Version Control for Researchers

Richard Polzin (4.11.2025)

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- Enables collaboration across different versions
- Supports parallel development
- Provides a detailed history of changes for accountability

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- **Merge:** Combining different branches
- **Remote:** A repository hosted elsewhere (e.g., GitHub, GitLab)

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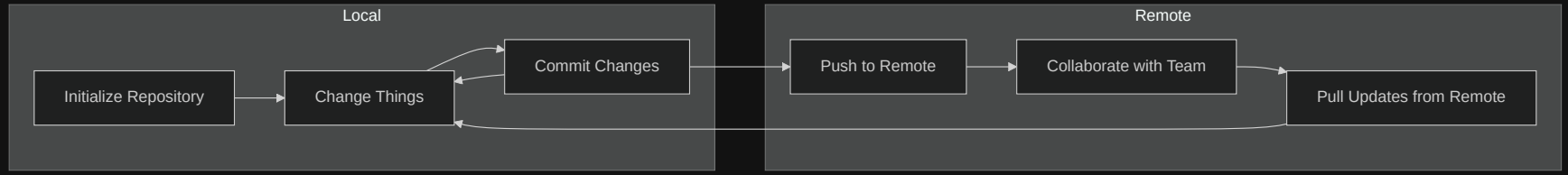

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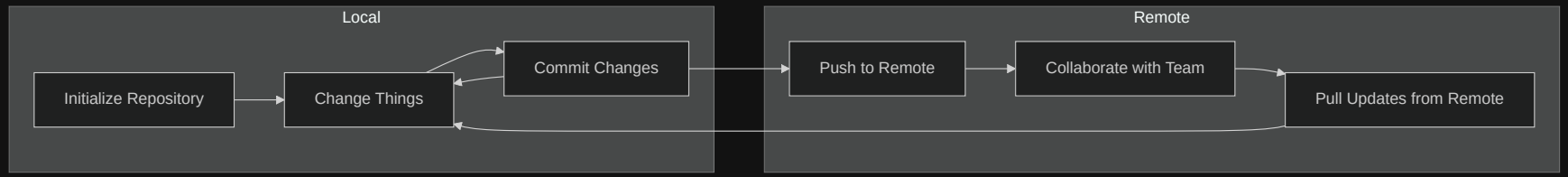

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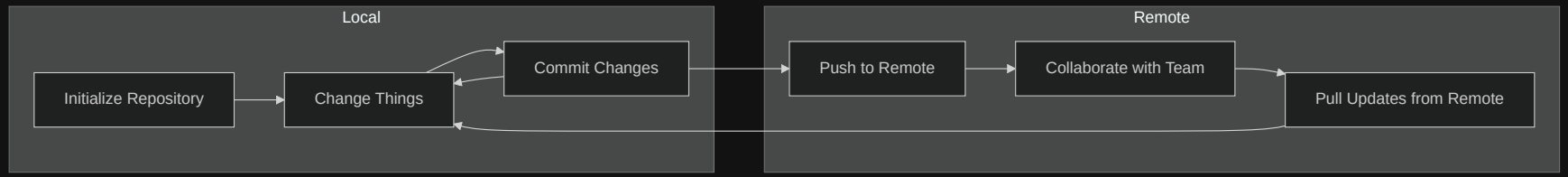

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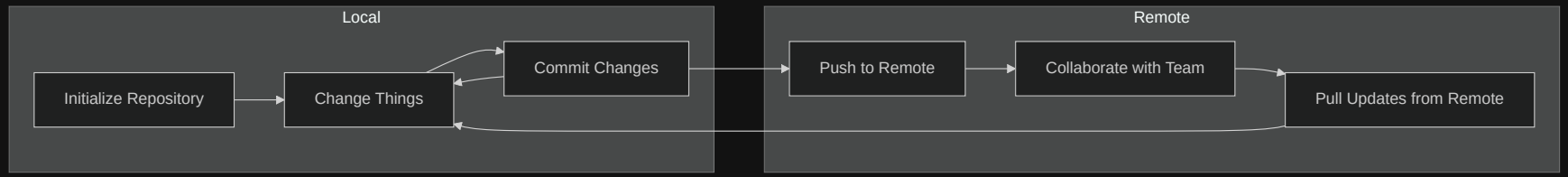

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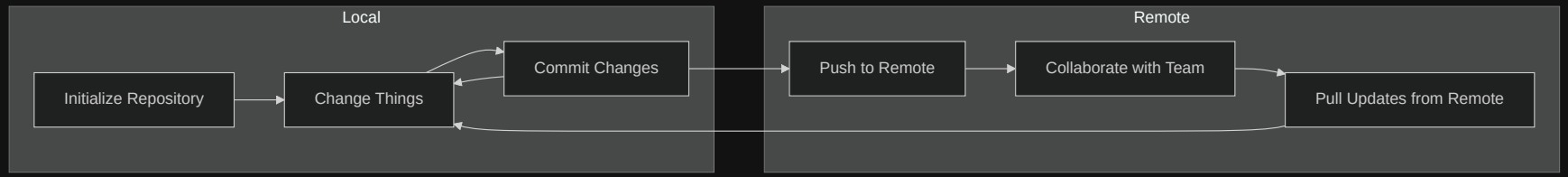

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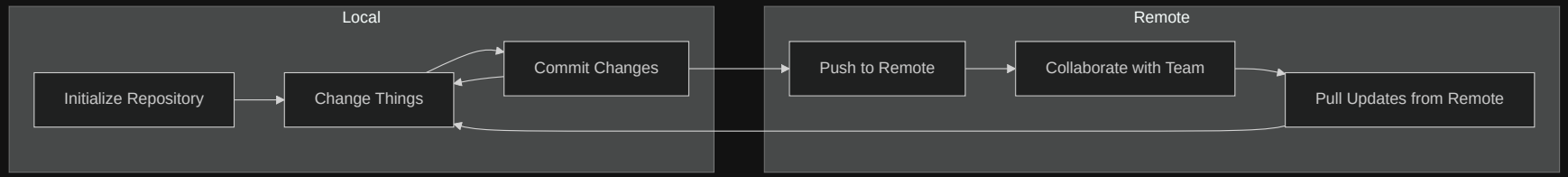

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- **Push to Remote:** Upload your commits to a remote repository with `git push`.
- **Pull Updates:** Fetch and integrate changes from the remote repository with `git pull`.

Example

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$ # Initialize a new Git repository
$ git init my_project # Create the directory and a .git folder in it
$ cd my_project
$ # Create a file and commit it
$ echo "# My Research Project" > README.md
$ git add README.md
$ git commit -m "Initial commit"
> Initial commit
> 1 file changed, 1 insertion(+)
> create mode 100644 README.md
$ # Check the status
$ git status
> On branch main
> nothing to commit, working tree clean
$ # Change a file
$ echo "\nthis is my cool description." >> README.md
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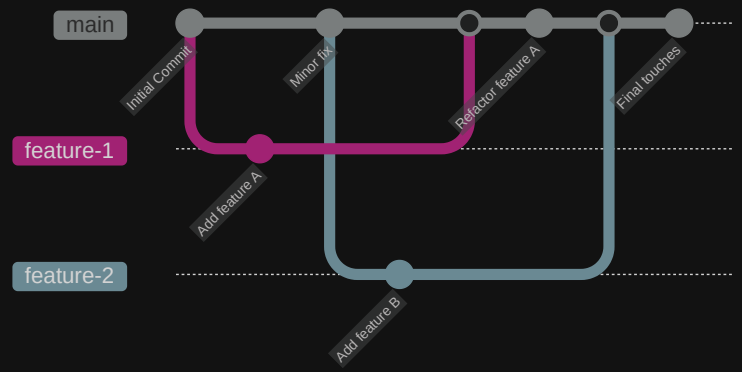
- **Git:** The (coolest 😉) software to do version control with.
- **Key Concepts:** Repository, Commit, Branch, Merge, Remote.
- **Basic Commands:** `git init`, `git add`, `git commit`, `git status`, `git log`, `git diff`.

Branching and Merging



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- **Origin:** The name of the remote repository.
- **Clone:** Create a local copy of a remote repository.

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- 🔄 Regularly push to a remote repository
- 🌿 Use branches for experimental changes

GitHub, GitLab, and Alternatives

- **GitHub:** Popular for open-source projects, big publicity/community
- **GitLab:** Itself Open-Source, available from RWTH-Aachen for Education only
- **Gitlab-CE:** Same as above, but more free license, less features

Advanced Topics (t.b.d.)

- Using Git with Jupyter Notebooks
- Git Large File Storage (LFS) for datasets
- Continuous Integration (CI) for automating workflows
- Working with submodules for modular projects

Summary

- Version Control helps manage research projects efficiently
- Enables collaboration and reproducibility
- Learning basic Git commands is a valuable skill
- Use hosted platforms for better sharing and tracking
- Start early, commit often, write good commit messages