Git and GitHub for (R) Collaboration

Armin Hatefi

Department of Mathematics and Statistics, Memorial University

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Motivation

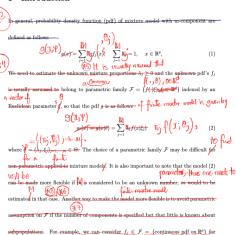
- We are working on far more collaborative projects than before sharing code and writing documents.
- We require to share and edit documents and codes at the same time.
- How to share code and make sure we are working on the same version?
- Emailing versions, using Dropbox and Google Drive? Then inefficient, prone to errors and painful ...
- With complex code, we need to have identical folder structures on each other's computers, work at the same time on the files, catch up easily changes/ collaborators ...

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Let's avoid inefficient methods

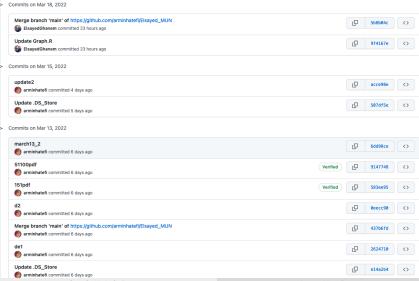


1 Introduction



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Let's properly keep track of everything



Git and GitHub

- Git is open source software for version control.
- Using Git, you can do things like see all previous versions of code you have ever created in a project.
- GitHub is the most popular service (others include GitLab) for collaborating on code using Git.
- It is possible to use Git without using GitHub, though most people combine the two

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Getting started ...

- Before you start using Git and GitHub, you need to set up your computer and install a few useful programs ...
- This is a one-time setup and once done, you will be able to easily create new projects and start collaboration.
- I found these instructions from different resources (particularly for Windows OS as I was not able to test); however, you should be able to troubleshooting easily ...
- A GitHub account
- Git on your computer
- GiHub Desktop
- R, RStudio and RMarkdown ...

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Get a GitHub account

- Sign up for GitHub: https://github.com/
- Keep you username and password, we will need them later again.
- Type git on the command line. If not, download and install Git application on your machine from: https://git-scm.com/downloads
- Once installed, type the following on the command line.
 - \$ git --version

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Configure the GitHub Desktop

- Download and install GitHub Desktop Application from: https://desktop.github.com/
- To authenticate an account, open the GitHub Desktop Application:
- ullet File > Options > Accounts > To the right of "GitHub.com," click Sign in .
- In the Sign in pane, click "Sign in using your browser".
- For the instructions see:
 - Installing and authenticating GitHub Desktop

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Clone and commit with GitHub Desktop

- Create a new repository testRepo on GitHub website.
- Clone testRepo repository via GitHub Desktop.
- Commit README.md on "GitHub.com" and pull it by GitHub Desktop.
- Create an R/Rmarkdown code in your local testRepo. Commit and Push by GitHub Desktop.
- Invite a collaborator to your testRepo:
 On GitHub.com > testRepo > Settings > Collaborators (you need to add the username of your collaborator e.g. < arminhatefi >)
- Your testRepo repository is ready for collaboration ...

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Basic Commands

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Clone and commit via cmd

- Create a new repo testCMD (with README.md) on GitHub.com
- Copy the testCMD HTTPS and clone into GitHub directory.
 - $cd \sim /github$
 - \$ git clone https://github.com/arminhatefi/testCMD.git
 - \$ cd testCMD
 - \$ vim README.md
- Create carDemo.rmd in your directory and knit it.
 - \$ git add carDemo.rmd
 - \$ git status
 - \$ git commit -a -m "Added carDemo.rmd"
 - \$ git push

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Clone and commit via cmd

• Update .rmd file on GitHub.com and pull it.

Rscript Head(pressure)

\$ git pull

• Your repository is ready for any drag, drop and commit ...

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- The first step is to install Git. See Chapter 6 of Happy Git with R shows the process for Mac, Windows, and Linux users.
- Create testRepo1 repository on GitHub.com.
- Clone testRepo1 either by cmd or Desktop into your local directory /GitHub.
- Open a new RStudio session in your local repository testRepo1.
- I am able to verify that I had Git installed using the terminal tab in RStudio.
 - \$ which git
 - \$ git --version

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Next we need to edit configuration/configure Git. See Chapter 7 of Happy
Git with R. Type in R console:
library(usethis)
edit_git_config()

- This leads you to your gitconfig file. Add your name and email and save this.
- Then create the new R project arminRproject via New Directory and save it in directory testRepo1.
- RStudio open a new session/ in your R project, type in R console: library(usethis) use_git()
- Now you should have a git repository (since the git tab appears in the top right panel).

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- Now create as Rmarkdown file testRmakdown in your project. You will see testRmakdown.rmd has not been committed yet.
- The next step is to commit the changes and see the history of commits.
- Next we need to connect RStudio and GitHub. To do that we need to create a Personal Access Token (PAT) on GitHub.
- Note that here some inconsistencies can happen because of OS, or some may not be able to validate the token.
- Type in the R console of your R project the following: library(usethis) create_github_token()
- This leads you to New personal access token page on GitHub. You need a
 description for example (R_GitHub_PAT).

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- This leads you to New personal access token page on GitHub. You need a
 description for example (R_GitHub_PAT).
- Now generate the token and then you have to copy the token (be careful the token is generated once. You will never see that again).
- In R console of your R project, type: library(gitcreds) gitcreds_set()
- Enter your Personal Access Token.
- Once you have done all of this, you have connected RStudio to GitHub!
- For any problem, see https://usethis.r-lib.org/reference/github-token.html.

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 If you have not linked your R project with testRepo1 (which is not the case for us), you can also type in your R console of your R project: library(usethis) use_github()

• Now look at GitHub.com, testRepo1 repository has been updated.

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GitHub First

- The most straightforward way to use RStudio and GitHub together is to create a repo on GitHub first. testRepo2
- Then when you start a new project in RStudio, use the version control option, enter your repo URL. You can create wherever you want (e.g., Desktop) but let's create again in JGitHub
- The testRepo2 is ready, create a new R file/ Rmarkdown and commit and then push the changes.
- You can pull changes too!

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Additional Resources

- For more information on Git with R, see https://happygitwithr.com/
- For an introduction to vim editor, see https://vim.rtorr.com/

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