

Installation Guide

Water Sampling with Applied Microcontrollers

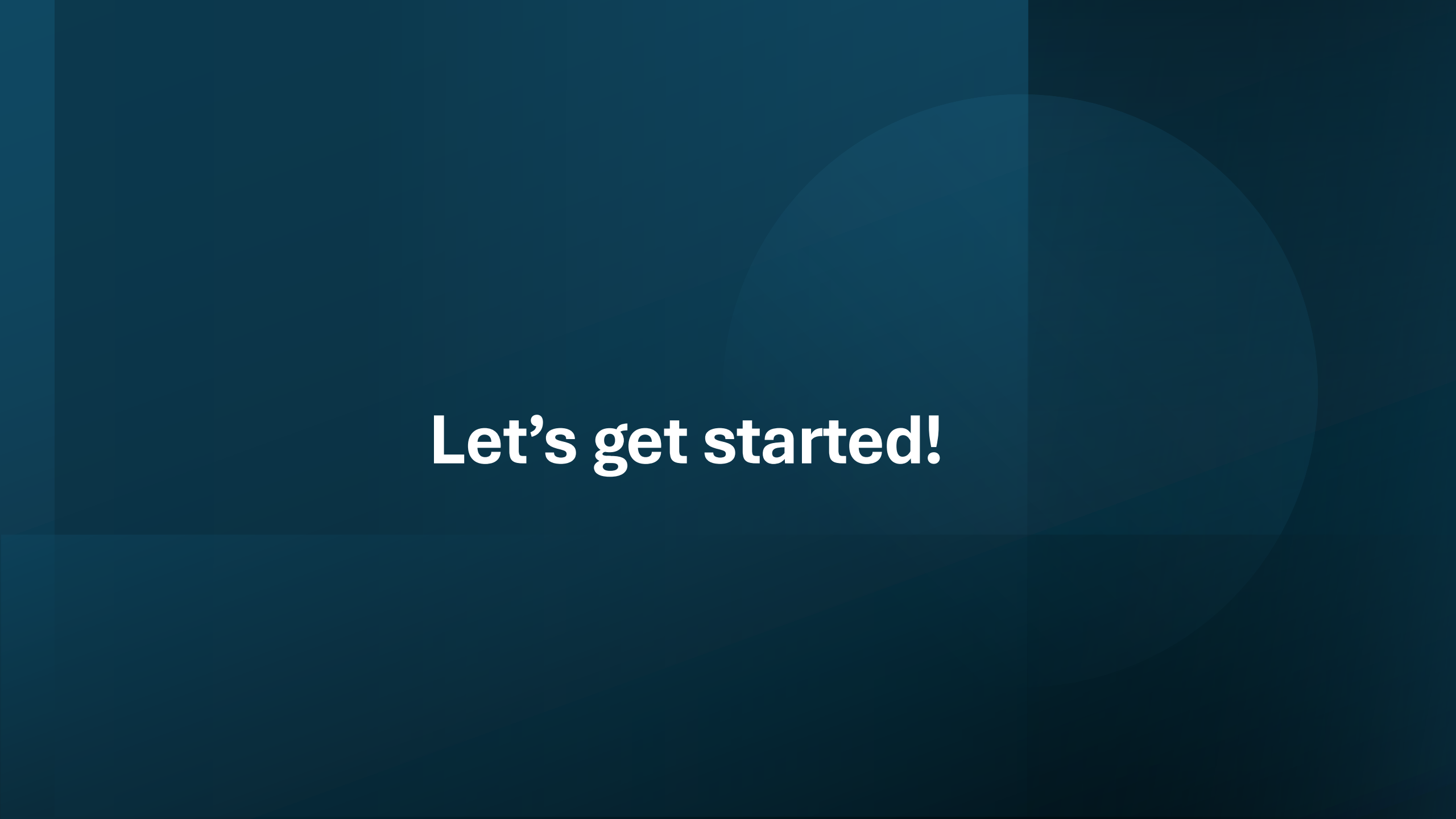
CIS 4951: Capstone II

Fall 2024

Prerequisites

Before you begin...

- Install **Git/GitHub Desktop**
 - Git: git-scm.com
 - GitHub Desktop:
<https://desktop.github.com/download/>
- Ensure **Python 3.7+** is installed (python.org)
- Verify **Pip** is up to date:
 - Run `python -m pip install --upgrade pip`

The background is a solid dark blue. A large, faint, light blue circle is positioned on the right side, partially cut off by the edge. A vertical line of a slightly lighter blue shade runs down the right side of the image, passing through the center of the circle.

Let's get started!

Option 1:

Local Setup Via Command Line

Steps:

1. Clone the repository:
`git clone https://github.com/your-username/flowcast-web-app.git.`

2. Navigate to the directory:
`cd flowcast-web-app`

3. Create a virtual environment:
`python -m venv venv`

4. Activate the environment:
Windows: `venv\Scripts\activate`
macOS/Linux: `source venv/bin/activate`

5. Install dependencies:
`pip install -r requirements.txt`

6. Run the app:
`streamlit run app.py`

7. Open in browser:
`http://localhost:XXXX`

Quick Demo

Step 1

```
username @ user_device ~ % git clone https://github.com/amart0513/flowcast-web-app.git
Cloning into 'flowcast-web-app'...
remote: Enumerating objects: 598, done.
remote: Counting objects: 100% (11/11), done.
remote: Compressing objects: 100% (11/11), done.
remote: Total 598 (delta 0), reused 2 (delta 0), pack-reused 587 (from 1)
Receiving objects: 100% (598/598), 21.87 MiB | 26.22 MiB/s, done.
Resolving deltas: 100% (341/341), done.
```

Step 2

```
username @ user_device      ~ % cd flowcast-web-app
username @ user_device      flowcast-web-app % ls
FlowCast                    README.md
```

Step 3 - 5

```
username @ user_device    flowcast-web-app % python3 --version
Python 3.13.1
username @ user_device    flowcast-web-app % python3 -m venv venv
username @ user_device    flowcast-web-app % ls
FlowCast                  README.md                 venv
[ username @ user_device  flowcast-web-app % source venv/bin/activate
[(venv) username @ user_device    flowcast-web-app % pip install -r requirements.txt
```

Step 6 - 7

```
[(venv) username @ user_device flowcast-web-app % cd ./FlowCast  
[(venv) username @ user_device FlowCast % ls  
01_Home.py      data      media      models      pages  
[(venv) username @ user_device FlowCast % streamlit run 01_Home.py
```

You can now view your Streamlit app in your browser.

Local URL: **http://localhost:XXXX**

For better performance, install the Watchdog module:

```
$ xcode-select --install  
$ pip install watchdog
```



[Home](#)[Background](#)[Real-Time Analysis](#)[Global Dashboard](#)[Sign Up](#)[About Us](#)

Welcome to FlowCast!

Real-time water quality insights powered by advanced machine learning.

[Learn More](#)[NOAA Website](#)

Our Purpose

Our project centered on the real-time analysis of water quality using advanced machine learning techniques, specifically tailored for the unique environmental conditions of Biscayne Bay and Haulover Beach. By focusing on location-specific datasets, we significantly improved predictive model performance, enabling timely forecasts for water quality issues that impact marine life and human health.

By employing machine learning models, we were able to process and analyze large-scale datasets in real-time, enabling predictive insights into water quality trends. The project's methodology included advanced data preprocessing techniques such as feature scaling, data imputation, and cross-validation to ensure the models remained robust and unbiased. Additionally, we incorporated geospatial data, which enhanced the accuracy of predictions by accounting for location-based variations in water quality indicators.

This data-driven approach significantly improved predictive model performance compared to traditional water quality analysis methods. The result is a highly reliable system capable of timely forecasts for potential water quality issues, such as harmful algal blooms, hypoxia, or elevated pollutant levels. These predictions have immediate applications in safeguarding marine life, supporting fisheries, and protecting human health by ensuring the water is safe for recreational activities.



The Heron collecting data from the FIU lake by Parking Garage 6 (PG-6).

Option 2:

GitHub Desktop Setup

Steps:

1. Open GitHub Desktop and select “**File > Clone Repository**”
2. Choose the repository or enter the URL:
<https://github.com/your-username/flowcast-web-app.git>
3. Choose a local path and click **Clone**.
4. Navigate to the directory:
`cd flowcast-web-app`
5. Follow **Steps 3-7** from **Option 1**.

Quick Demo

Step 1

GitHub
Desktop

[Download](#)

[Release Notes](#)

[Help](#)

Download GitHub Desktop

Focus on what matters instead of fighting with Git. Whether you're new to Git or a seasoned user, GitHub Desktop simplifies your development workflow.

[Download for macOS](#)

Try beta features and help improve future releases

Experience the latest features and bug fixes before they're released.

[Check out Beta](#)

Do you use an Apple silicon Mac?

See the [Apple docs](#) about Apple vs Intel chips.

[Download for Apple silicon Mac](#)

Looking for Windows?

Need to download the install for Windows?

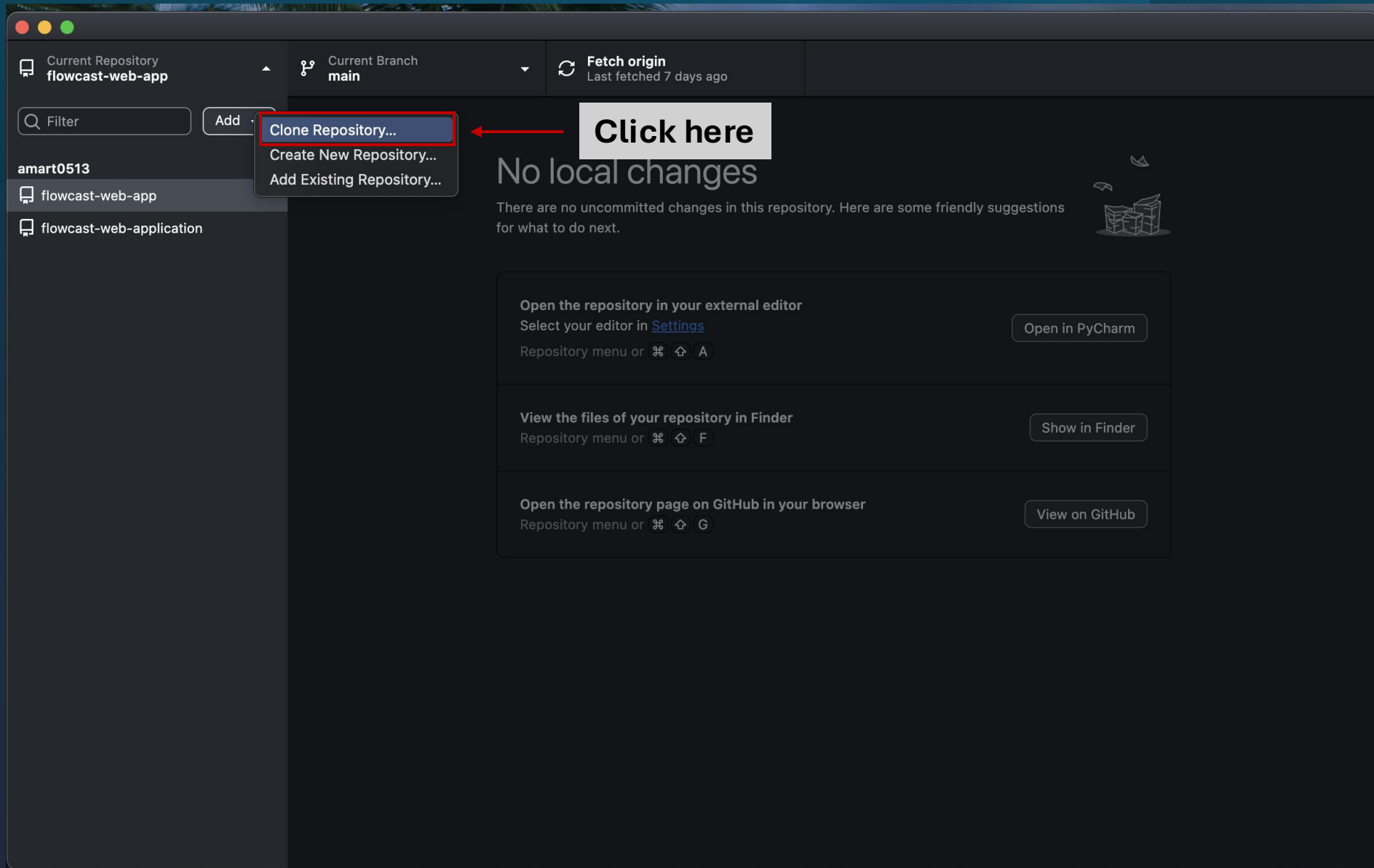
[Download for Windows](#)

By downloading, you agree to the [Open Source Applications Terms](#).

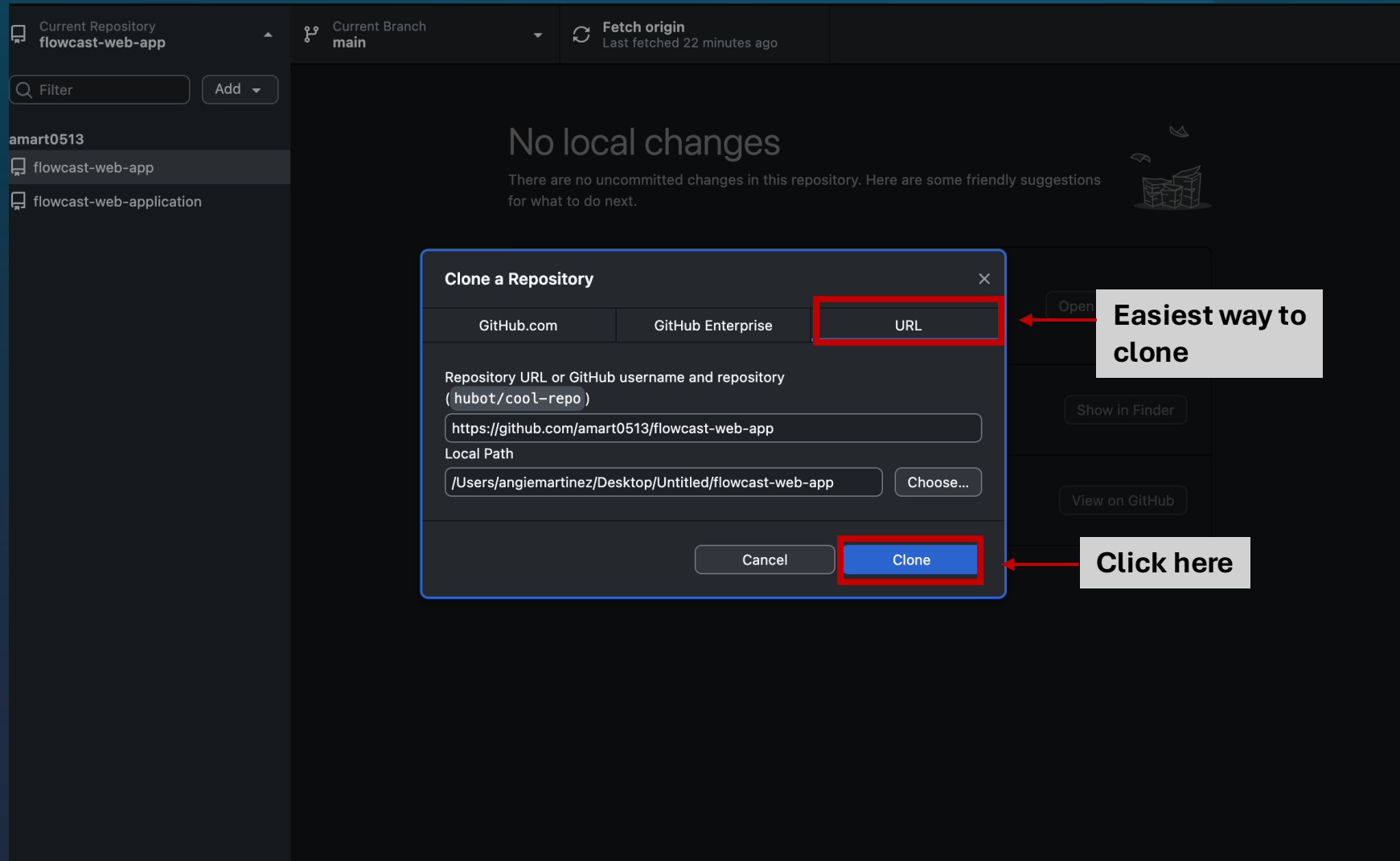
[Terms](#) [Privacy Policy](#) [EULA](#) [Release Notes](#)

© 2024 GitHub, Inc. All rights reserved.

Step 2



Step 3



Should be able to see this (repository should be successfully cloned)

Current Repository
flowcast-web-app

Current Branch
main

Fetch origin
Last fetched 2 minutes ago

ChangesHistory

☒ 0 changed files

No local changes

There are no uncommitted changes in this repository. Here are some friendly suggestions for what to do next.

Open the repository in your external editor

Select your editor in [Settings](#)

Repository menu or ⌘⇧A

Open in PyCharm

View the files of your repository in Finder

Repository menu or ⌘⇧F

Show in Finder

Open the repository page on GitHub in your browser

Repository menu or ⌘⇧G

View on GitHub

Summary (required)

Description

You can customize your settings here (IDE, files, etc.)

Step 4

```
username @ user_device    flowcast-web-app % python3 --version
Python 3.13.1
username @ user_device    flowcast-web-app % python3 -m venv venv
username @ user_device    flowcast-web-app % ls
FlowCast                  README.md                venv
[ username @ user_device  flowcast-web-app % source venv/bin/activate
```

Step 5 - 6

```
[(venv) username @ user_device flowcast-web-app % cd ./FlowCast
[(venv) username @ user_device FlowCast % ls
01_Home.py      data          media          models          pages
[(venv) username @ user_device FlowCast % streamlit run 01_Home.py
```

You can now view your Streamlit app in your browser.

Local URL: **http://localhost:XXXX**

For better performance, install the Watchdog module:

```
$ xcode-select --install
$ pip install watchdog
```



[Home](#)[Background](#)[Real-Time Analysis](#)[Global Dashboard](#)[Sign Up](#)[About Us](#)

Welcome to FlowCast!

Real-time water quality insights powered by advanced machine learning.

[Learn More](#)[NOAA Website](#)

Our Purpose

Our project centered on the real-time analysis of water quality using advanced machine learning techniques, specifically tailored for the unique environmental conditions of Biscayne Bay and Haulover Beach. By focusing on location-specific datasets, we significantly improved predictive model performance, enabling timely forecasts for water quality issues that impact marine life and human health.

By employing machine learning models, we were able to process and analyze large-scale datasets in real-time, enabling predictive insights into water quality trends. The project's methodology included advanced data preprocessing techniques such as feature scaling, data imputation, and cross-validation to ensure the models remained robust and unbiased. Additionally, we incorporated geospatial data, which enhanced the accuracy of predictions by accounting for location-based variations in water quality indicators.

This data-driven approach significantly improved predictive model performance compared to traditional water quality analysis methods. The result is a highly reliable system capable of timely forecasts for potential water quality issues, such as harmful algal blooms, hypoxia, or elevated pollutant levels. These predictions have immediate applications in safeguarding marine life, supporting fisheries, and protecting human health by ensuring the water is safe for recreational activities.



The Heron collecting data from the FIU lake by Parking Garage 6 (PG-6).