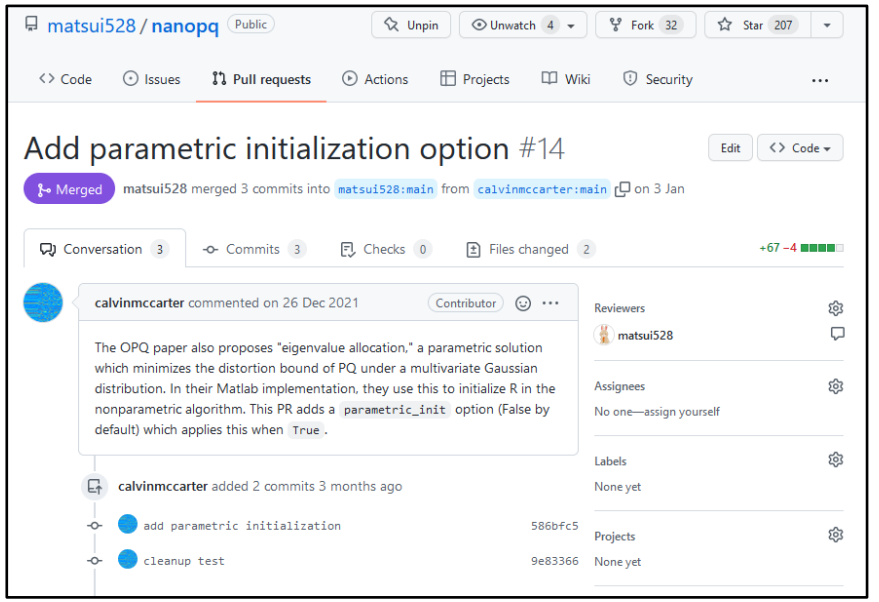
Unsubscribe

You're receiving notifications because you're watching this repository.

➢ “help wanted”

Seminar & hands-on style





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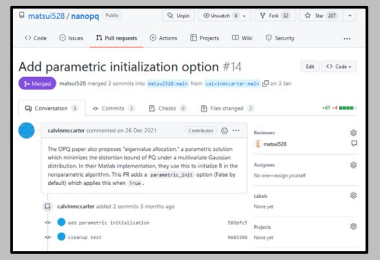


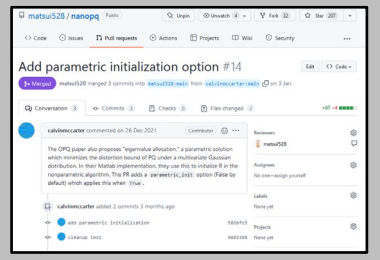
- Run others' repositories

- Create **Pull Requests**, e.g.,
  - ✓ *The code doesn't work in Mac, so update XXX and YYY*
  - ✓ *Add another method for benchmark and run it again*
  - ✓ *Find and fix a bug*
  - ✓ *Propose another component to improve the method such as better IO*

- If there're "help-wanted" or "good-first-issue", you can try it

Step 3:

- Run others' repositories
- Create a Pull Request to update them



- It is usually nice idea to create issues and discuss the point before submitting PRs.

- Remarks:
  - ✓ **modern software development ≅ communication**

- Reference:
  - ✓ Opensource guideline https://opensource.guide/

media-comp / 2022-matmul Public

Watch 1 | Fork 0 | Star 0

Code | Issues 3 | Pull requests | Actions | Projects | Wiki | Security | Insights

Print in milliseconds #3

Open hoge528 opened this issue 31 seconds ago · 1 comment

Edit | New issue

➢ You can create an issue on other's repository

hoge528 commented 31 seconds ago

Hi!
It would be easier to read if the results were displayed in milliseconds instead of seconds. May I make such a PR?

matsui528 commented now — Contributor

Sure! Good idea 👍

➢ Discussion

Write | Preview

Leave a comment

Attach files by dragging & dropping, selecting or pasting them.

Close issue | Comment

Assignees
No one assigned

Labels
None yet

Projects
None yet

Milestone
No milestone

Development
No branches or pull requests

Notifications — Customize
Unsubscribe
You're receiving notifications because you authored the thread.

media-comp / 2022-matmul Public

Pin | Unwatch 1 | Fork 0 | Star 0

Code | Issues 3 | Pull requests | Actions | Projects

➢ Fork the repo, and create a PR

Change the format of print function, from sec to msec #4

Edit | Code

Merged matsui528 merged 1 commit into `media-comp:main` from `hoge528:print_in_msec` 2 minutes ago

Conversation 0 | Commits 1 | Checks 0 | Files changed 1 | +2 −2

hoge528 commented 4 minutes ago • edited — Contributor

In benchmark script, print the runtime in milliseconds instead of seconds

Discussed in #3

`Print in milliseconds` Verified 489c4a5

matsui528 commented 2 minutes ago

Thank you! LGTM

➢ The repo owner will review the PR, and merge/reject it

matsui528 merged commit `f3a0cd4` into `media-comp:main` 2 minutes ago — Revert

matsui528 changed the title ~~Print in milliseconds~~ Change the format of print function, from seconds to milliseconds now

Reviewers
No reviews

Assignees
No one—assign yourself

Labels

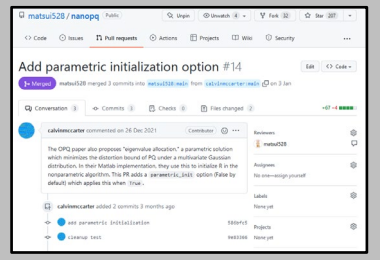
Projects
None yet

Milestone
No milestone

Development
Successfully merging this pull request may close these issues.

Step 3:

- Run others' repositories
- Create a Pull Request to update them



- Good issues
  - ✓ Be humble
  - ✓ Discuss precisely (e.g., for bug-report, write all necessary information such as OS, version of software, etc)
  - ✓ Don't paste screenshot. Write a log message

- Good PRs
  - ✓ Don't make drastic changes
  - ✓ A small but important contribution
  - ✓ Independent and easy to review

Step 3:

- Run others' repositories
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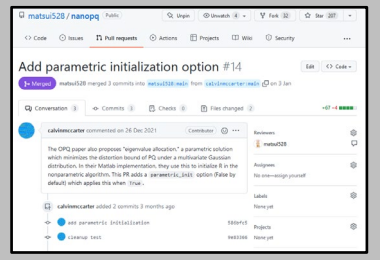
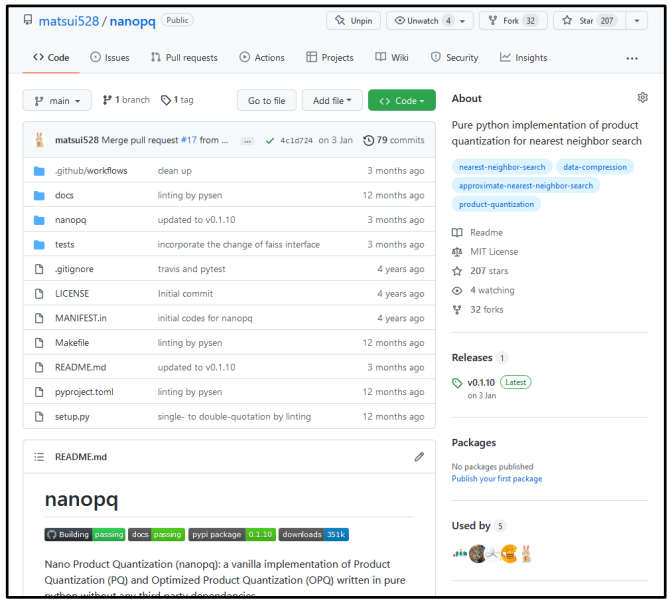
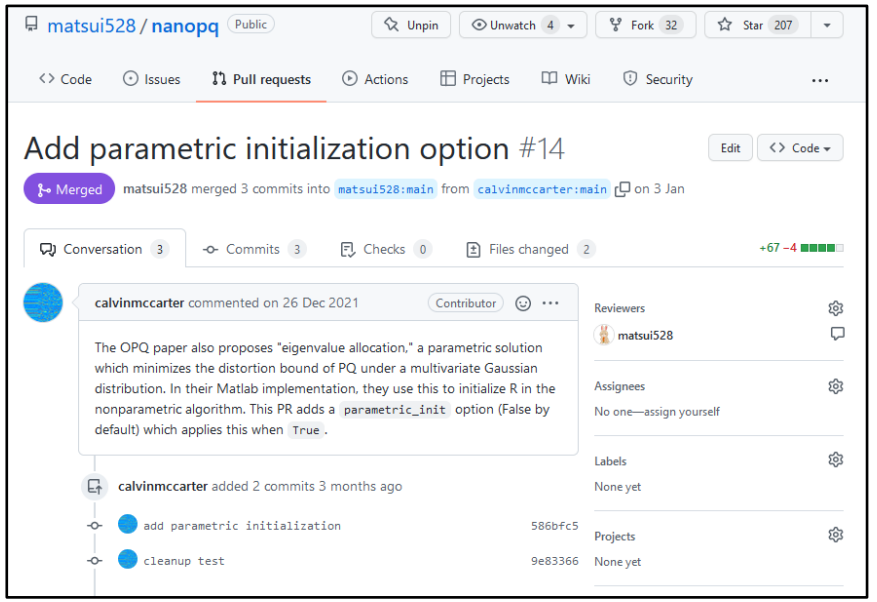


- If you receive PRs
  - ✓ Do review
  - ✓ Accept or reject
  - ✓ Don't be aggressive when asking for corrections

Seminar & hands-on style





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Step 4:

- Short presentations?

- Another round of (short) presentations about PRs
  - ✓ Explain the PRs you created
- Depends on the number of attendees

Computational resources

- For CPU:
  - ✓ Your own computer
  - ✓ Cloud IDE: Google Cloud Shell Editor
    - https://cloud.google.com/shell/docs/launching-cloud-shell-editor
    - Free
- For GPU:
  - ✓ Your Lab computer (Ask your professor in advance to see if it is acceptable to use Lab GPUs for this lecture.)
  - ✓ Cloud IDE: Amazon SageMaker Studio Lab
    - https://studiolab.sagemaker.aws/login
    - Free

In summary: (1) when you present

- By 23:59 of the day before your presentation,
  - ✓ Let me know the title of the paper
  - ✓ Let me know the name of the repo (I will create one for you under https://github.com/media-comp)
  - ✓ Push your code to the repo
  - ✓ Submit your slides (pdf) to me

- You can reach me via Slack
  if you are a student of IST ICE
- If not, e-mail me matsui@hal.t.u-tokyo.ac.jp
  or DM me via twitter @utokyo_bunny

In summary: (2) after your presentation

- If you receive a PR, review and merge/reject it.

In summary: (3) when you're not a presenter

- Listen to the presentation
- After the presentation, do the following if you like the paper
  - ✓ Run the code
  - ✓ Send PRs

Assessment

- Presentation + Coding (Repo) + PR
  - ✓ Please submit at least **three Pull Requests** to different repositories

- Attendance?
  - ✓ I'm tracking your log-in information of Zoom
  - ✓ Come to the class every time
  - ✓ Depending on the number of students attending the lecture, attendance may be used as a grade.

If you wish to take this class

- Please fill out the survey at ITC-LMS **today** (mandatory)
  - ✓ I will make a schedule of presentation

- If anyone could present next week, I'd appreciate it!

Next week

- The 1st time presentation, or my lecture

Questionnaire

- Have you ever reimplemented an existing work in your field?
- Do you know how to use Git/GitHub?
- Do you know “fork”?
- Have you ever created a Pull Request?
- Have you ever reviewed a Pull Request?
- Do you know how to use GitHub actions?