lab3_2

November 24, 2023

1 Comparing Interpolation Techniques for Predicting Temperature Trends

1.0.1 GIS 5571 Lab 3 part2

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November 28

[47]:
```
import requests
import os
import pandas as pd
import arcpy
from arcpy.sa import *
```

[96]:
```
# Set the workspace
arcpy.env.workspace = r"D:\fall2023\arc1\lab3\lab3_2\lab3_2\lab3_2.gdb"
```

[37]:
```
url = "https://ndawn.ndsu.nodak.edu/table.csv?
 ↪station=78&station=111&station=98&station=162&station=174&station=142&station=164&station=1
response = requests.get(url)
```

[39]:
```
folder = r"D:\fall2023\arc1\lab3\lab3_2\data"

if not os.path.exists(folder):
    os.makedirs(folder)
```

[92]:
```
file_path = r"D:\fall2023\arc1\lab3\lab3_2\data\tmp_monthly.csv"

with open(file_path, "wb") as file:
    file.write(response.content)
```

[85]:
```
tmp_monthly = pd.read_csv(file_path, header = 4)
tmp_monthly
```

[85]:

	Unnamed: 0	deg	deg.1	…	Unnamed: 6	Degrees F	Unnamed: 8
0	Ada	47.32119	-96.51406	…	23	53.361	NaN
1	Ada	47.32119	-96.51406	…	24	43.086	NaN

```
2           Ada  47.32119 -96.51406  …          25     39.637         NaN
3           Ada  47.32119 -96.51406  …          26     36.737         NaN
4           Ada  47.32119 -96.51406  …          27     25.152         NaN
…           …        …        …   …          …        …
5785    Zeeland  46.01351 -99.68768  …          17     31.253         NaN
5786    Zeeland  46.01351 -99.68768  …          18     40.014         NaN
5787    Zeeland  46.01351 -99.68768  …          19     43.477         NaN
5788    Zeeland  46.01351 -99.68768  …          20     39.172         NaN
5789    Zeeland  46.01351 -99.68768  …          21     29.059         NaN

[5790 rows x 9 columns]
```

[87]:
```
tmp_monthly.rename(columns={'Unnamed: 0':'Station Name', 'deg':'Latitude', 'deg.
 ↪1':'Longitude', 'Degrees F':'Avg'}, inplace=True)
tmp_monthly['MAX'] = tmp_monthly['Avg']
tmp_monthly['MIN'] = tmp_monthly['Avg']
tmp_monthly
```

[87]:
```
     Station Name  Latitude  Longitude    ft  …     Avg  Unnamed: 8     MAX
MIN
0             Ada  47.32119  -96.51406   910  …  53.361         NaN  53.361
53.361
1             Ada  47.32119  -96.51406   910  …  43.086         NaN  43.086
43.086
2             Ada  47.32119  -96.51406   910  …  39.637         NaN  39.637
39.637
3             Ada  47.32119  -96.51406   910  …  36.737         NaN  36.737
36.737
4             Ada  47.32119  -96.51406   910  …  25.152         NaN  25.152
25.152
…             …        …         …   …   …  …     …          …     …
…
5785      Zeeland  46.01351  -99.68768  2070  …  31.253         NaN  31.253
31.253
5786      Zeeland  46.01351  -99.68768  2070  …  40.014         NaN  40.014
40.014
5787      Zeeland  46.01351  -99.68768  2070  …  43.477         NaN  43.477
43.477
5788      Zeeland  46.01351  -99.68768  2070  …  39.172         NaN  39.172
39.172
5789      Zeeland  46.01351  -99.68768  2070  …  29.059         NaN  29.059
29.059

[5790 rows x 11 columns]
```

[88]:
```
# Drop specific columns (4, 5, 6, 7, and 9)
columns_to_drop = [3, 4, 5, 6, 8]
```

```
tmp_monthly = tmp_monthly.drop(columns=tmp_monthly.columns[columns_to_drop])

# Reset the index after dropping columns
tmp_monthly2 = tmp_monthly.reset_index(drop=True)
```

[89]:
```
df_tmp = tmp_monthly2.to_csv(r"D:
↪\fall2023\arc1\lab3\lab3_2\data\tmp_monthly_clean.csv")
```

[90]:
```
df_tmp = r"D:\fall2023\arc1\lab3\lab3_2\data\tmp_monthly_clean.csv"

# Output feature class
out_feature_class = r"D:\fall2023\arc1\lab3\lab3_2\lab3_2\lab3_2.gdb\stations"
X_field = "Longitude"
Y_field = "Latitude"
coordinate_system = arcpy.SpatialReference(4326)  # Example: WGS 1984

# Create an XY event layer
arcpy.management.XYTableToPoint(df_tmp, out_feature_class, X_field, Y_field)
```

[90]:
```
<Result 'D:\\fall2023\\arc1\\lab3\\lab3_2\\lab3_2\\lab3_2.gdb\\stations'>
```

[91]:
```
# Input feature class
input_feature_class = "stations"

# Output dissolved feature class
output_feature_class = "TMP_stations"

# Dissolve based on the "Avg" field using the MEAN statistic
arcpy.management.Dissolve(input_feature_class, output_feature_class,␣
↪["Station_Name"], "Avg MEAN; MAX MAX; MIN MIN" )
```

[91]:
```
<Result 'D:\\fall2023\\arc1\\lab3\\lab3_2\\lab3_2\\lab3_2.gdb\\TMP_stations'>
```

IDW / Kriging / Global Polynomial Interpolation

[122]:
```
def interpolation_methods(feature_class, values):
    for value in values:
        IDW = Idw(feature_class, value)
        IDW.save(f"IDW_{value}")

        Kriging_tool = Kriging(feature_class, value, KrigingModelOrdinary())
        Kriging_tool.save(f"Kriging_{value}")

        GPI = arcpy.ga.GlobalPolynomialInterpolation(feature_class, value,␣
↪out_raster=f"GPI_{value}")
```

```
interpolation_methods("TMP_stations", ["MEAN_Avg", "MAX_MAX", "MIN_MIN"])
```