FINAL CODE

DATE	3 NOVEMBER 2022
TEAM ID	PNT2022TMID52171
PROJECT NAME	Smart solutions for Railways

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 SSFR, plot


# Use the smart solution for railways(SSFR)

ssfr = SSFR()

# 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 = journey time ,train announcement , waiting
arrangement ,security in the station, seat condition

# 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)
```