FINAL CODE

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| Team ID | PNT2022TMID45278 |
| Project Name | Real-time river water quality monitoring  and control system |

CODE:

# Import common libraries import numpy as np import pandas as pd

import matplotlib.pyplot as plt

# Import the PyGeohydro libaray tools import pygeohydro as gh

from pygeohydro import NWIS, plot

# Use the national water info system (NWIS) nwis = NWIS()

# Specify date range of interest

dates = ("2020-01-01", "2020-12-31")

# Filter stations to have only those with proper dates

stations = info\_box[(info\_box.begin\_date <= dates[0]) & (info\_box.end\_date >= dates[1])].site\_no.tolist()

# Remove duplicates by converting to a set stations = set(stations)

# Specify characteristics of interest

select\_attributes = ['CAT\_BASIN\_AREA', 'CAT\_ELEV\_MAX', 'CAT\_STREAM\_SLOPE']

# Initialize a storage matrix

nldi\_data = np.zeros((len(flow\_data.columns), len(select\_attributes)))

# Loop through all gages, and request NLDI data near each gage for i, st in enumerate(flow\_data.columns):

# Navigate up all flowlines from gage

flowlines = NLDI().navigate\_byid(fsource = 'nwissite',

fid = f'{st}', navigation="upstreamTributaries", source = 'flowlines',

distance = 10)

# Get the nearest comid

station\_comid = flowlines.nhdplus\_comid.to\_list()[0]

# Source NLDI local data

nldi\_data[i,:] = NLDI().getcharacteristic\_byid(station\_comid, "local", char\_ids = select\_attributes)