PROGRAMMING IN PYTHON II

Version Control and Collaboration – Git

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Outline

1. Motivation

2. Git

3. Github and Gitlab

4. Tasks

MOTIVATION

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    2. Reusability
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- We want to keep track of our project history (Version Control)
    1. Reproducibility
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    4. Version conflicts, different published versions
- We want to be able to collaborate (or let others use our code)
    1. Common interface and tools for communication
    2. Modifications
    3. Different versions

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GIT

Git

- Git
  - ☐ Efficient tracking of directory contents
  - ☐ Independent of types of files/data
  - ☐ Suitable for version control and collaboration
  - ☐ Supports distributed, non-linear workflows
  - ☐ Commonly used in ML
  - ☐ Large datasets usually not in Git or version control
- We will not go into details but look at the basics of how to use Git
- Tech Talk: Linus Torvalds on git
  https://www.youtube.com/watch?v=4XpnKHJAok8

How to use Git? – Theory (1)

- Create a Git repository on your machine
  - □ Create a new repository
  - □ Clone/Fork an existing repository
- Create a file locally and add it to git index
  - □ The files are now staged and can be committed
- Commit new/modified files to the Git repository
  - □ The committed file states are now saved in the Git repository
  - □ Each commit includes a commit message
- You can now access the history of the Git repository (=previous commits)
- You can create branches for different versions and collaboration

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How to use Git? – Theory (2)

- You can interact with other repositories (e.g. remote repositories on a server)
  - ☐ pull get latest versions of files from other repository
  - ☐ push push version of your repository to another repository
  - ☐ merge get latest versions of files from other repository and combine with latest file versions in your repository

How to use Git? – Practice

- Install Git
  - ☐ `https://git-scm.com/book/en/v2/Getting-Started-Installing-Git`
- Setup Git using `git config`
  - ☐ `https://git-scm.com/book/en/v2/Getting-Started-First-Time-Git-Setup`
- Git is command-line but many GUIs exist
  - ☐ E.g. PyCharm git integration
- Literature and command-line Git guide:
  - ☐ `https://git-scm.com/book/en/v2`
  - ☐ `https://rogerdudler.github.io/git-guide/`

How to use Git? – PyCharm

■ We will see how to use the git integration in PyCharm at the end of this lesson

GITHUB AND GITLAB

Github and Gitlab (1)

- In ML you will most likely have to use Github or Gitlab at some point
- `https://github.com`
  - Platform that hosts Git projects
  - Many features for project/task management
  - Free accounts (for public and private projects)
  - Many open-source projects
  - Over 100 million repositories[1]
  - Example: `https://github.com/git/git`

[1] `https://venturebeat.com/2018/11/08/github-passes-100-million-repositories/`

Github and Gitlab (2)

■ On Github/Gitlab you may create a fork of an existing repository
  - □ Creates a copy of the repository on your account
  - □ Can be modified by you
  - □ Can be pushed to the parent repository using a pull request
■ Github/Gitlab provide management for issues
  - □ Can be tagged and assigned to users
  - □ If you create an issue, always make sure to do it properly or you will get ignored/banned
    - • Check if there are similar issues already!
    - • Do not hijack, stay on-topic!
    - • Provide input/output/exact descriptions of the issue!
    - • Read the rules if specified!
    - • You want something from someone, not the other way around!

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TASKS

Tasks

1. Look up Git readme to find what "git" stands for
2. Install and configure Git
3. Activate Git intergration for a PyCharm project
   - ☐ Perform a commit
   - ☐ Perform a second commit
   - ☐ Create a new branch and commit it
   - ☐ Take a look at the Git Log
   - ☐ Perform a checkout of an old version
4. Clone a github project using PyCharm
   - ☐ Take a look at the Log
   - ☐ Modify a file and commit it to your local clone of the github repository
5. If you have a github account:
   - ☐ Fork a github project to your account