Interpolation: This file contains the code for Interpolating the existing Dataset. The various Datsets are interpolated and Smoothened as per requirement and minimal error.

```
clear;
clc;
close all;
```

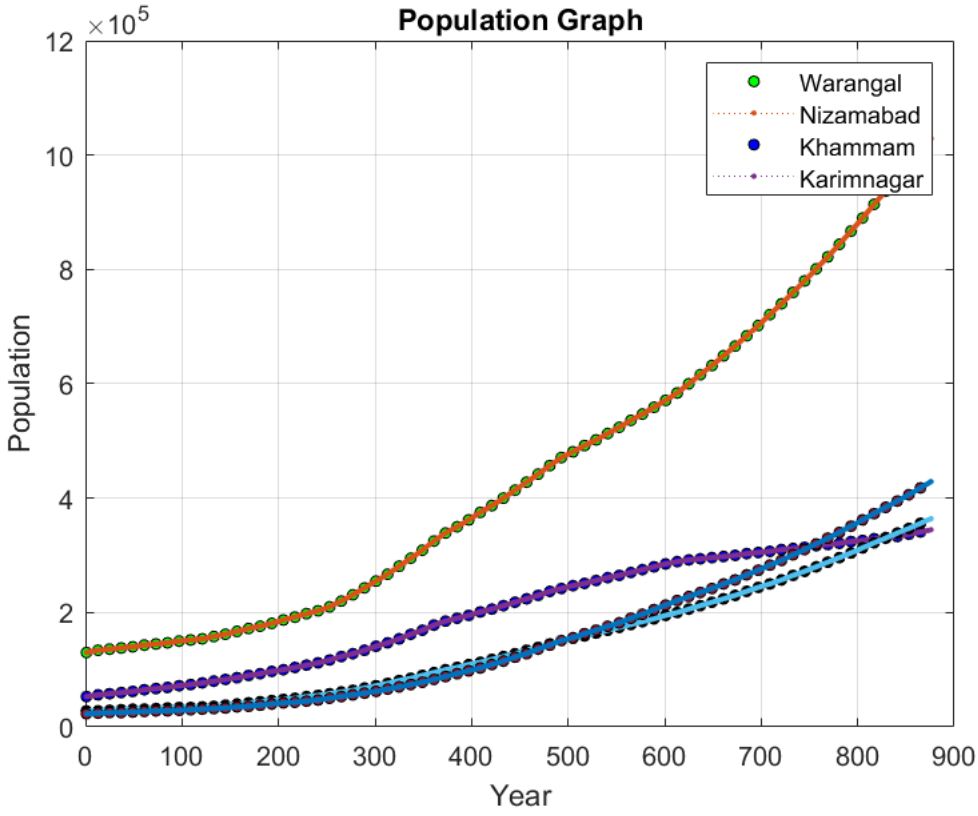
```
%Population Interpolation.
%The datasets are loaded as arrays.
```

```
%Years.
%1950-2022.
Y=1:12:876;

%Population Dataset from 1950-2022 years.
Warangal=[130000 134000    136000    138000    140000    143000    145000    147000    150000
Nizamabad=[53000    56000    58000    60000    62000    65000    67000    69000    72000    740
Khammam=[28000    28000    29000    30000    31000    31000    32000    33000    34000    34000
Karimnagar=[23000    24000    25000    25000    26000    27000    28000    28000    29000    30

%Months.
%73 years from 1950-2022.
% 73 x 12 = 876 Months.
M=1:876;
```

```
%Interpolation.
%The Yearly dataset is interpolated to obtain Monthly Dataset. Linear
%Interpolation with Extrapolation is used as it is more natural.
Warangal_interpolated= interp1(Y,Warangal,M,'linear','extrap');
Nizamabad_interpolated= interp1(Y,Nizamabad,M,'linear','extrap');
Khammam_interpolated= interp1(Y,Khammam,M,'linear','extrap');
Karimnagar_interpolated= interp1(Y,Karimnagar,M,'linear','extrap');
```

```
%Plotting the graphs.
h=plot(Y,Warangal,'go');
set(h,'MarkerFaceColor',get(h,'Color'),'MarkerSize',4,'MarkerEdgeColor', 'k');
hold on;
plot(M,Warangal_interpolated,':.');
hold on;
h=plot(Y,Nizamabad,'bo');
set(h,'MarkerFaceColor',get(h,'Color'),'MarkerSize',4,'MarkerEdgeColor', 'k');
hold on;
plot(M,Nizamabad_interpolated,':.');
hold on;
h=plot(Y,Khammam,'ko');
set(h,'MarkerFaceColor',get(h,'Color'),'MarkerSize',4,'MarkerEdgeColor', 'k');
hold on;
plot(M,Khammam_interpolated,':.');
hold on;
h=plot(Y,Karimnagar,'o');
```

```
set(h,'MarkerFaceColor',get(h,'Color'),'MarkerSize',4,'MarkerEdgeColor', 'k');
hold on;
plot(M,Karimnagar_interpolated,':.');
hold off;
grid on;
title('Population Graph');
xlabel('Year');
ylabel('Population');
legend('Warangal','Nizamabad','Khammam','Karimnagar');
```




```
%Saving the population data in a single vector.
Population_Monthly_Interpolated_Vector=[Warangal_interpolated Nizamabad_interpolated Khammam_in

%Saving as .mat file.
save('Population_Monthly_Interpolated_Vector.mat','Population_Monthly_Interpolated_Vector');
```

```
clear;
clc;
```

```
%Energy Calculation.
%The TS NPDCL Energy Consumption Datasets are used.
```

```
%Path Directory.
%Contains the files from Jan 2019- Jan 2022.
%Contains 48 files.
```

```
files = dir('Energy\TS-NPDCL_consumption_detail_industrial_*.csv');
directory='Energy\';
```

```
%Empty Arrays to store Mean, Variance and Skewness of TotServices,
%BilledServices, Units and Load respectively.
% 3 Features from each value.
% 4 x 3 = 12 Features in total.
Energy_Warangal=[];
Energy_Nizamabad=[];
Energy_Khammam=[];
Energy_Karimnagar=[];
```

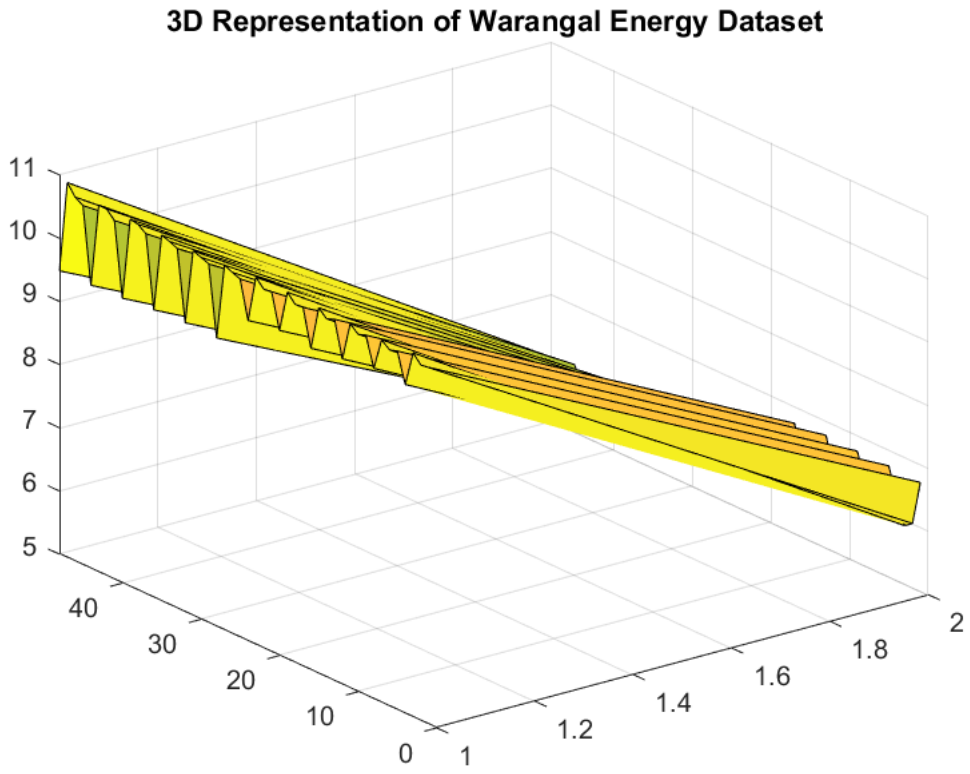
```
%Loading all the .csv files.
%There are 48 files, each corresponding to a month from 2019-2022.
for i=1:length(files)
    file_name = files(i).name;
    myMatrix = readtable([directory file_name]);

    %Loading all the values from Warangal Circle.
    myTable = find(strcmp(myMatrix.Circle,'WARANGAL'));
    Energy_Warangal_temp= [myMatrix.TotServices(myTable) myMatrix.BilledServices(myTable) myMat

    %Loading all the values from Nizamabad Circle.
    myTable = find(strcmp(myMatrix.Circle,'NIZAMABAD'));
    Energy_Nizamabad_temp= [myMatrix.TotServices(myTable) myMatrix.BilledServices(myTable) myMa

    %Loading all the values from Khammam Circle.
    myTable = find(strcmp(myMatrix.Circle,'KHAMMAM'));
    Energy_Khammam_temp= [myMatrix.TotServices(myTable) myMatrix.BilledServices(myTable) myMatr

    %Loading all the values from Karimnagar Circle.
    myTable = find(strcmp(myMatrix.Circle,'KARIMNAGAR'));
    Energy_Karimnagar_temp= [myMatrix.TotServices(myTable) myMatrix.BilledServices(myTable) myM

    %Calculating the mean, variance and skewness.
    Energy_Warangal=[Energy_Warangal; mean(Energy_Warangal_temp,1) var(Energy_Warangal_temp,1)
    Energy_Nizamabad=[Energy_Nizamabad; mean(Energy_Nizamabad_temp,1) var(Energy_Nizamabad_temp
    Energy_Khammam=[Energy_Khammam; mean(Energy_Khammam_temp,1) var(Energy_Khammam_temp,1) skew
    Energy_Karimnagar=[Energy_Karimnagar; mean(Energy_Karimnagar_temp,1) var(Energy_Karimnagar_
end
```

```
%Rearranging the values according to months.
%The files are read Apr, Aug, Dec, Feb, Jan, Jul, Jun, Mar, May, Nov, Oct,
%Sept order.
Energy_Warangal_temp=Energy_Warangal;
Energy_Warangal(1:4,:)=Energy_Warangal_temp(17:20,:);
Energy_Warangal(5:8,:)=Energy_Warangal_temp(13:16,:);
Energy_Warangal(9:12,:)=Energy_Warangal_temp(29:32,:);
Energy_Warangal(13:16,:)=Energy_Warangal_temp(1:4,:);
Energy_Warangal(17:20,:)=Energy_Warangal_temp(33:36,:);
Energy_Warangal(21:24,:)=Energy_Warangal_temp(25:28,:);
```

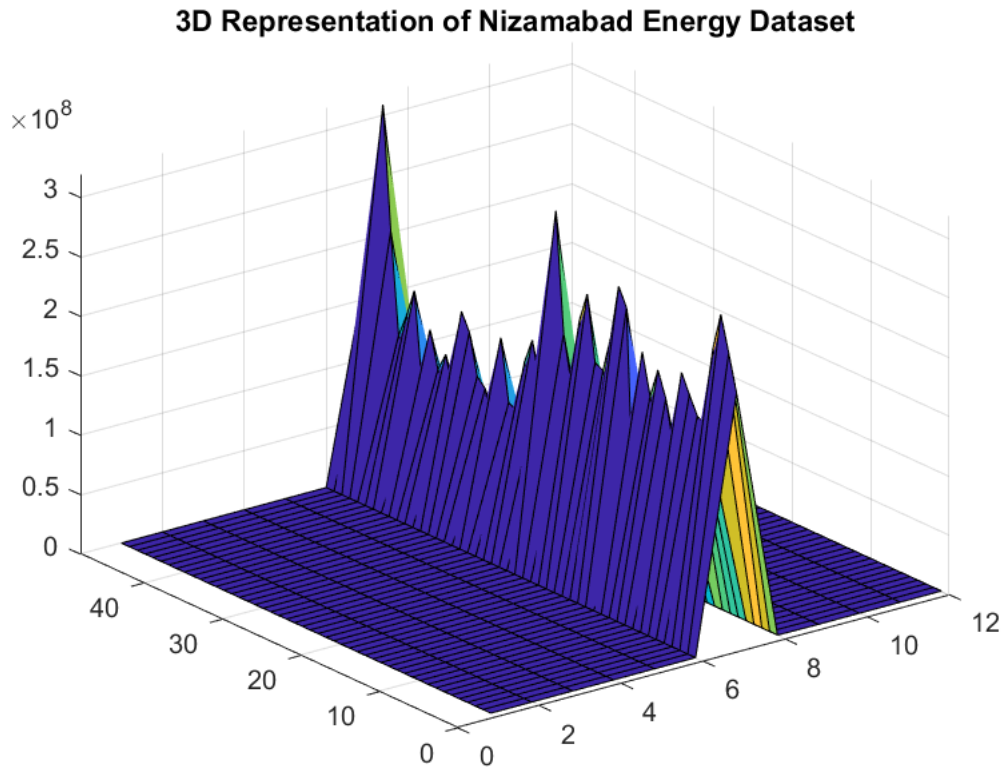
```
Energy_Warangal(25:28,:)=Energy_Warangal_temp(21:24,:);
Energy_Warangal(29:32,:)=Energy_Warangal_temp(5:8,:);
Energy_Warangal(33:36,:)=Energy_Warangal_temp(45:48,:);
Energy_Warangal(37:40,:)=Energy_Warangal_temp(41:44,:);
Energy_Warangal(41:44,:)=Energy_Warangal_temp(37:40,:);
Energy_Warangal(45:48,:)=Energy_Warangal_temp(9:12,:);

Energy_Nizamabad_temp=Energy_Nizamabad;
Energy_Nizamabad(1:4,:)=Energy_Nizamabad_temp(17:20,:);
Energy_Nizamabad(5:8,:)=Energy_Nizamabad_temp(13:16,:);
Energy_Nizamabad(9:12,:)=Energy_Nizamabad_temp(29:32,:);
Energy_Nizamabad(13:16,:)=Energy_Nizamabad_temp(1:4,:);
Energy_Nizamabad(17:20,:)=Energy_Nizamabad_temp(33:36,:);
Energy_Nizamabad(21:24,:)=Energy_Nizamabad_temp(25:28,:);
Energy_Nizamabad(25:28,:)=Energy_Nizamabad_temp(21:24,:);
Energy_Nizamabad(29:32,:)=Energy_Nizamabad_temp(5:8,:);
Energy_Nizamabad(33:36,:)=Energy_Nizamabad_temp(45:48,:);
Energy_Nizamabad(37:40,:)=Energy_Nizamabad_temp(41:44,:);
Energy_Nizamabad(41:44,:)=Energy_Nizamabad_temp(37:40,:);
Energy_Nizamabad(45:48,:)=Energy_Nizamabad_temp(9:12,:);

Energy_Khammam_temp=Energy_Khammam;
Energy_Khammam(1:4,:)=Energy_Khammam_temp(17:20,:);
Energy_Khammam(5:8,:)=Energy_Khammam_temp(13:16,:);
Energy_Khammam(9:12,:)=Energy_Khammam_temp(29:32,:);
Energy_Khammam(13:16,:)=Energy_Khammam_temp(1:4,:);
Energy_Khammam(17:20,:)=Energy_Khammam_temp(33:36,:);
Energy_Khammam(21:24,:)=Energy_Khammam_temp(25:28,:);
Energy_Khammam(25:28,:)=Energy_Khammam_temp(21:24,:);
Energy_Khammam(29:32,:)=Energy_Khammam_temp(5:8,:);
Energy_Khammam(33:36,:)=Energy_Khammam_temp(45:48,:);
Energy_Khammam(37:40,:)=Energy_Khammam_temp(41:44,:);
Energy_Khammam(41:44,:)=Energy_Khammam_temp(37:40,:);
Energy_Khammam(45:48,:)=Energy_Khammam_temp(9:12,:);

Energy_Karimnagar_temp=Energy_Karimnagar;
Energy_Karimnagar(1:4,:)=Energy_Karimnagar_temp(17:20,:);
Energy_Karimnagar(5:8,:)=Energy_Karimnagar_temp(13:16,:);
Energy_Karimnagar(9:12,:)=Energy_Karimnagar_temp(29:32,:);
Energy_Karimnagar(13:16,:)=Energy_Karimnagar_temp(1:4,:);
Energy_Karimnagar(17:20,:)=Energy_Karimnagar_temp(33:36,:);
Energy_Karimnagar(21:24,:)=Energy_Karimnagar_temp(25:28,:);
Energy_Karimnagar(25:28,:)=Energy_Karimnagar_temp(21:24,:);
Energy_Karimnagar(29:32,:)=Energy_Karimnagar_temp(5:8,:);
Energy_Karimnagar(33:36,:)=Energy_Karimnagar_temp(45:48,:);
Energy_Karimnagar(37:40,:)=Energy_Karimnagar_temp(41:44,:);
Energy_Karimnagar(41:44,:)=Energy_Karimnagar_temp(37:40,:);
Energy_Karimnagar(45:48,:)=Energy_Karimnagar_temp(9:12,:);
```

```
%Plotting to see various distributions of the Data.
%Looking at the non-linear nature of the dataset.
figure;
surf(Energy_Warangal(:,1:2));
```

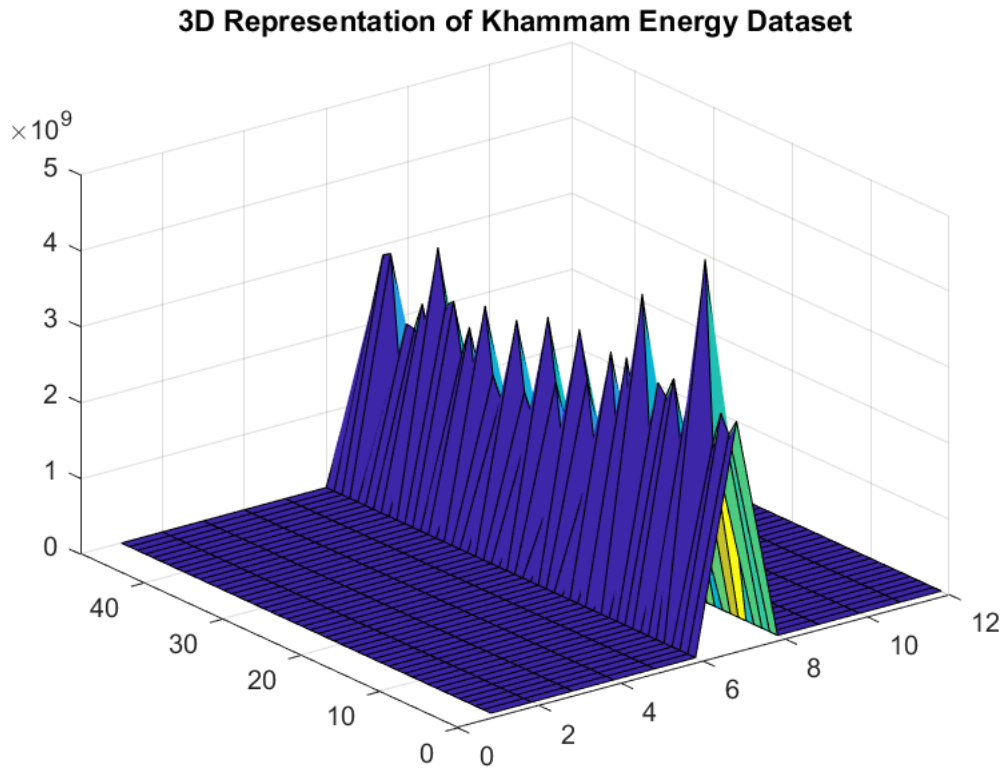
```
title('3D Representation of Warangal Energy Dataset');
```



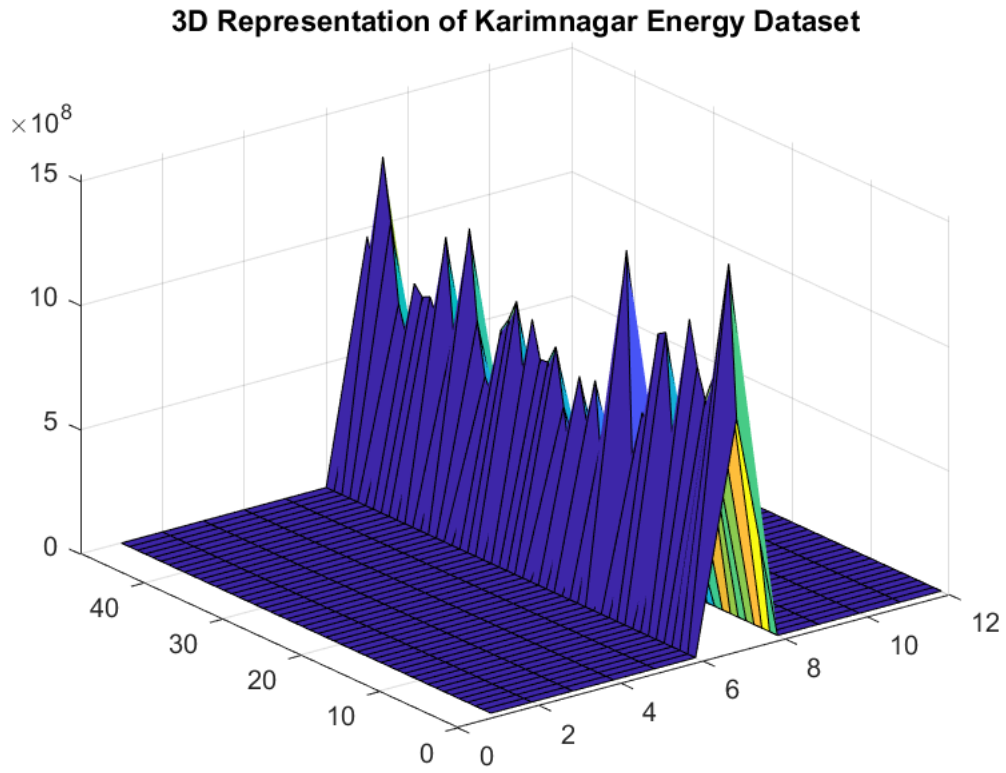

```
figure;
surf(Energy_Nizamabad);
title('3D Representation of Nizamabad Energy Dataset');
```




```
figure;
surf(Energy_Khammam);
title('3D Representation of Khammam Energy Dataset');
```




```
figure;
surf(Energy_Karimnagar);
title('3D Representation of Karimnagar Energy Dataset');
```



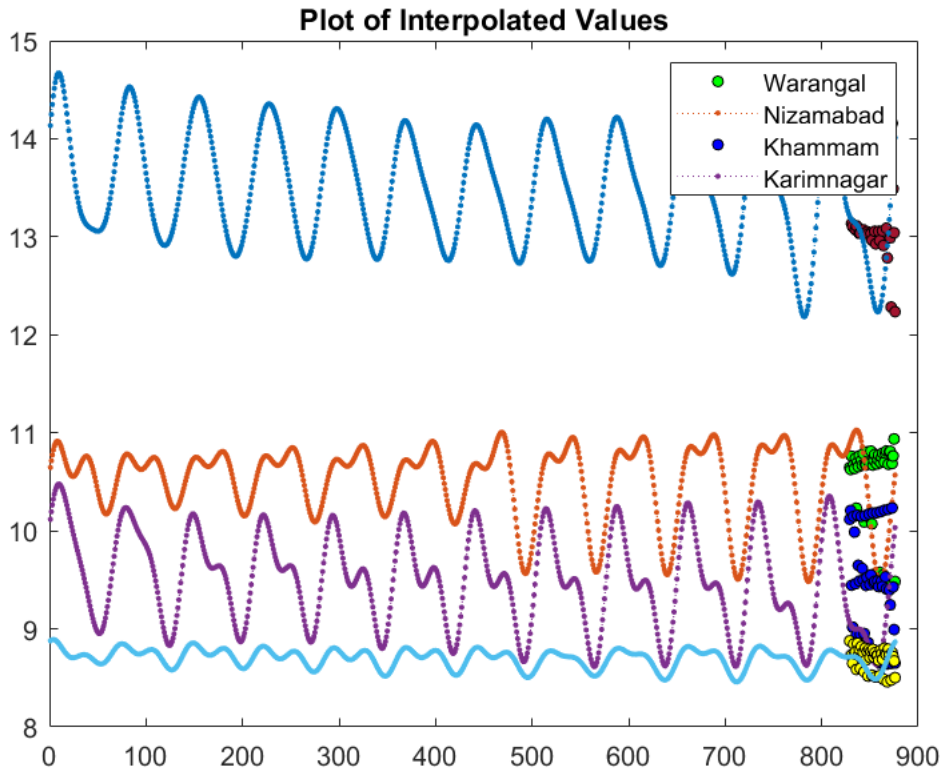

```
%Saving as .mat files.
save('Energy.mat','Energy_Warangal','Energy_Nizamabad','Energy_Khammam','Energy_Karimnagar');
```

```
clear;
clc;
```

```
%Loading the Energy values.
load('Energy.mat');

%Available Data.
Y=829:876;

%Months.
M=1:876;
```

```
%Interpolation of Energy Values.
%Interpolation using FFT Method is performed to fit the oscillating Data.
%This interpolation is the best option available and provides the least
%deviation from available data.
Energy_Warangal_interpolated= interpft(Energy_Warangal,876);
Energy_Nizamabad_interpolated= interpft(Energy_Nizamabad,876);
Energy_Khammam_interpolated= interpft(Energy_Khammam,876);
Energy_Karimnagar_interpolated= interpft(Energy_Karimnagar,876);
```

```
%Plotting the graphs.
for i=1:12
    figure;
h=plot(Y,Energy_Warangal(:,i),'go');
set(h,'MarkerFaceColor',get(h,'Color'),'MarkerSize',4,'MarkerEdgeColor', 'k');
hold on;
plot(M,Energy_Warangal_interpolated(:,i),':.');
hold on;
h=plot(Y,Energy_Nizamabad(:,i),'bo');
set(h,'MarkerFaceColor',get(h,'Color'),'MarkerSize',4,'MarkerEdgeColor', 'k');
hold on;
plot(M,Energy_Nizamabad_interpolated(:,i),':.');
hold on;
h=plot(Y,Energy_Khammam(:,i),'yo');
set(h,'MarkerFaceColor',get(h,'Color'),'MarkerSize',4,'MarkerEdgeColor', 'k');
hold on;
plot(M,Energy_Khammam_interpolated(:,i),':.');
hold on;
h=plot(Y,Energy_Karimnagar(:,i),'o');
set(h,'MarkerFaceColor',get(h,'Color'),'MarkerSize',4,'MarkerEdgeColor', 'k');
hold on;
plot(M,Energy_Karimnagar_interpolated(:,i),':.');
hold off;
title('Plot of Interpolated Values');
legend('Warangal','Nizamabad','Khammam','Karimnagar');
end;
```

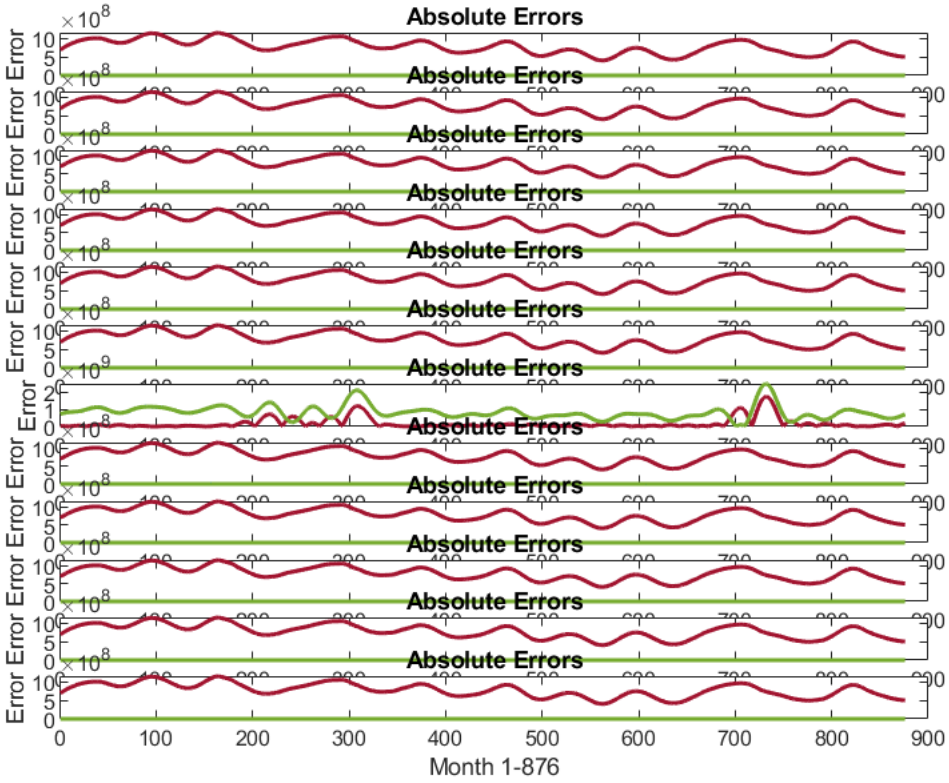


```
%Monthly_Energy_Interpolated_Vector=[Energy_Warangal_interpolated Energy_Nizamabad_interpolated

save('Monthly_Energy_Interpolated_Vector.mat','Energy_Warangal_interpolated', 'Energy_Nizamabad
```

```
clear;
clc;
```

```
load('Monthly_Energy_Interpolated_Vector.mat');
load('Energy.mat');

%Smoothening the Curves using various Techniques for Warangal, Nizamabad, Khammam and Karimnaga
%This Smoothening is customized for each city to fit reality.
% RLOESS is used.
for i=1:12
Warangal_Smoothened_Monthly_Energy_Interpolated_Vector(:,i)=smooth(1:876,Energy_Warangal_interp
Nizamabad_Smoothened_Monthly_Energy_Interpolated_Vector(:,i)=smooth(1:876,Energy_Nizamabad_inte
Khammam_Smoothened_Monthly_Energy_Interpolated_Vector(:,i)=smooth(1:876,Energy_Khammam_interpol
Karimnagar_Smoothened_Monthly_Energy_Interpolated_Vector(:,i)=smooth(1:876,Energy_Karimnagar_in
end
```

```
%Checking the absolute errors.
figure;
for i=1:12
subplot(12,1,i);
plot(1:876,abs(Warangal_Smoothened_Monthly_Energy_Interpolated_Vector-Energy_Warangal_interpola
title('Absolute Errors');
xlabel('Month 1-876');
ylabel('Error');
end
```




```
Smoothened_Monthly_Energy_Interpolated_Vector=[Warangal_Smoothened_Monthly_Energy_Interpolated_

save('Smoothened_Monthly_Energy_Interpolated_Vector.mat','Smoothened_Monthly_Energy_Interpolate
```

```
clear;
clc;
```

```
%Pollution Dataset.
%The values of SO2, NOx, PM10, NH3 are used from this dataset.
```

```
%Warangal.
%SO2
Warangal_SO2=[7.0    7.0    7.1    7.0    8.0    7.0    7.0    7.0    7.0    7.0    6.0    8.0
mean_value=(mean(Warangal_SO2));
Warangal_SO2(Warangal_SO2 == 0) = mean_value;

%NOx
Warangal_NOx=[26.0    19.0    21.8    20.0    19.0    22.0    20.0    28.0    20.0    22.0
mean_value=round(mean(Warangal_NOx));
Warangal_NOx(Warangal_NOx == 0) = mean_value;

%PM10
Warangal_PM10=[76    72    63    73    84    68    56    36    52    61    83    84 76    79
mean_value=round(mean(Warangal_PM10));
```

```
Warangal_PM10(Warangal_PM10 == 0) = mean_value;

%NH3
Warangal_NH3=[22    21    24    21    21    28    24    22    20    22    21    23 22    25
mean_value=round(mean(Warangal_NH3));
Warangal_NH3(Warangal_NH3 == 0) = mean_value;

%Make a Single Vector.
Warangal_Pollutants=[Warangal_SO2' Warangal_NOx' Warangal_PM10' Warangal_NH3'];
```

```
%Nizamabad.
%SO2
Nizamabad_SO2=[0    0    0    0    0    4.0    4.0    5.0    5.0    6.0    5.0    5.0 5.0    5.
mean_value=(mean(Nizamabad_SO2));
Nizamabad_SO2(Nizamabad_SO2 == 0) = mean_value;

%NOx
Nizamabad_NOx=[0    0    0    0    0    15.0    17.0    18.0    18.0    22.0    21.0    21.0 20
mean_value=round(mean(Nizamabad_NOx));
Nizamabad_NOx(Nizamabad_NOx == 0) = mean_value;

%PM10
Nizamabad_PM10=[67    64    66    68    71    61    57    58    56    64    60    62 61    62
mean_value=round(mean(Nizamabad_PM10));
Nizamabad_PM10(Nizamabad_PM10 == 0) = mean_value;

%NH3
Nizamabad_NH3=[0    0    0    0    0    21    21    21    21    21    21    21 21    21    21
mean_value=round(mean(Nizamabad_NH3));
Nizamabad_NH3(Nizamabad_NH3 == 0) = mean_value;

%Make a Single Vector.
Nizamabad_Pollutants=[Nizamabad_SO2' Nizamabad_NOx' Nizamabad_PM10' Nizamabad_NH3'];
```

```
%Khammam.
%SO2
Khammam_SO2=[6.0 7.0    6.1    8.0    7.0    5.0    8.0    5.0    8.0    7.0    7.0    8.0 7.0
mean_value=(mean(Khammam_SO2));
Khammam_SO2(Khammam_SO2 == 0) = mean_value;


%NOx
Khammam_NOx=[19.0    19.0    20.7    19.0    19.0    21.0    22.0    14.0    17.0    23.0    24
mean_value=round(mean(Khammam_NOx));
Khammam_NOx(Khammam_NOx == 0) = mean_value;

%PM10
Khammam_PM10=[46    51    54    51    47    47    41    37    39    48    55    60 60    64
mean_value=round(mean(Khammam_PM10));
Khammam_PM10(Khammam_PM10 == 0) = mean_value;
```

```
%NH3
Khammam_NH3=[0    0    0    0    0    20    22    20    21    21    28    22 21    23    27
mean_value=round(mean(Khammam_NH3));
Khammam_NH3(Khammam_NH3 == 0) = mean_value;

%Make a Single Vector.
Khammam_Pollutants=[Khammam_SO2' Khammam_NOx' Khammam_PM10' Khammam_NH3'];
```

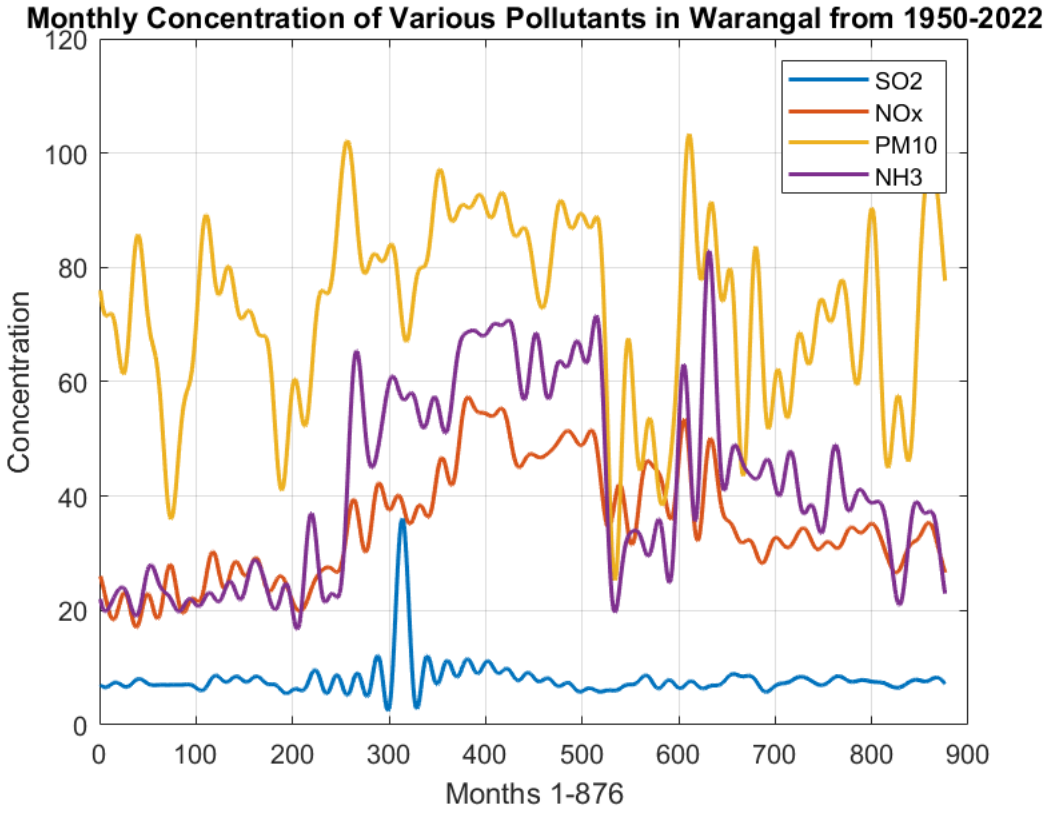
```
%Karimnagar.
%SO2
Karimnagar_SO2=[8.0    9.0    7.7    7.0    5.0    5.0    4.0    6.0    6.0    6.0    7.0    7.
mean_value=(mean(Karimnagar_SO2));
Karimnagar_SO2(Karimnagar_SO2 == 0) = mean_value;

%NOx
Karimnagar_NOx=[22.0    25.0    32.1    29.0    21.0    19.0    20.0    20.0    23.0    23.0
mean_value=round(mean(Karimnagar_NOx));
Karimnagar_NOx(Karimnagar_NOx == 0) = mean_value;

%PM10
Karimnagar_PM10=[69    59    42    62    52    47    23    33    29    50    69    83 84    75
mean_value=round(mean(Karimnagar_PM10));
Karimnagar_PM10(Karimnagar_PM10 == 0) = mean_value;

%NH3
Karimnagar_NH3=[27    24    25    21    23    21    23    21    21    25    22    24 25    26
mean_value=round(mean(Karimnagar_NH3));
Karimnagar_NH3(Karimnagar_NH3 == 0) = mean_value;

%Make a Single Vector.
Karimnagar_Pollutants=[Karimnagar_SO2' Karimnagar_NOx' Karimnagar_PM10' Karimnagar_NH3'];
```

```
%Interpolation using FFT Method.
Warangal_Pollution_interpolated= interpft(Warangal_Pollutants,876);
Nizamabad_Pollution_interpolated= interpft(Nizamabad_Pollutants,876);
Khammam_Pollution_interpolated= interpft(Khammam_Pollutants,876);
Karimnagar_Pollution_interpolated= interpft(Karimnagar_Pollutants,876);
```

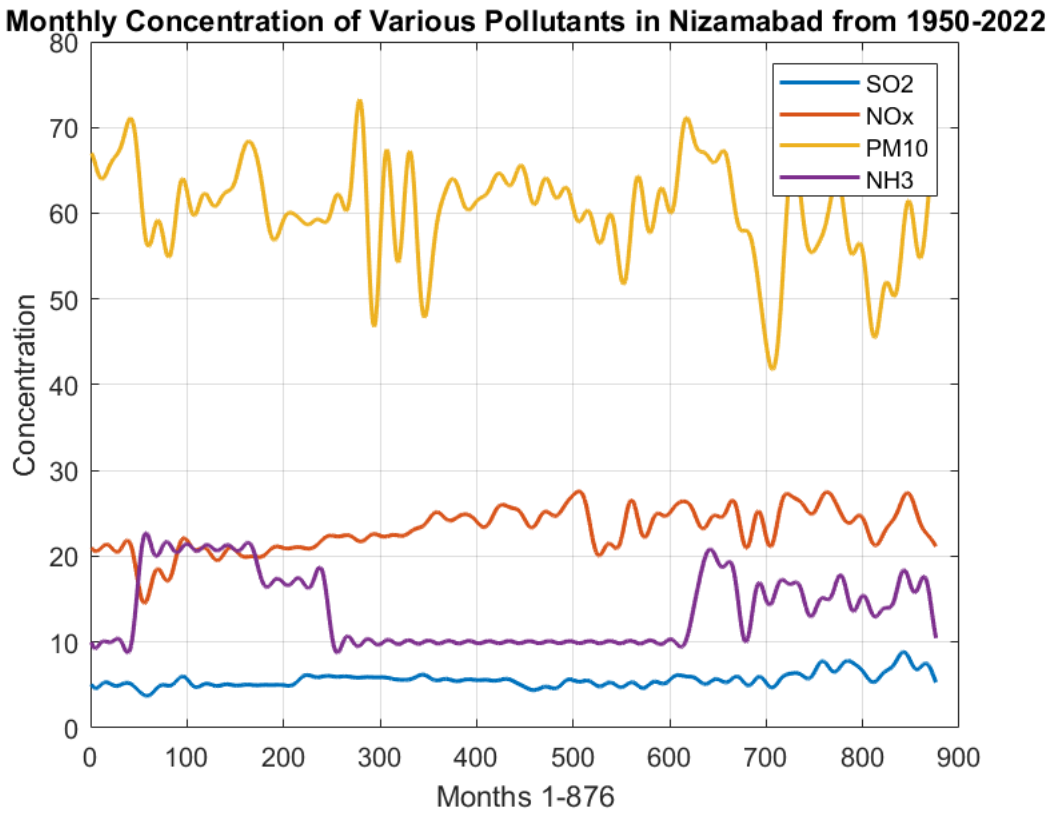
```
%Making the Final Vector.
Pollutants_Concentration_Vector=[Warangal_Pollution_interpolated; Nizamabad_Pollution_interpola

%Saving in .mat format.
save('Pollutants_Concentration_Vector.mat','Pollutants_Concentration_Vector');
```

```
%Plotting the graphs of the Interpolated values.
figure;
for i=1:4
plot(1:876,Warangal_Pollution_interpolated(:,i),'LineWidth',1.5);
hold on;
end
hold off;
```

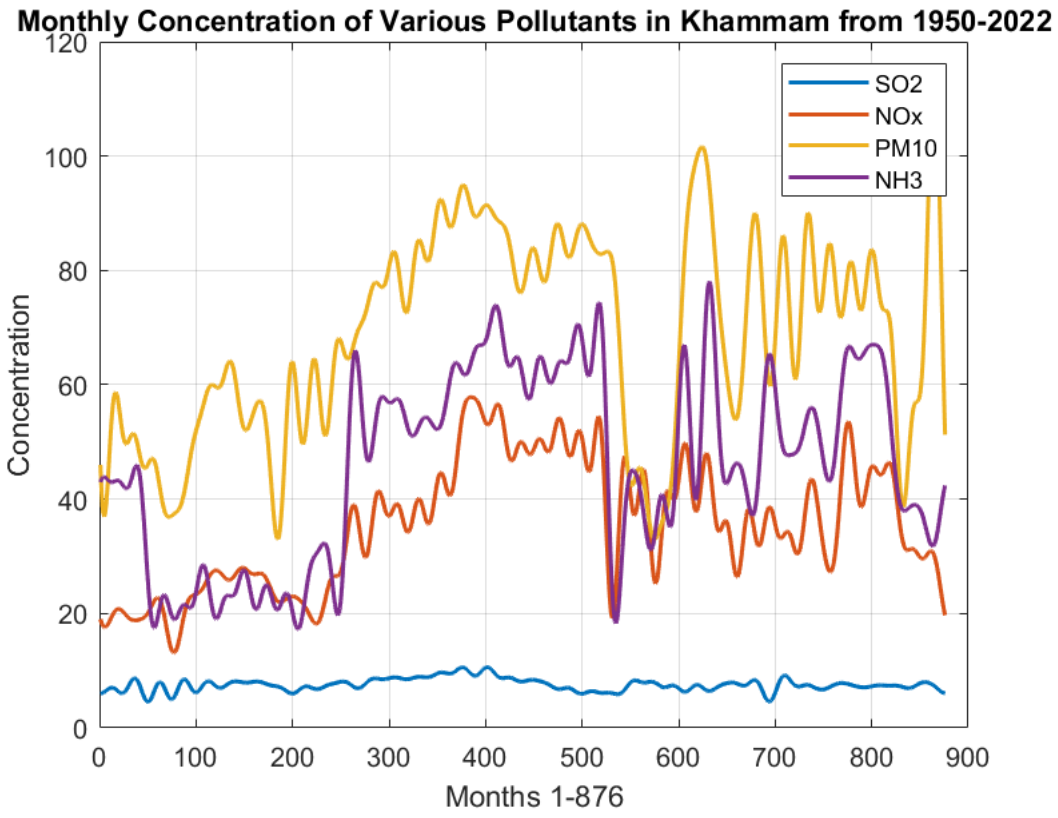
```
grid on;
legend('SO2','NOx','PM10','NH3');
xlabel('Months 1-876');
ylabel('Concentration');
title('Monthly Concentration of Various Pollutants in Warangal from 1950-2022');
```



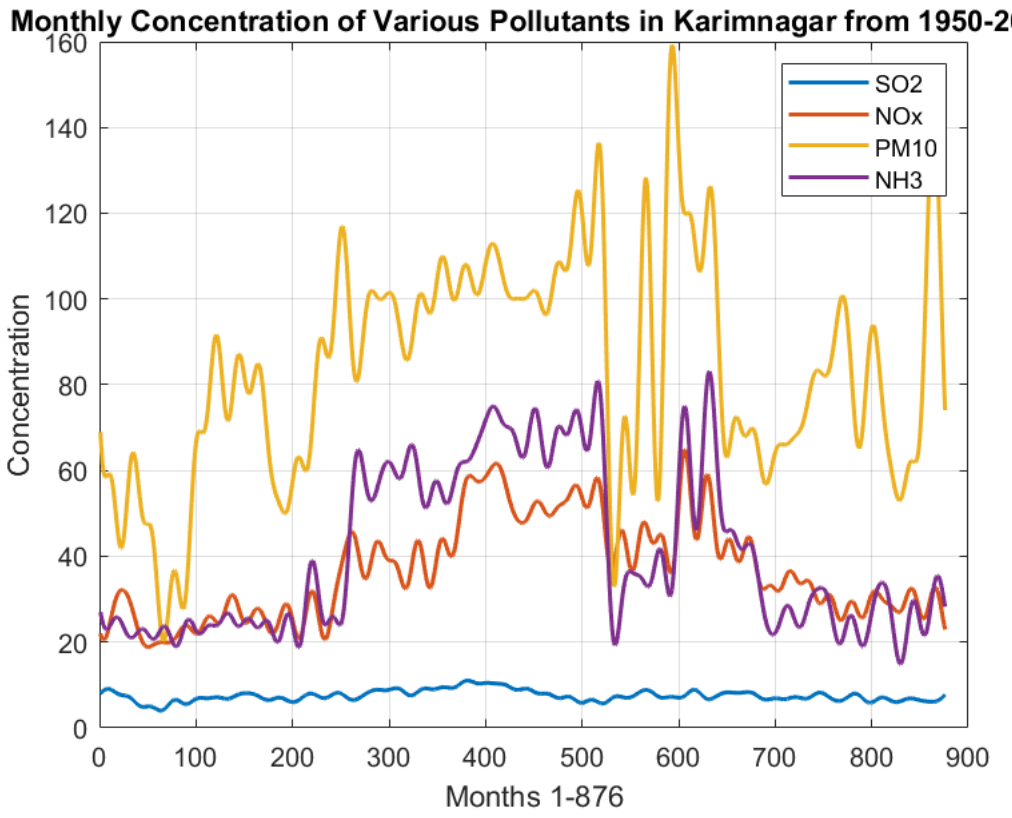

```
figure;
for i=1:4
plot(1:876,Nizamabad_Pollution_interpolated(:,i),'LineWidth',1.5);
hold on;
end
hold off;
grid on;
legend('SO2','NOx','PM10','NH3');
xlabel('Months 1-876');
ylabel('Concentration');
title('Monthly Concentration of Various Pollutants in Nizamabad from 1950-2022');
```




```
figure;
for i=1:4
plot(1:876,Khammam_Pollution_interpolated(:,i),'LineWidth',1.5);
hold on;
end
hold off;
grid on;
legend('SO2','NOx','PM10','NH3');
xlabel('Months 1-876');
ylabel('Concentration');
title('Monthly Concentration of Various Pollutants in Khammam from 1950-2022');
```




```
figure;
for i=1:4
plot(1:876,Karimnagar_Pollution_interpolated(:,i),'LineWidth',1.5);
hold on;
end
hold off;
grid on;
legend('SO2','NOx','PM10','NH3');
xlabel('Months 1-876');
ylabel('Concentration');
title('Monthly Concentration of Various Pollutants in Karimnagar from 1950-2022');
```

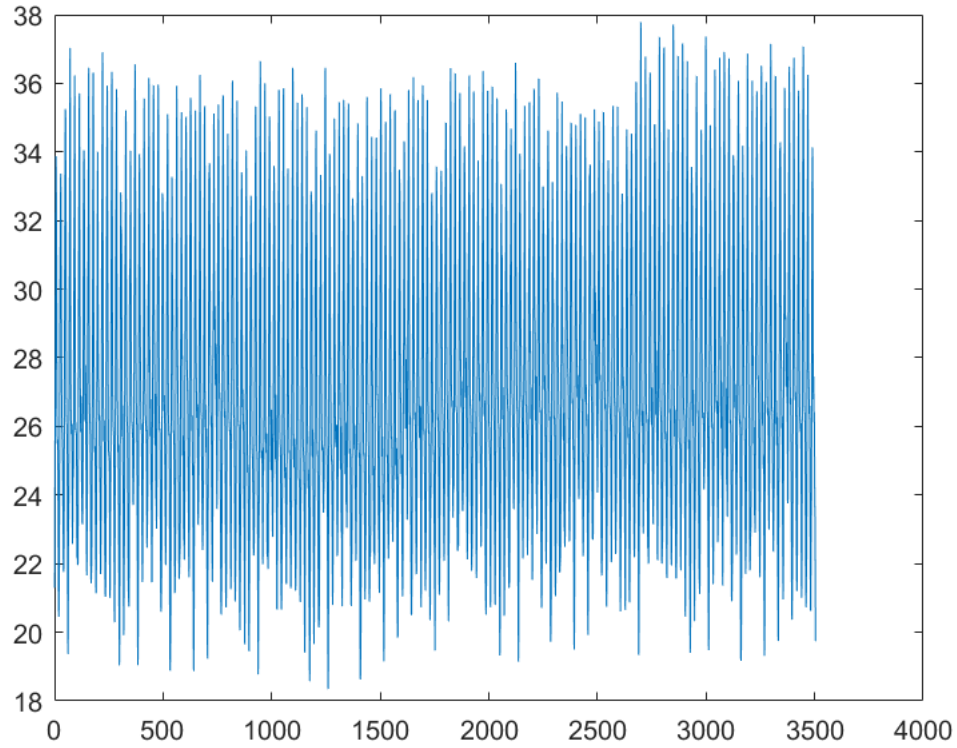


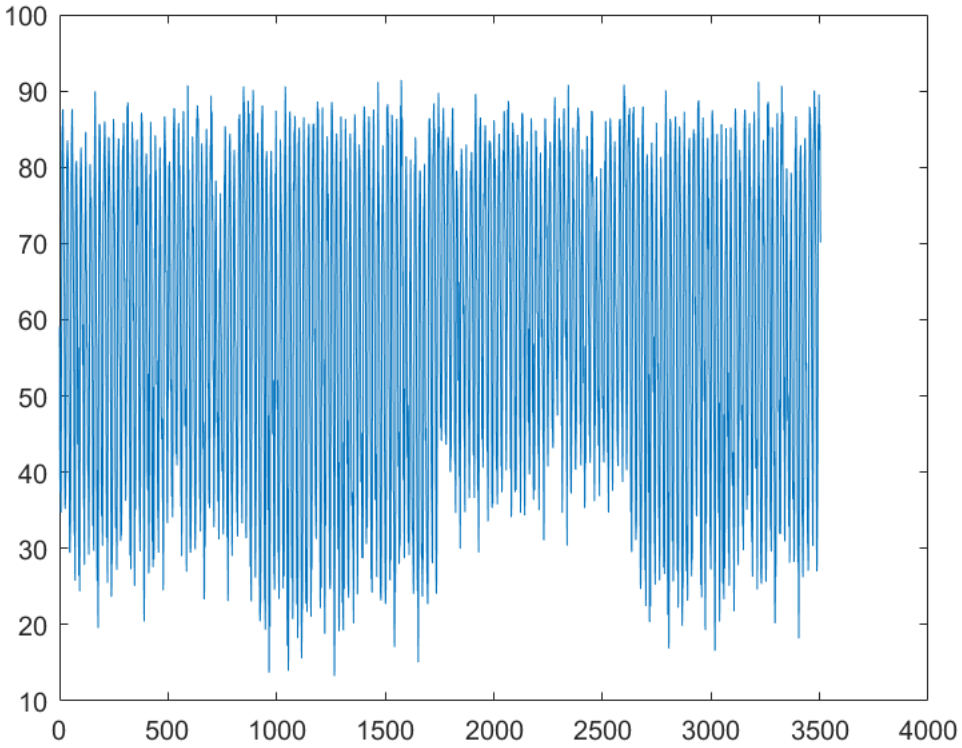

```
clear;
clc;
```

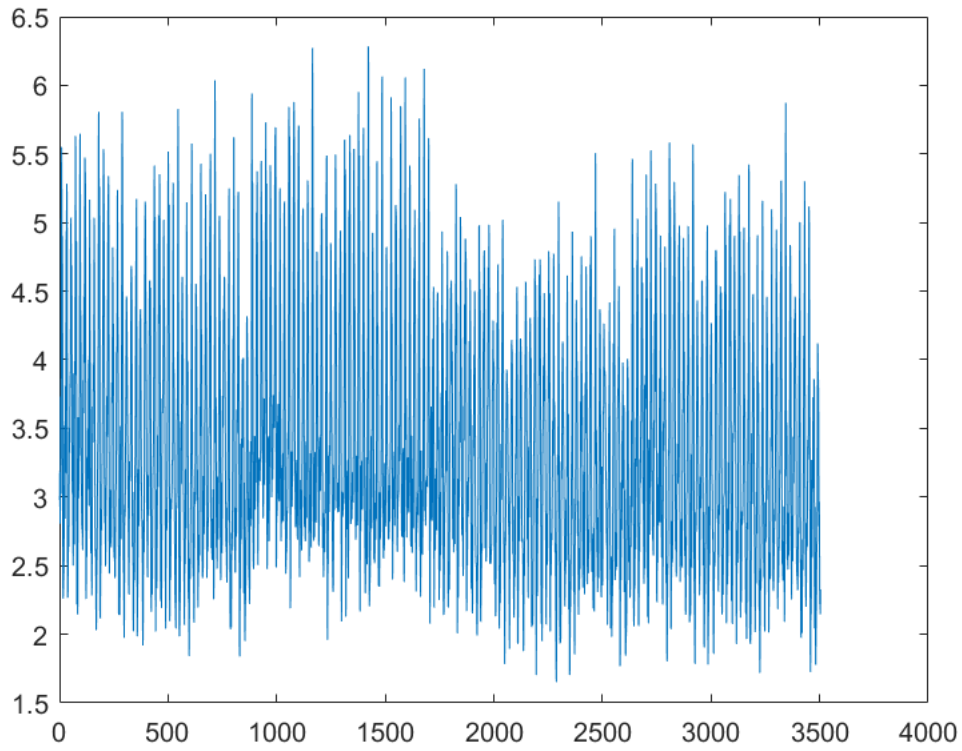
```
%Interpolating the existing MERRA-2 Dataset.
```

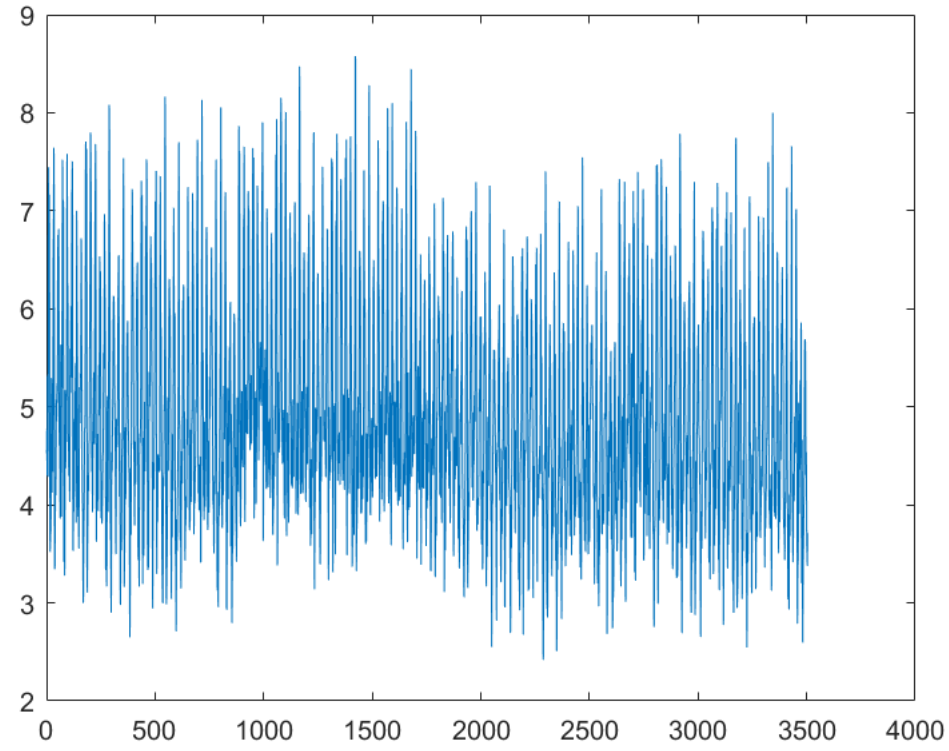
```
% import the CSV file as a table
my_table = readtable('MERRA-2.csv');

% convert the table to a double array
data = table2array(my_table);

%Creating a new array for storing Interpolated data.
MERRA_2_Interpolated=[];

for i=1:492:1968
    x=data(i:i+491,:);
    x_interpolated= interpft(x,876);
    MERRA_2_Interpolated=[MERRA_2_Interpolated; x_interpolated];
end

for i=1:11
MERRA_2_Interpolated_Smoothened(:,i)=smooth(1:3504,MERRA_2_Interpolated(:,i),0.5,'rloess');
end

%Plotting the Interpolated Features.
```

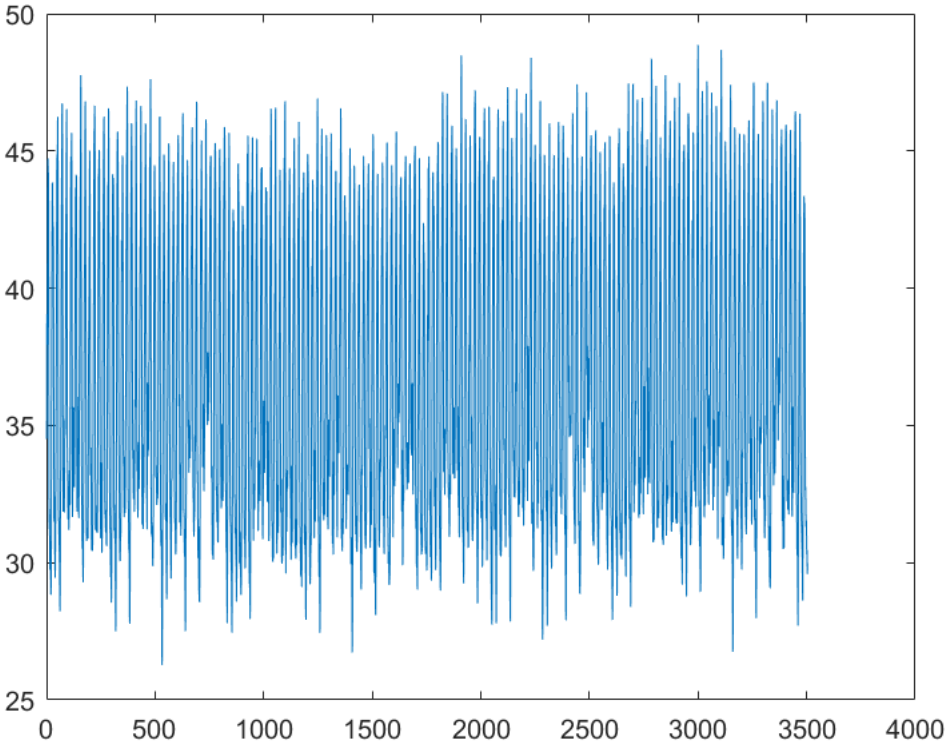
```
for i=1:11
    figure;
    plot(1:3504,MERRA_2_Interpolated(:,i));
end
```

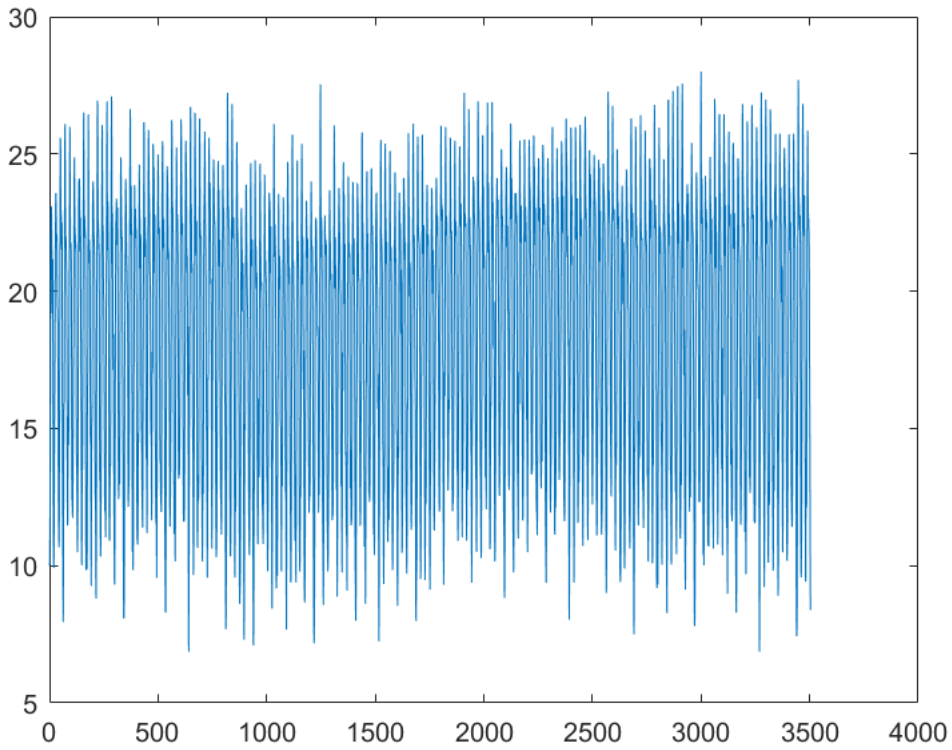


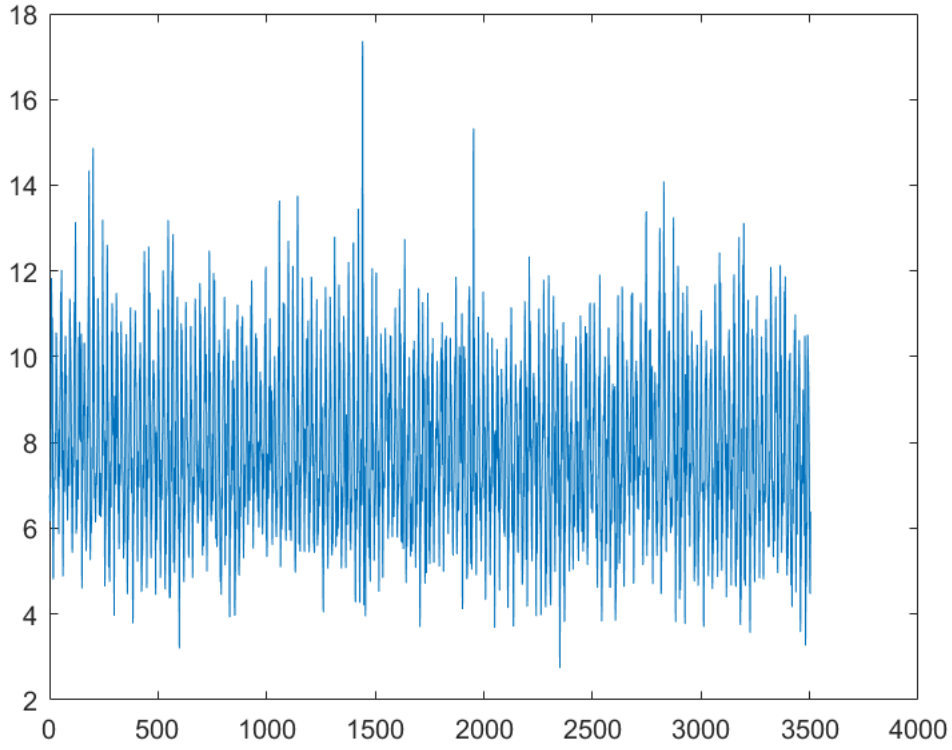

100
90
80
70
60
50
40
30
20
10
0
500
1000
1500
2000
2500
3000
3500
4000

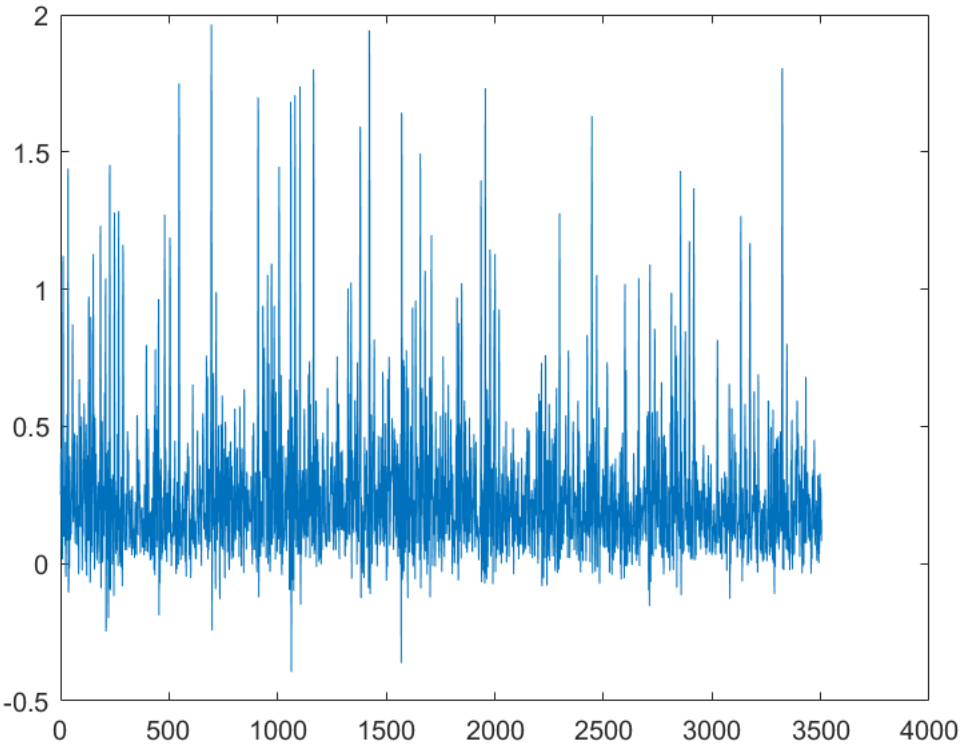

6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
0
500
1000
1500
2000
2500
3000
3500
4000

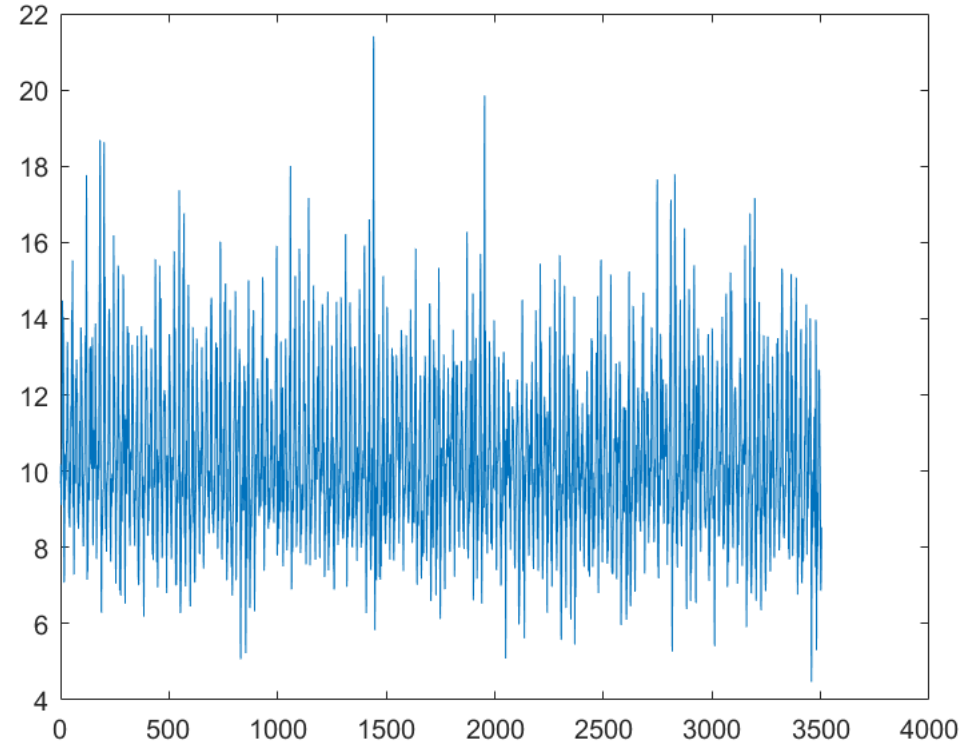

9
8
7
6
5
4
3
2
0
500
1000
1500
2000
2500
3000
3500
4000


50
45
40
35
30
25
0
500
1000
1500
2000
2500
3000
3500
4000


30
25
20
15
10
5
0
500
1000
1500
2000
2500
3000
3500
4000


18
16
14
12
10
8
6
4
2
0
500
1000
1500
2000
2500
3000
3500
4000


2
1.5
1
0.5
0
-0.5
0
500
1000
1500
2000
2500
3000
3500
4000


22
20
18
16
14
12
10
8
6
4
0
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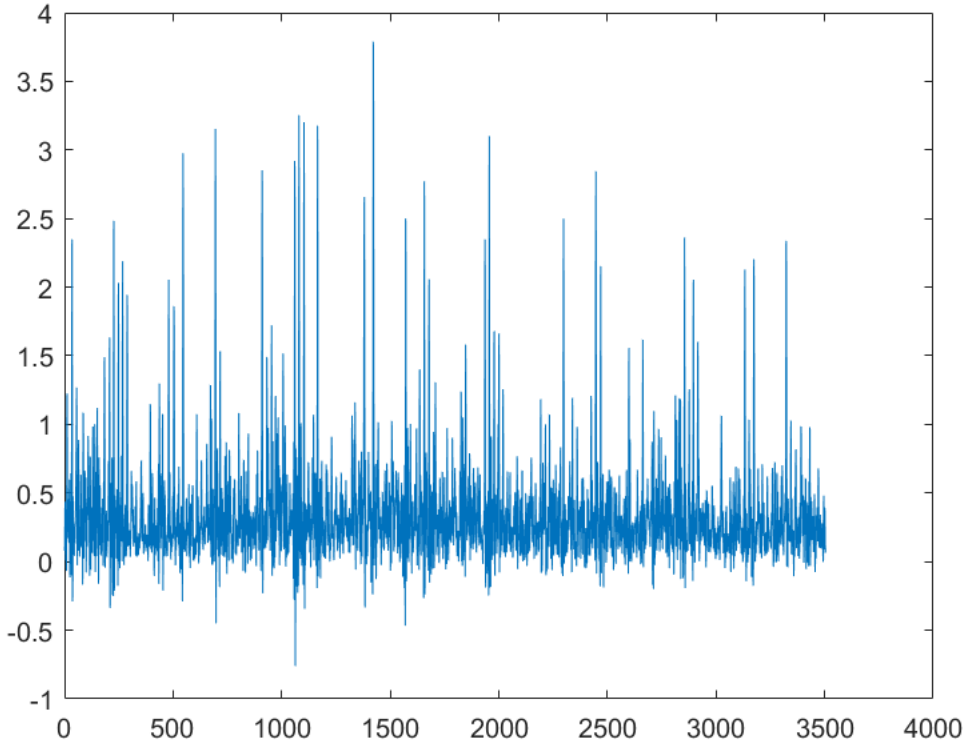
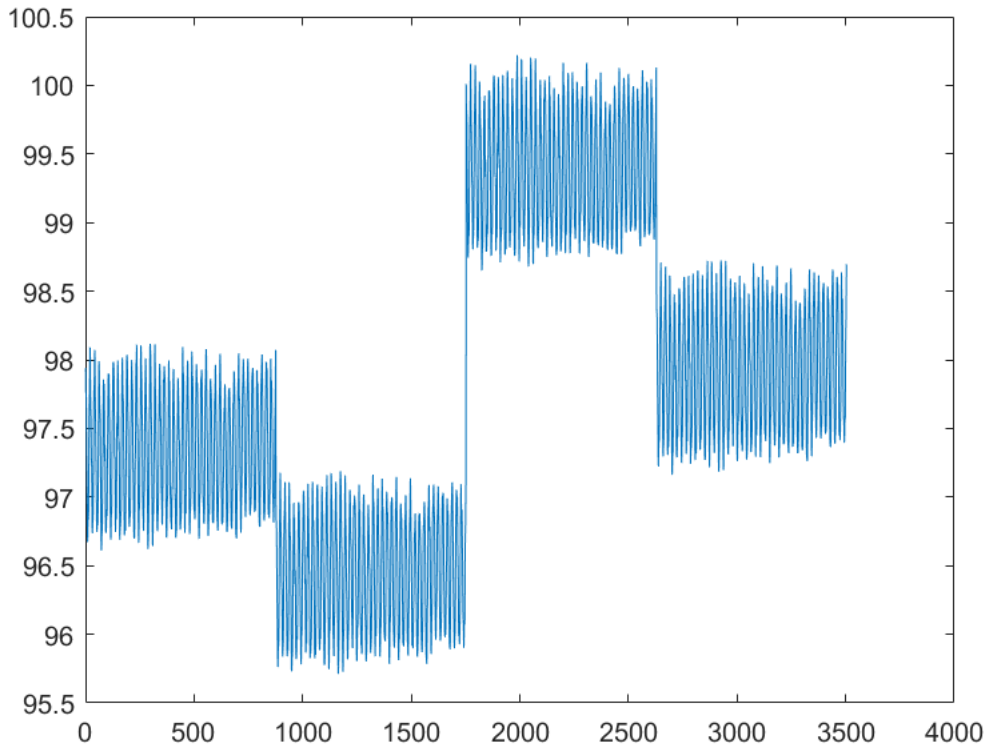





```
%Preparing the Final "Heatwaves Dataset.csv" file with all features for
%Model Building.
```

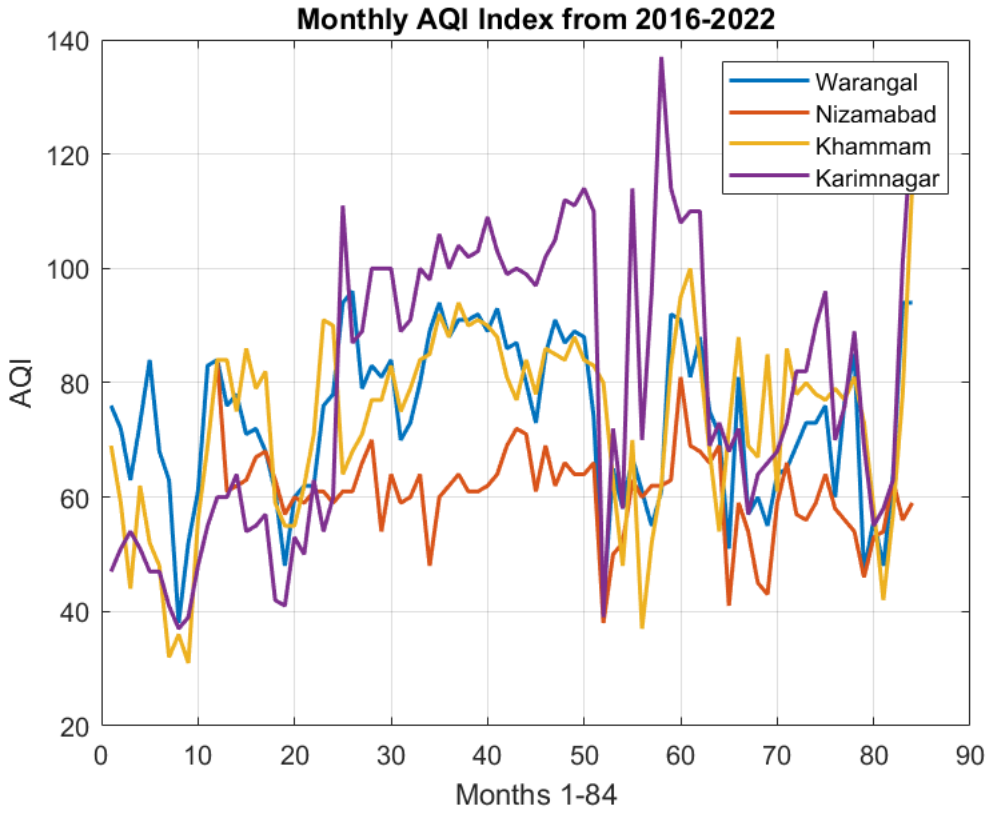
```
load('Population_Monthly_Interpolated_Vector.mat')

Data=[MERRA_2_Interpolated_Smoothened Population_Monthly_Interpolated_Vector'];
csvwrite('Heatwaves Dataset.csv',Data);
```

```
clear;
clc;
```

```
%Interpolating the AQI Dataset.
```

```
%AQI dataset.
%Warangal Mee-Seva Station.
Warangal_AQI=[76 72    63    73    84    68    63    38    52    61    83    84 76  78  71  72

%Nizamabad.
Nizamabad_AQI=[69    59    44    62    52    48    32    36    31    56    69    84 61 62 63 67
mean_value=round(mean(Nizamabad_AQI));
Nizamabad_AQI(Nizamabad_AQI == 0) = mean_value;

%Khammam.
Khammam_AQI=[69    59    44    62    52    48    32    36    31    56    69    84 84  75  86  7
mean_value=round(mean(Khammam_AQI));
Khammam_AQI(Khammam_AQI == 0) = mean_value;

%Karimnagar.
Karimnagar_AQI=[47    51    54    51    47    47    41    37    39    48    55    60 60 64    5

AQI_Vector_Actual=[Warangal_AQI Nizamabad_AQI Khammam_AQI Karimnagar_AQI];
```

```
%Plotting the AQI Index.
figure;
plot(1:84,Warangal_AQI,'LineWidth',1.5);
hold on;
plot(1:84,Nizamabad_AQI,'LineWidth',1.5);
hold on;
plot(1:84,Khammam_AQI,'LineWidth',1.5);
hold on;
plot(1:84,Karimnagar_AQI,'LineWidth',1.5);
hold off;
grid on;
title('Monthly AQI Index from 2016-2022');
xlabel('Months 1-84');
ylabel('AQI');
legend('Warangal','Nizamabad','Khammam','Karimnagar');
```




```
%Interpolation.
AQI_Warangal_interpolated= interpft(Warangal_AQI,876);
AQI_Nizamabad_interpolated= interpft(Nizamabad_AQI,876);
AQI_Khammam_interpolated= interpft(Khammam_AQI,876);
AQI_Karimnagar_interpolated= interpft(Karimnagar_AQI,876);

%Single Vector.
AQI_Vector_Interpolated=[AQI_Warangal_interpolated AQI_Nizamabad_interpolated AQI_Khammam_inter

%Saving in .mat format.
save('AQI_Vector.mat','AQI_Vector_Actual','AQI_Vector_Interpolated');
```

```
clear;
clc;
```

```
%Making the Final "AQI.csv" file with all the Features for Model Building.
load('AQI_Vector.mat');
load('Population_Monthly_Interpolated_Vector.mat');
load('Smoothened_Monthly_Energy_Interpolated_Vector.mat');
load('Pollutants_Concentration_Vector.mat');

Data=[Population_Monthly_Interpolated_Vector' Smoothened_Monthly_Energy_Interpolated_Vector rou

save('Dataset.mat','Data');
csvwrite('AQI.csv',Data);
```