Introduction to programming

Lecture 4:

- GitHub

MCNB - Winter semester 2025/2026

FREIE UNIVERSITÄT BERLIN

Next lecture (November 11) online!

https://fu-berlin.webex.com/meet/prs8468ox43645

Coin throw practice (10 minutes)

Find the mistake in the code below.

We're trying to simulate 20 coin throws.
If a random number ranging between 0 and 1 is lower or equal 0.5, the coin shows "heads".
If it's higher than 0.5, the coin shows "tails".

```
coin_flip_results = cell(0);
for i=1:20
     if rand(1) <= .5
          coin_flip_results{end+1} = 'heads';
     elseif rand(1) > .5
          coin_flip_results{end+1} = 'tails';
     end
end
```

Do you get 20 "heads" or "tails"? If not, why not?

GitHub

GitHub

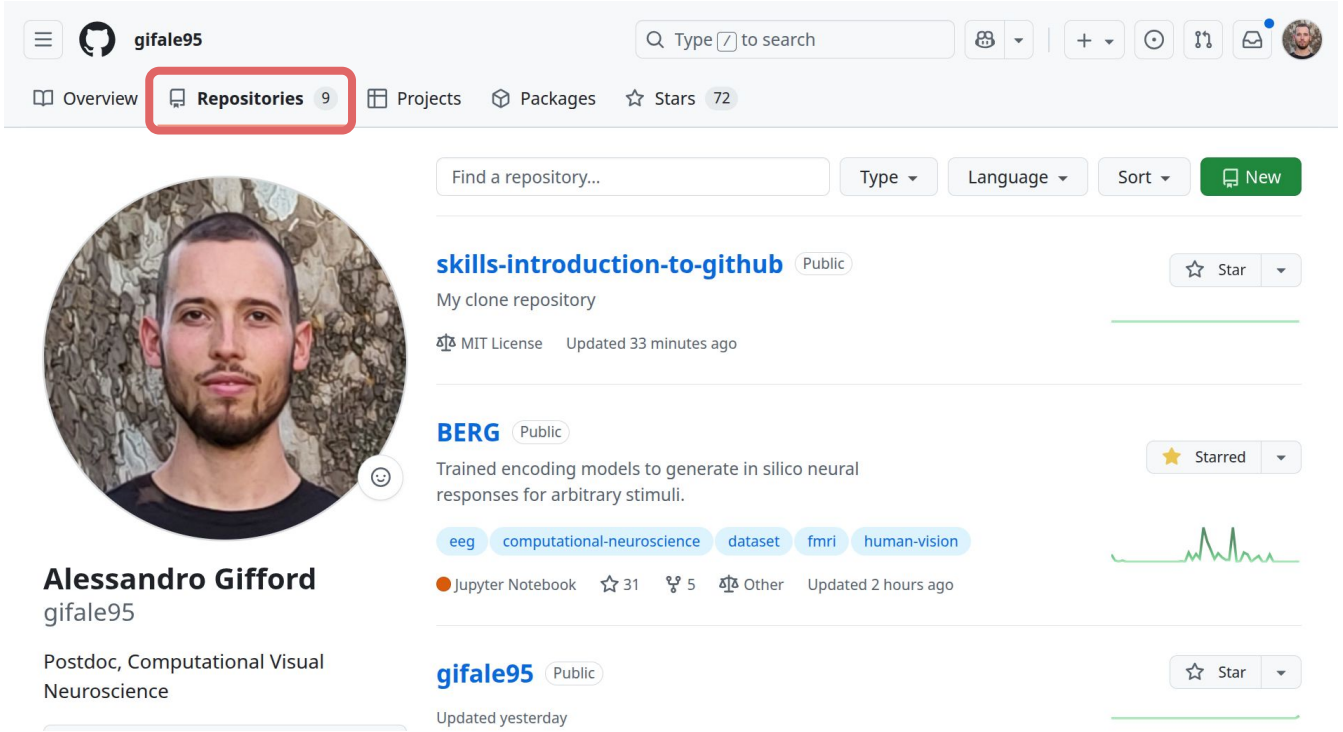
What is GitHub?: GitHub is a collaboration platform that uses Git for versioning. It is the most popular platform to store, share, and contribute to software.

Version control: is the practice of tracking and managing changes to a file or set of files over time, allowing users to collaborate, recall specific versions later, and revert to previous states.

Git versioning: https://www.youtube.com/watch?v=OqmSzXDrJBk&list=LL&index=1

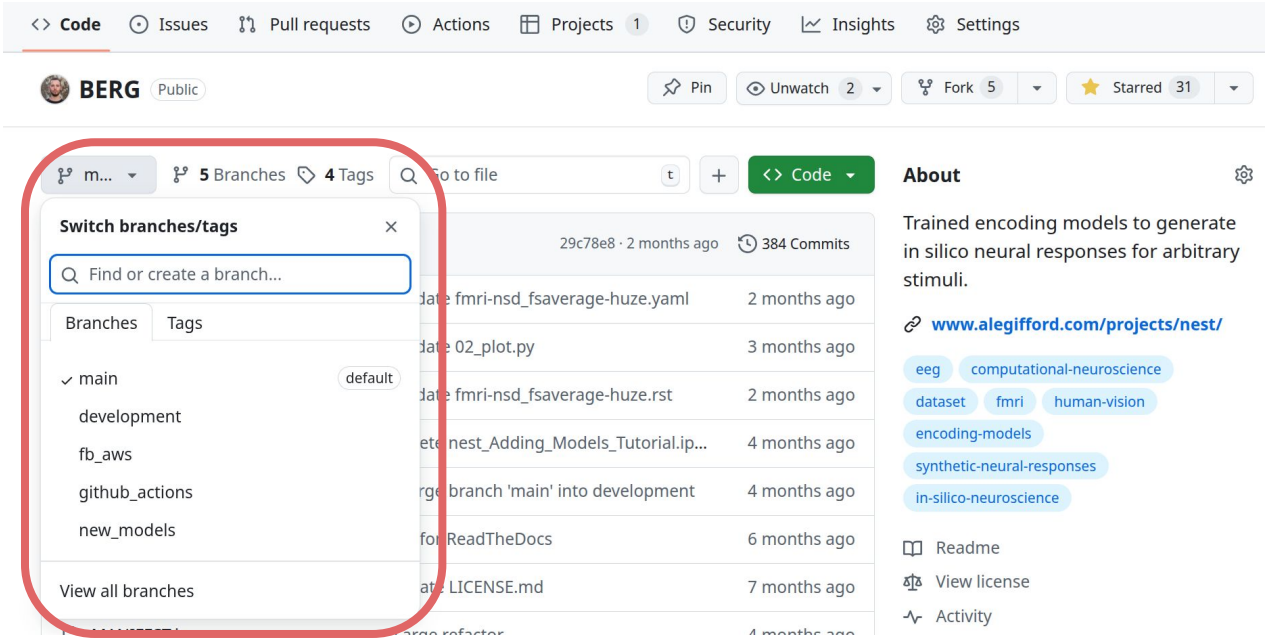
Repositories

What is a repository?: A repository is a project containing files and folders. A repository tracks versions of files and folders. For more information, see "About repositories" from GitHub Docs.



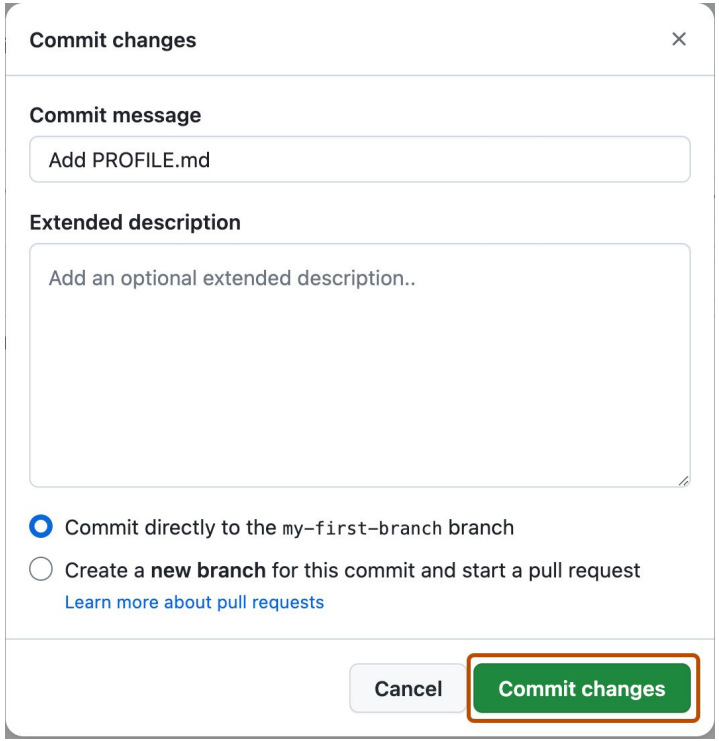
Branches

What is a branch?: A branch is a parallel version of your repository. By default, your repository has one branch named *main* and it is considered to be the definitive branch. Creating additional branches allows you to copy the *main* branch of your repository and safely make any changes without disrupting the main project. For more information, see "About branches".



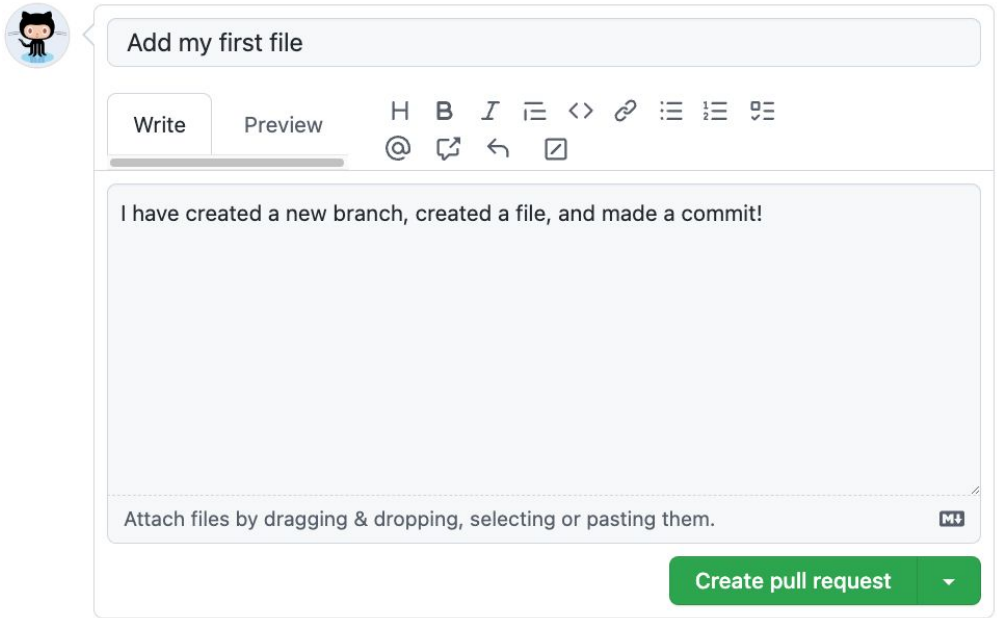
Commit changes

What is a commit?: A commit is a set of changes to the files and folders in your project. A commit exists in a branch. For more information, see "About commits".



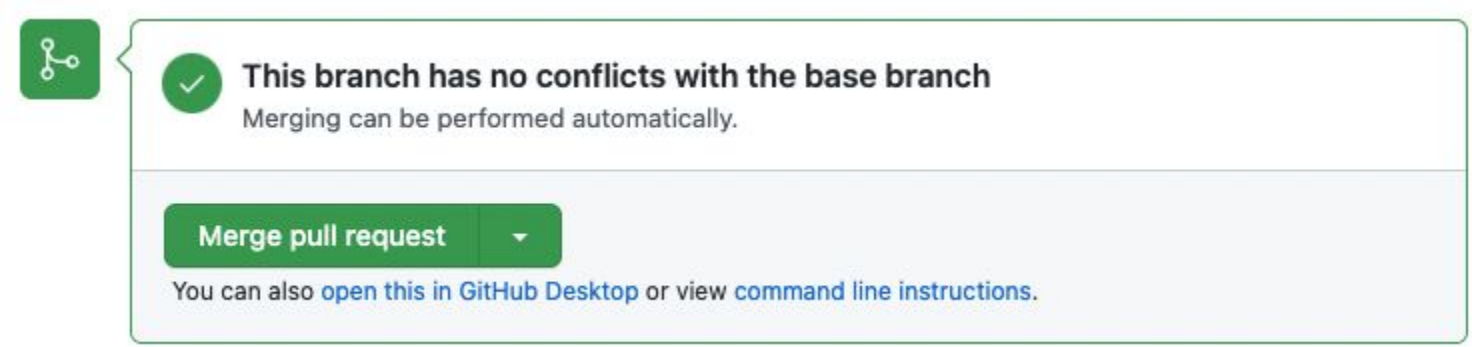
Pull requests

What is a pull request?: Collaboration happens on a pull request. The pull request shows the changes in your branch to other people and allows people to accept, reject, or suggest additional changes to your branch. In a side by side comparison, this pull request is going to keep the changes you just made on your branch and propose applying them to the *main* project branch. For more information about pull requests, see "About pull requests".



Merges

What is a merge?: A merge adds the changes in your pull request and branch into the *main* branch. For more information about merges, see "Merging a pull request".



Repository README (Markdown)

```
# In silico discovery of representational relationships
across visual cortex

Here we provide the code to reproduce all results from the
paper:</br>
"[In silico discovery of representational relationships
across visual cortex][paper_doi]"</br>
Alessandro T. Gifford, Maya A. Jastrzębowska, Johannes J.D.
Singer, Radoslaw M. Cichy</br>
_Nature Human Behavior_, 2025



## 📄 Paper abstract

Human vision is mediated by a complex interconnected
network of cortical brain areas that jointly represent
visual information. Although these areas are increasingly
understood in isolation, their representational
relationships remain unclear. Here we developed relational
neural control and used it to investigate the
representational relationships for univariate and
multivariate functional magnetic resonance imaging (fMRI)
responses of areas across the visual cortex. Through
relational neural control, we generated and explored in
silico fMRI responses for large numbers of images,
discovering controlling images that align or disentangle
responses across areas, thus indicating their shared or
unique representational content. This revealed a typical
network-level configuration of representational
relationships in which shared or unique representational
content varied on the basis of cortical distance,
categorical selectivity and position within the visual
hierarchy. Closing the empirical cycle, we validated the in
silico discoveries on in vivo fMRI responses from
independent participants. Together, this reveals how visual
areas jointly represent the world as an interconnected
```

In silico discovery of representational relationships across visual cortex

Here we provide the code to reproduce all results from the paper:

"In silico discovery of representational relationships across visual cortex"

Alessandro T. Gifford, Maya A. Jastrzębowska, Johannes J.D. Singer, Radoslaw M. Cichy

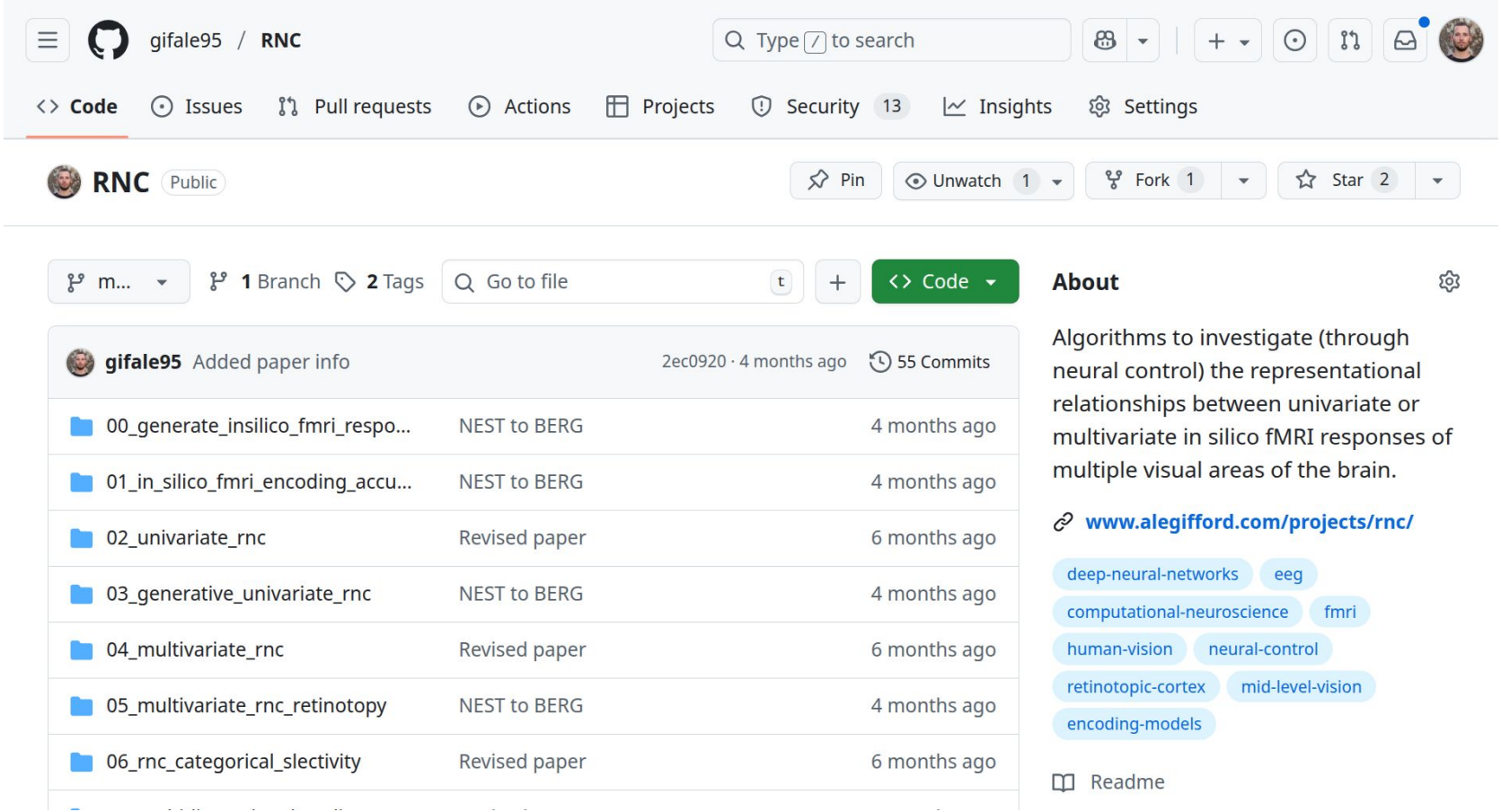
Nature Human Behavior, 2025

📄 Paper abstract

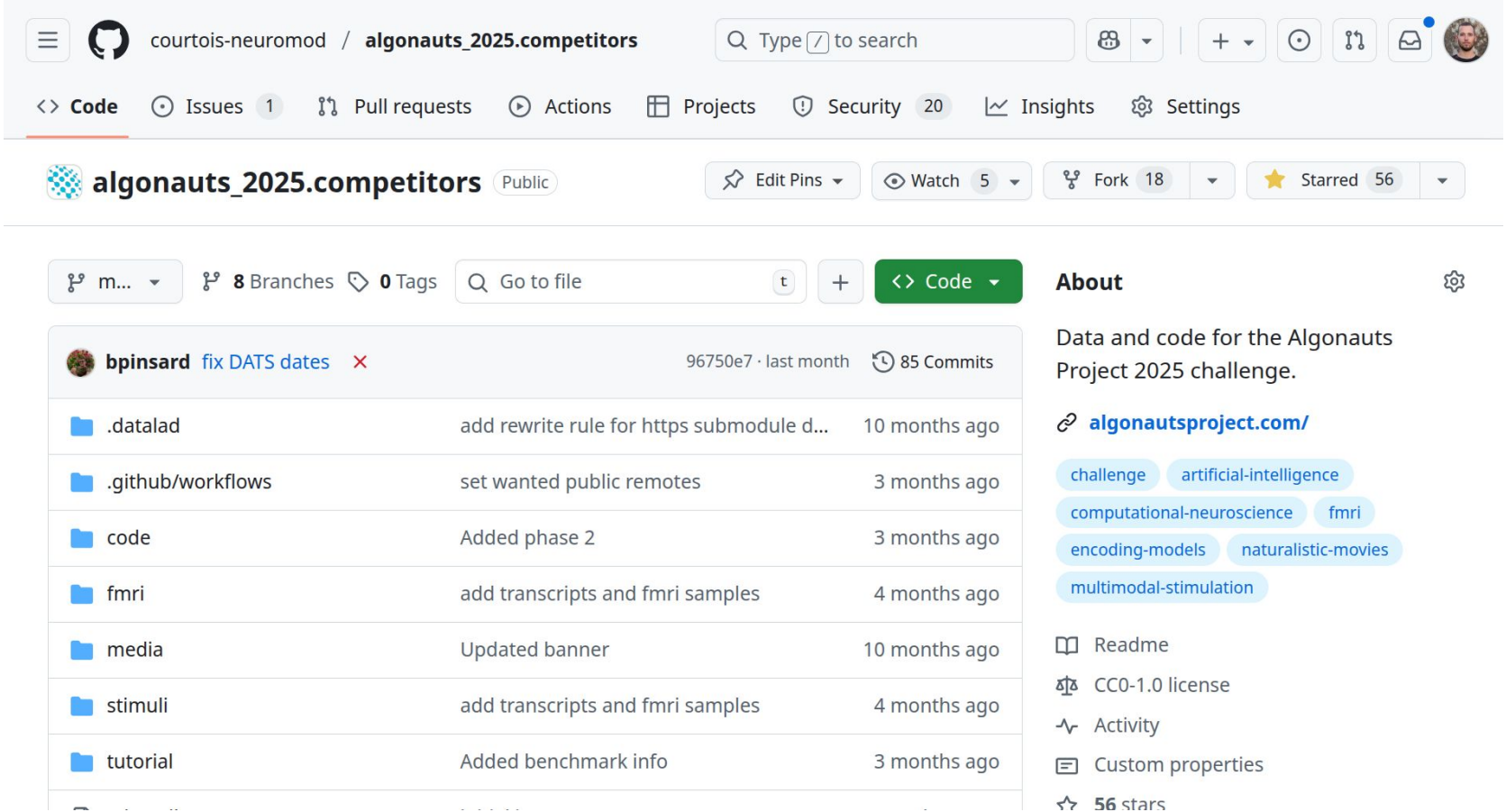
Human vision is mediated by a complex interconnected network of cortical brain areas that jointly represent visual information. Although these areas are increasingly understood in isolation, their representational relationships remain unclear. Here we developed relational neural control and used it to investigate the representational relationships for univariate and multivariate functional magnetic resonance imaging (fMRI) responses of areas across the visual cortex. Through relational neural control, we generated and explored in silico

Markdown tutorial: https://docs.github.com/en/get-started/writing-on-github

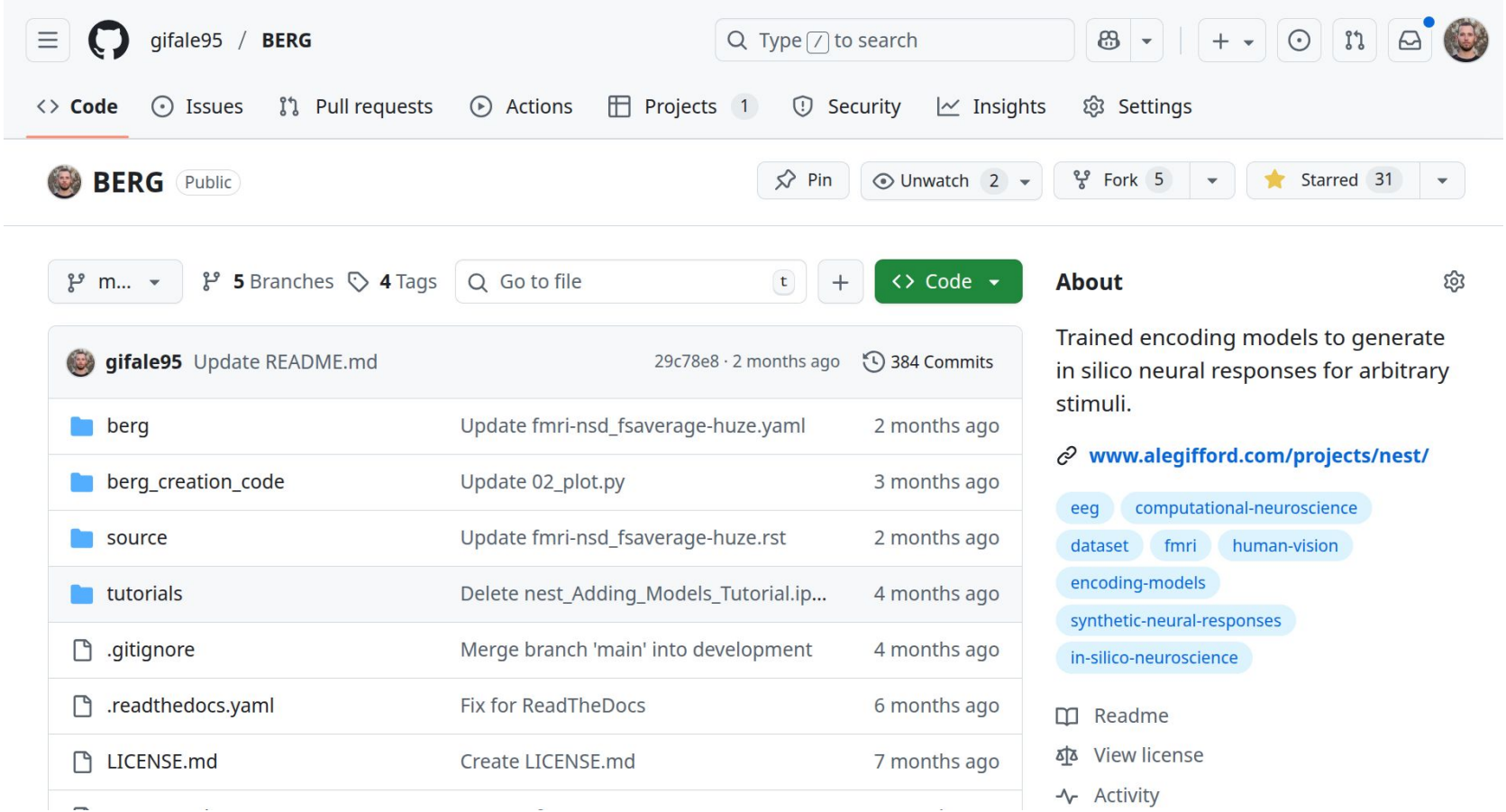
Repository real example (I)



Repository real example (II)



Repository real example (III)



Assignment 4

Assignment 4a: GitHub Tutorials

Create a GitHub account.

Complete the following tutorials:

- https://github.com/skills/introduction-to-github
- https://github.com/skills/communicate-using-markdown

Send me the screenshot of the final README of each tutorial:

- Before the next lecture on November 11.
- Include your name and the course number (127050) in the email subject.
- alessandro.gifford@gmail.com

Assignment 4b: Create your own GitHub course repo

Create a repository of this course, and make it public.

Add to the repository the `*.m` files of the previous Assignments 2-3.

Note: you can also do this locally from your computer by using the terminal (for this, see the "*Git Tutorial*" and "*Git and GitHub*" sections of this page), or by using the GitHub extensions of VS Code.

Send me the link of your public repository:

- Before the next lecture on November 11.
- Include your name and the course number (127050) in the email subject.
- alessandro.gifford@gmail.com