UrbanTexture
User Manual

Version 1.0.0

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https://www.urbancomp.net/

1. Product Introduction

1.1 UrbanTexture Product

UrbanTexture V1.0.0 is used to calculate the distribution curve of buildings around a geographic location and supports the extraction of the curves' mathematical features. The features acquired by UrbanTexture can be used to express the land surface temperature.

UrbanTexture also supports interfaced input and output data, Geohash-based spatial analysis, curve visualization and feature extraction.
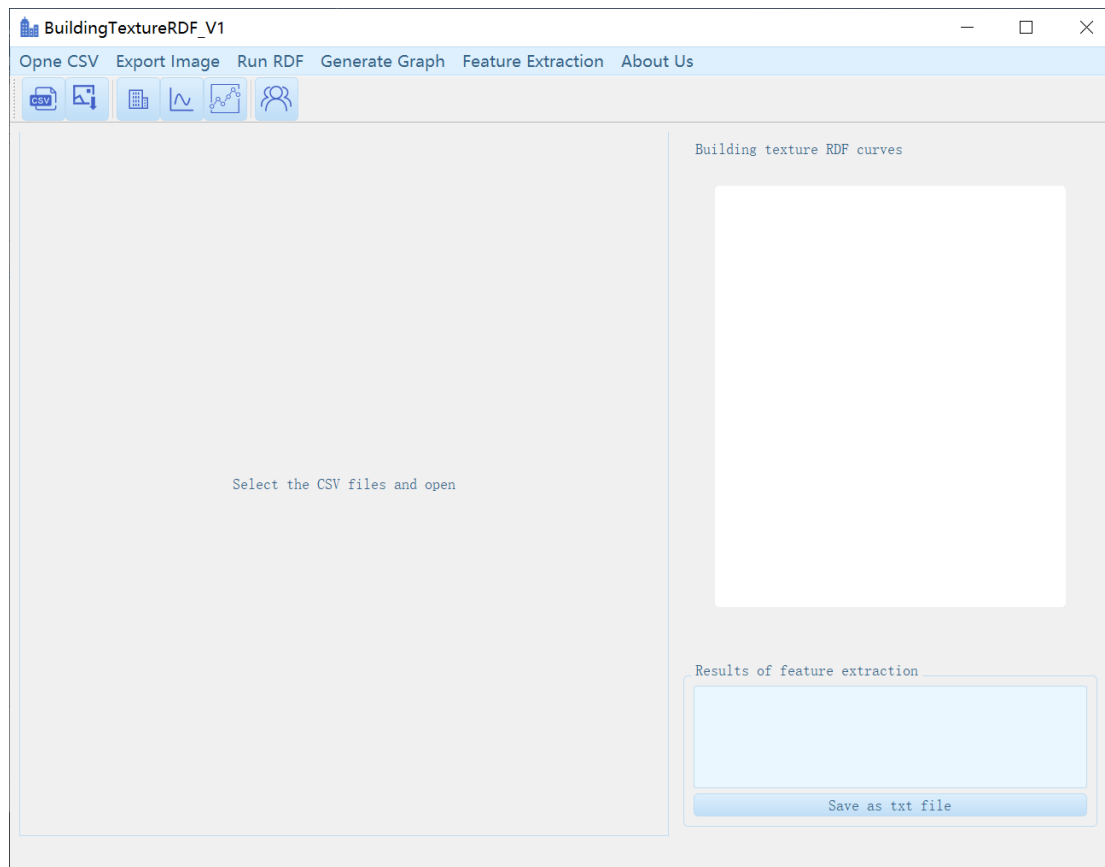
1.2 Target Users

Researchers and urban planners in the field of urban planning.

1.3 Installation

Please **unzip** the software package to the full English file path. Open the unzipped folder, click **"setup.exe"**, and follow the wizard to complete the installation. Click **"UrbanTexture.exe"** or shortcut to use the software.
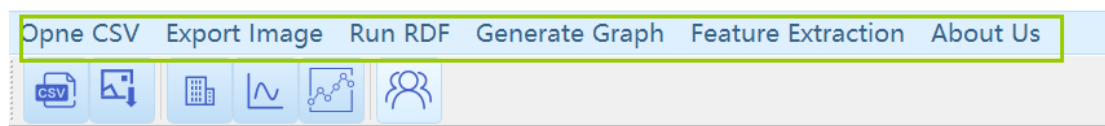
1.4 User Interface

1.5 Software Control Panel Desciption

1.5.1 Menu Bar
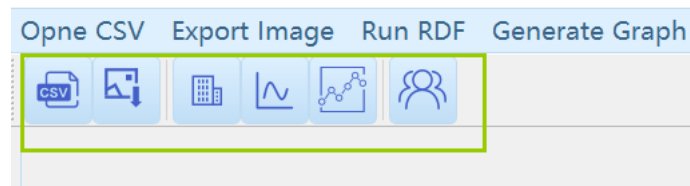
The menu bar of UrbanTexture includes 6 parts:
"Open CSV", "Export Image", "Run RDF", "Generate Graph", "Feature Extraction" and "About US".
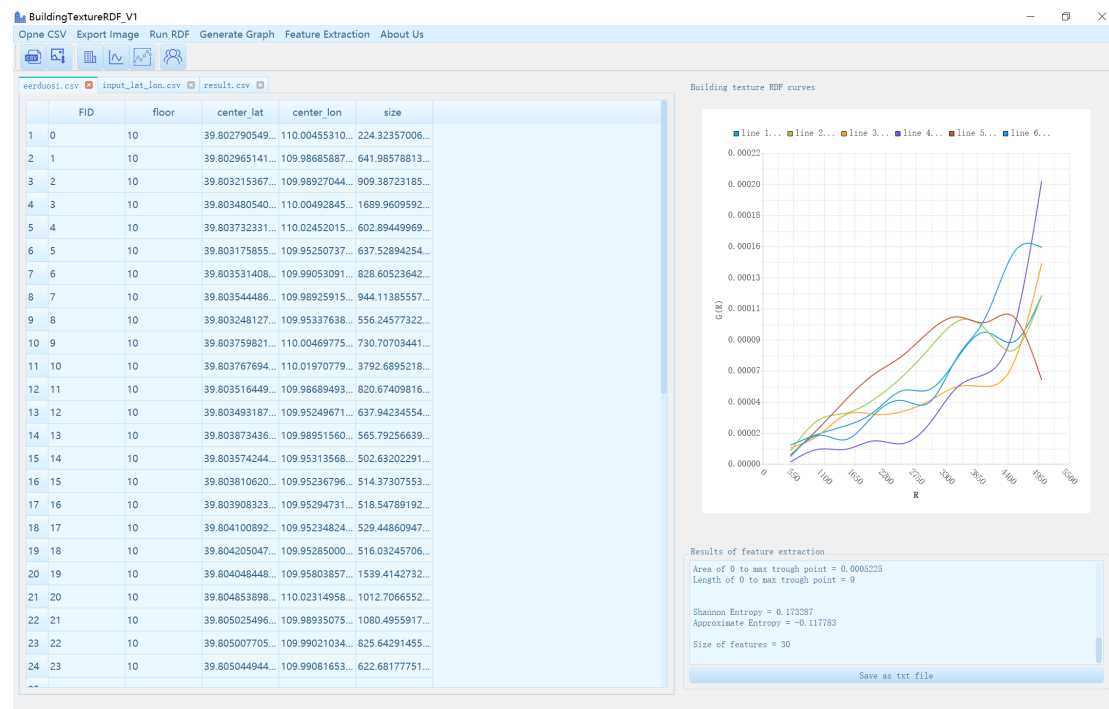

1.5.2 Toolbar

This part is consist of **"CSV", "Export Image", "RDF"," GenerateGraph", "Feature Extraction" and "AboutUs".**
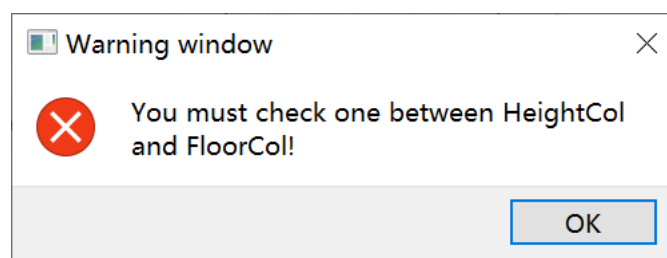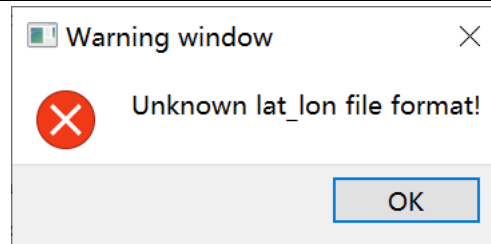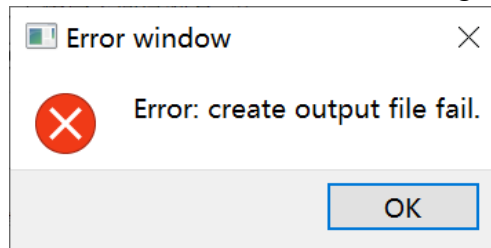
1.5.3 Data Visualization Panel

1.5.4 Exception Prompt Dialog Box

In **"Generate RDF"**, if no parameter is selected or an incorrect parameter is selected, the following error message will be displayed:

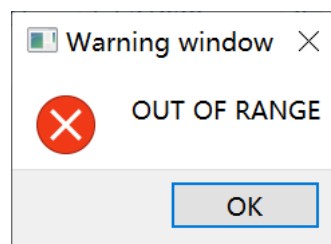**Warning window** ✕

❌ Unknown lat_lon file format!

OK

If the output path of the CSV file is not selected, a message will be displayed:

Error window ✕

❌ Error: create output file fail.

OK

Click **"Generate Graph"** icon or **"Feature Extraction"** icon is displayed, the interface for selecting parameters will be displayed. If you do not select the CSV file or the number of lines, the following error message will be displayed:

Warning window ✕

❌ Invalid file path!

OK
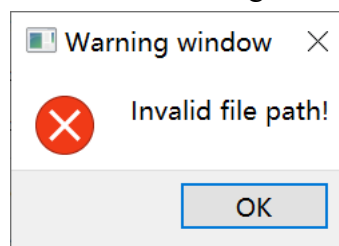
In "**Generate Graph**", if you enter the number of building lines out of range, you will get an error message:

Warning window ✕

❌ OUT OF RANGE

OK

In "**Generate Graph**", you cannot select the same number of columns when selecting parameters.

Warning window ✕

❌ You have selected a duplicate column number, please verify again!

OK
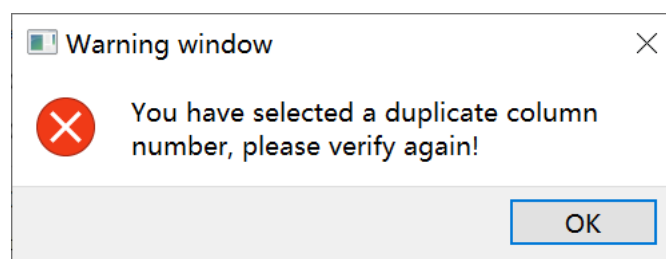
In "**Generate Graph**", FID is an integer, latitude and longitude is a decimal, you cannot select the wrong column to enter value.
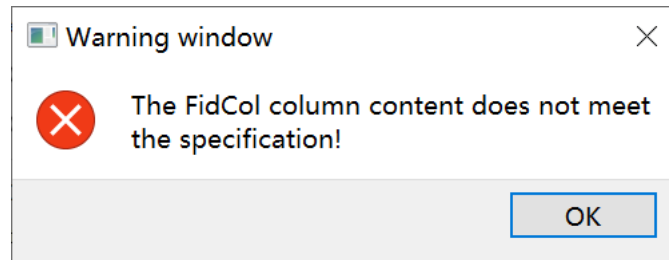
In "**Generate Graph**", the number of building lines you enter cannot exceed the maximum file size.
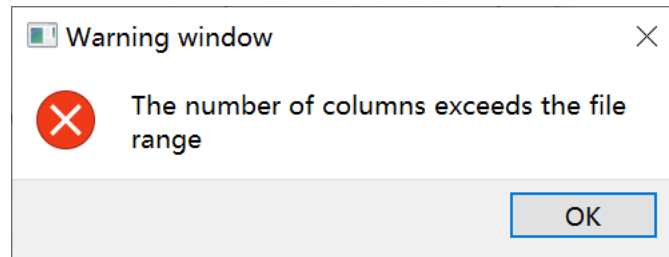
In **"Generate Graph"** and **"Feature Extraction"**, you must select a compliant CSV file to draw curves or calculate characteristic values of curves.
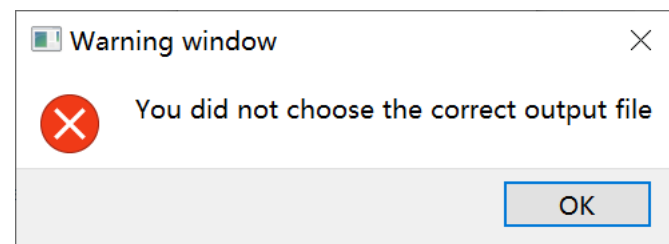
2. Data Display Function

2.1 Basic Function
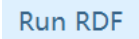
2.1.1   Import CSV Files

Click **"CSV"** icon on the toolbar of the main window to go to the dialog box for opening the CSV file. Select the CSV file to be opened and import it.

You can add multiple CSV files for viewing.
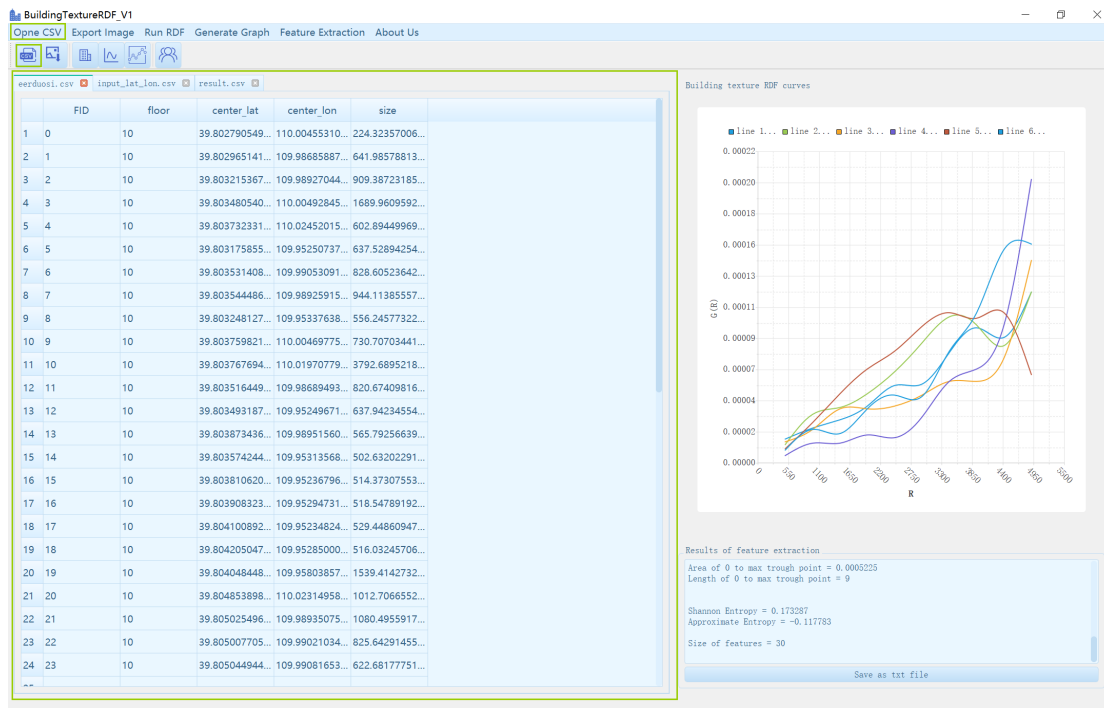
2.1.2 Generate TextureRDF

Click the icon on the toolbar or the "**Run RDF**" button on the menu bar of the main interface, and the following interface will appear.

The parameter information is described in details on the first page. You can also see the parameter information at the end of this section.

generateTextureRDF — □ ✕

Parameter Description | Parameter Settings

First, please enter the path of the csv file containing the building information;

Second, you need to enter the column number that contains the location information, which contains the following four parameters:
    Column number of FID: range[0, maximum column number), shows the information of FID data, and the column data must be integers.
    Column number of longitude: range[0, maximum column number), shows the information of longitude data, and the column data must be decimals.
    Column number of latitude: range[0, maximum column number), shows the information of latitude data, and the column data must be decimals.

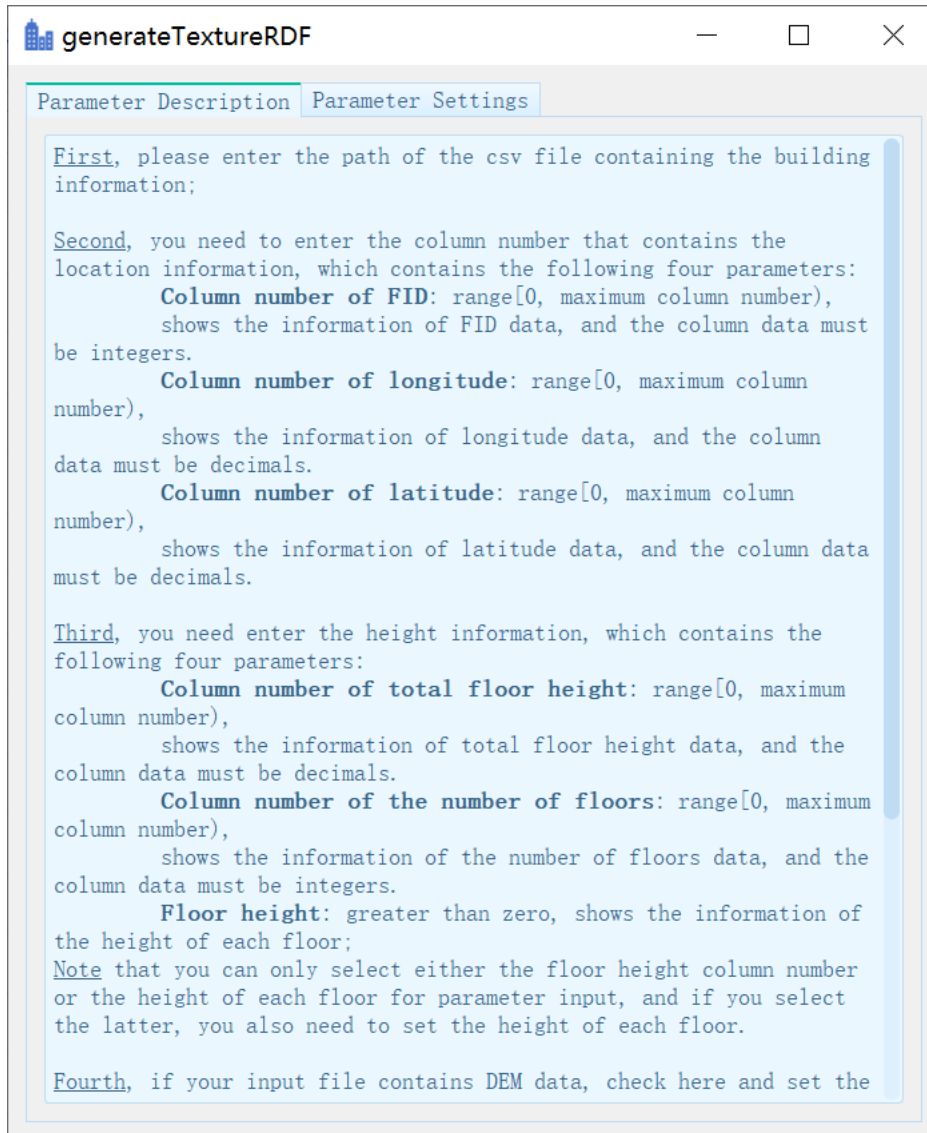Third, you need enter the height information, which contains the following four parameters:
    Column number of total floor height: range[0, maximum column number), shows the information of total floor height data, and the column data must be decimals.
    Column number of the number of floors: range[0, maximum column number), shows the information of the number of floors data, and the column data must be integers.
    Floor height: greater than zero, shows the information of the height of each floor;
Note that you can only select either the floor height column number or the height of each floor for parameter input, and if you select the latter, you also need to set the height of each floor.

Fourth, if your input file contains DEM data, check here and set the

Click **"CSV1 for input"** , **" CSV2 for input "**and **"Output CSV"** buttons to jump to **Explorer** and select the file to enter. If the selection is successful, you will be prompted.
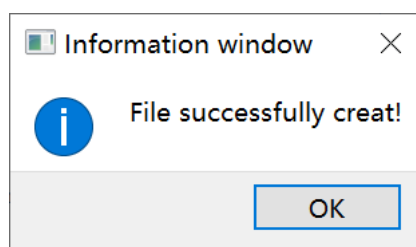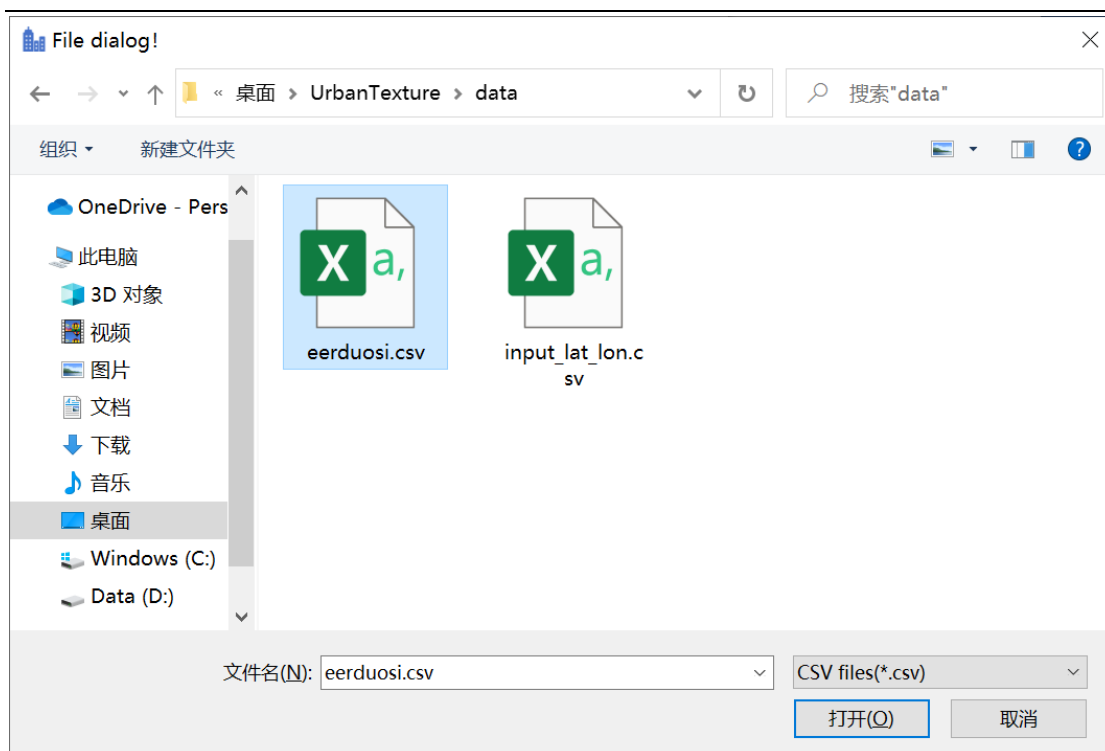
Enter all parameters that conform to the rules, then click **"Run"**. The parameters you have entered will be visualized in the small window in the lower left corner:

Click the **"CSV"** icon to display the output file results

BuildingTextureRDF_V1

Opne CSV Export Image Run RDF Generate Graph Feature Extraction About Us

Start result.csv

	nFID	lat	lon	entropy	R500.000	R1000.000	R1500.000	R2000.000
1	0	39.820801	109.946785	2.135613	0.000014	0.000022	0.000028	0.000038
2	1	39.835842	109.969597	2.161432	0.000010	0.000032	0.000037	0.000047
3	2	39.806011	109.991631	2.251056	0.000019	0.000043	0.000063	0.000077
4	3	39.805717	110.027641	2.109608	0.000012	0.000021	0.000036	0.000036
5	4	39.825142	109.976997	2.227457	0.000016	0.000047	0.000071	0.000079
6	5	39.847683	109.944885	1.738420	0.000002	0.000011	0.000011	0.000017
7	6	39.833275	109.988876	2.114570	0.000007	0.000026	0.000047	0.000065
8	7	39.802933	109.953743	1.952288	0.000006	0.000021	0.000018	0.000036
9	8	39.809200	109.973785	2.228068	0.000014	0.000037	0.000060	0.000076
10	9	39.834583	109.967834	2.111059	0.000009	0.000032	0.000042	0.000051
11	10	39.802605	109.960289	2.010444	0.000007	0.000018	0.000030	0.000043
12	11	39.815018	110.028816	1.959095	0.000008	0.000029	0.000039	0.000040
13	12	39.818584	110.021973	2.169353	0.000011	0.000027	0.000052	0.000053
14	13	39.816174	110.033043	2.036339	0.000006	0.000018	0.000034	0.000032
15	14	39.802368	110.014404	2.058463	0.000005	0.000028	0.000046	0.000058
16	15	39.827374	109.989876	2.223614	0.000015	0.000034	0.000069	0.000090
17	16	39.817215	110.009872	2.230914	0.000020	0.000058	0.000063	0.000075
18	17	39.830582	110.012833	1.993606	0.000001	0.000009	0.000023	0.000053

Building texture RDF curves

Results of feature extraction

Save as txt file

2.1.2.1 Column number of FID

Range [0, maximum column number), represents the data information of FID and must be integers.

2.1.2.2 Column number of longitude

Range [0, maximum column number), represents the data information of longitude, and must be decimals.

2.1.2.3 Column number of latitude

Range [0, maximum column number), represents the data information of latitude and must be decimals.

2.1.2.4 Column number of total floor height

Range [0, maximum column number), represents the data information of total floor height and must be decimals.

2.1.2.5 Column number of the number of floors

Range [0, maximum column number), represents the data information of floors and must be integers.

2.1.2.6 Floor height

Greater than zero, represents the data information of the height of each floor;
Note that you can only select either the floor height column number or the height of each floor for parameter input, and if you select the latter, you also need to set the height of each floor.

2.1.2.7 Column number of DEM

Range[0, maximum column number), and the column data must be decimals.

2.1.2.8 Dome step radius

Greater than zero.

2.1.2.9 Total radius of dome

Greater than the dome step radius.

2.1.2.10   Hash level

Range[0, 10], describes the normalized level.

2.1.2.11   Whether to normalize

Check it if you want your data to be normalized.
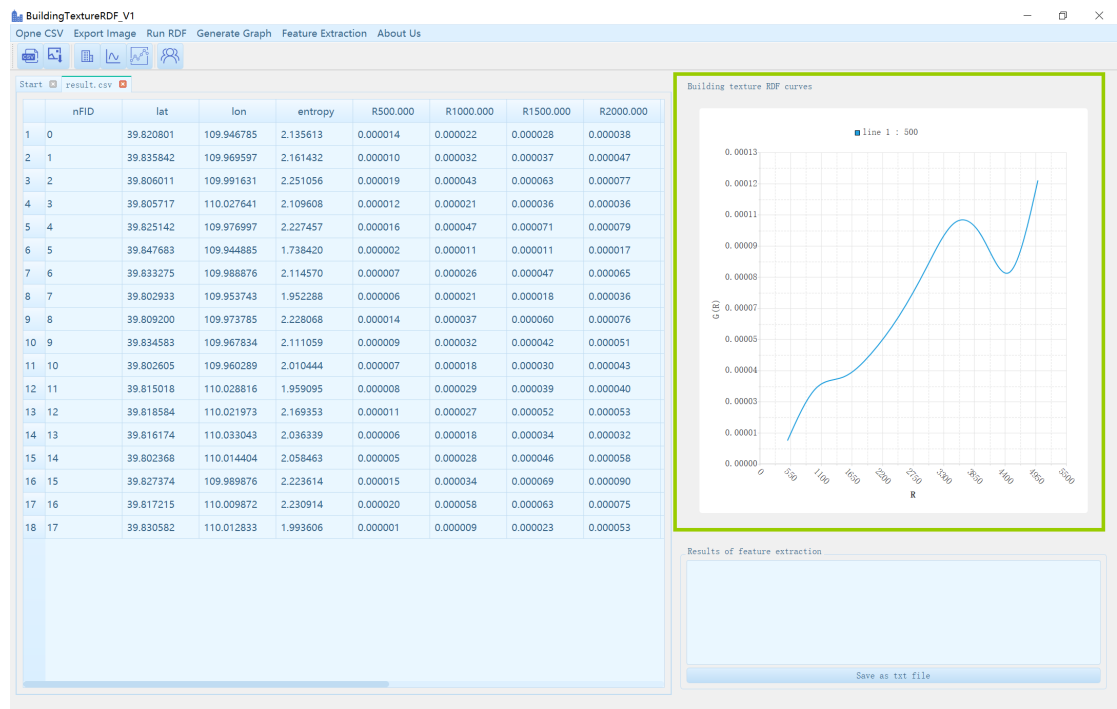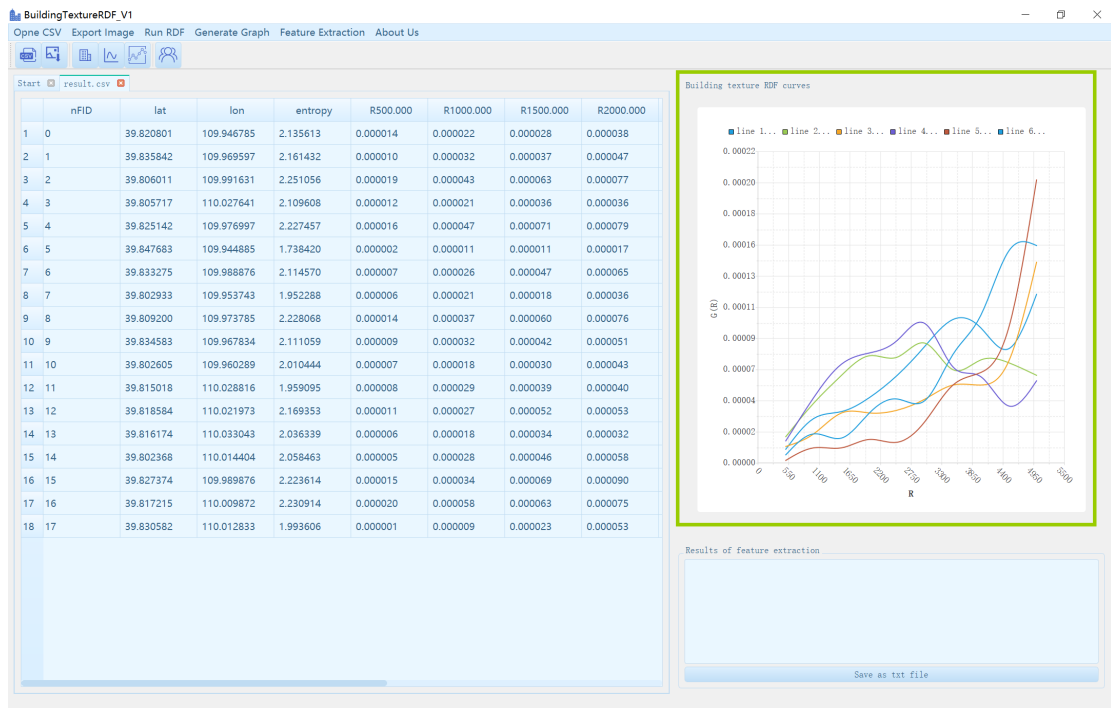
2.1.3 Curve Drawing and Output

Click on the **"Generate Graph"** icon or button in the

toolbar, select the CSV file that you want to generate the curve, and fill in the number of lines for the corresponding building.
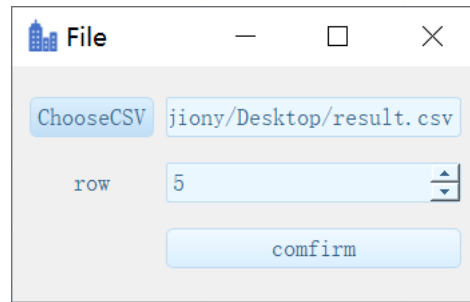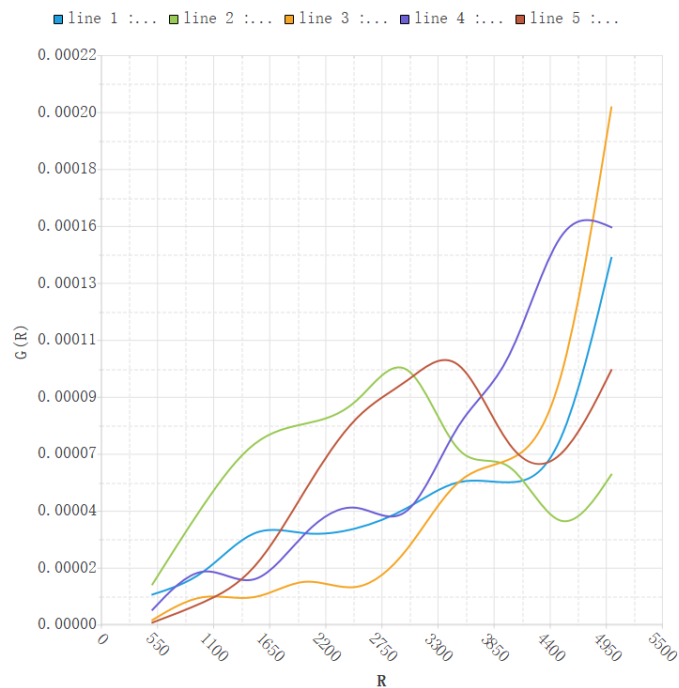

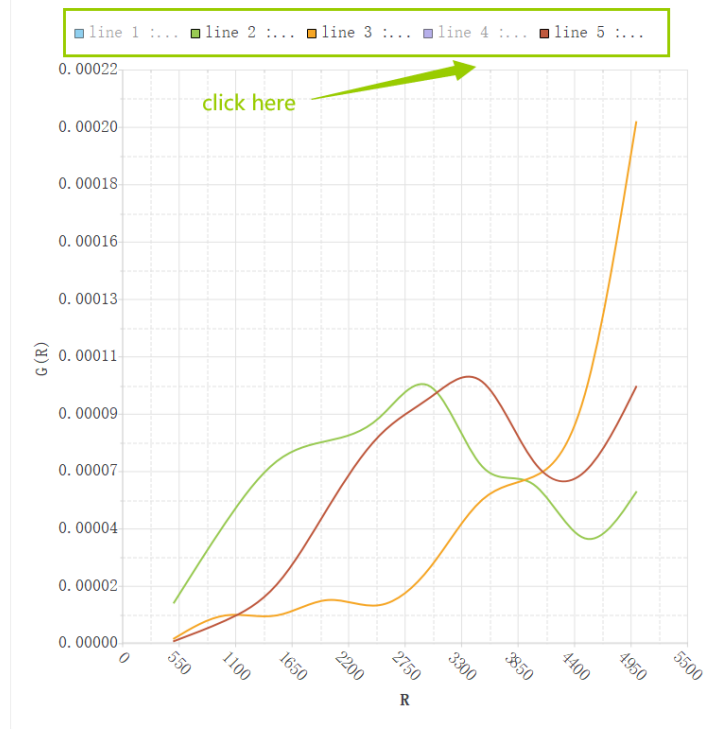Click **"Confirm"** button to generate the corresponding curve in the interface:

If necessary, you can repeat the above steps to add more curves for comparison.
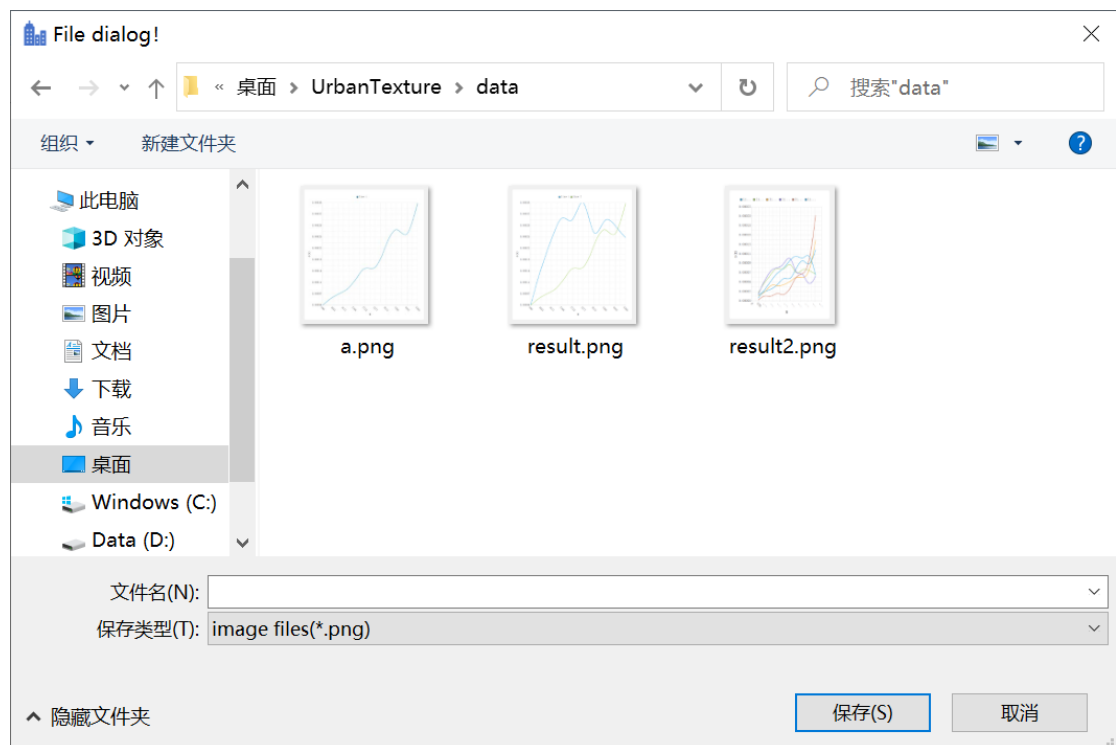
For more accurate comparison, you can also click the legend corresponding to the curve in the chart to hide the curve for more intuitive analysis.

After the curve is drawn, click the "**Export Image**" icon [icon] or button

[Export Image] and select the image storage path to download the curve.
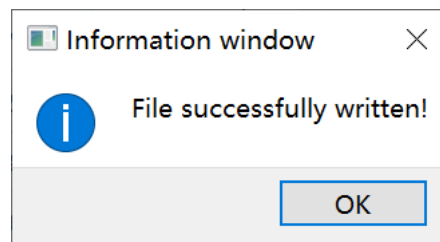

2.1.4 Curve Feature Extraction

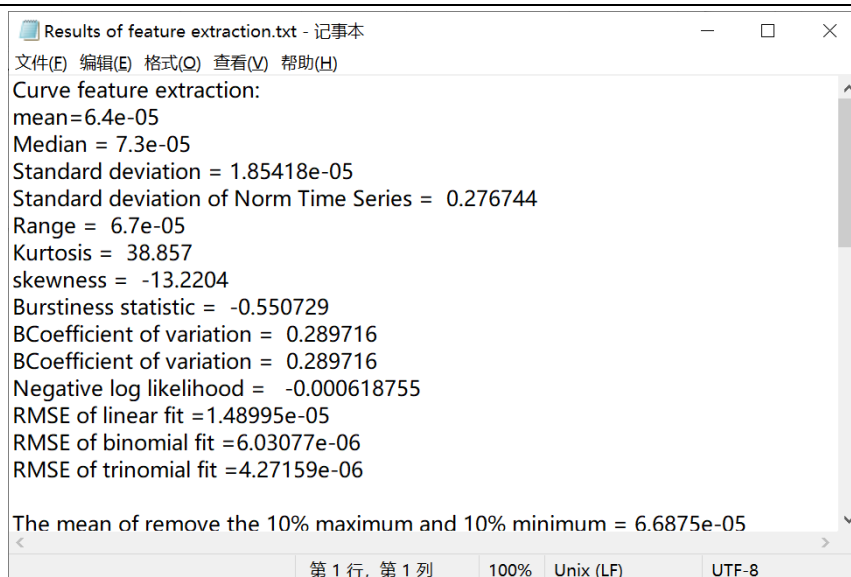After the curve is drawn, the characteristics of the curve can be extracted to

provide a reference for the study. Click the "**Feature Extraction**" icon or

button , select the curve CSV file you want to extract, and

select the number of building lines to see the details of each feature value in the

lower right corner of the interface.
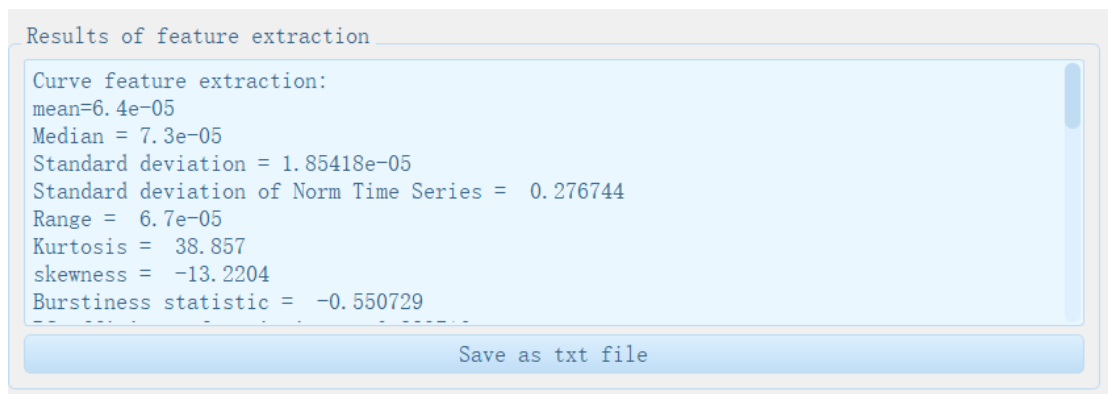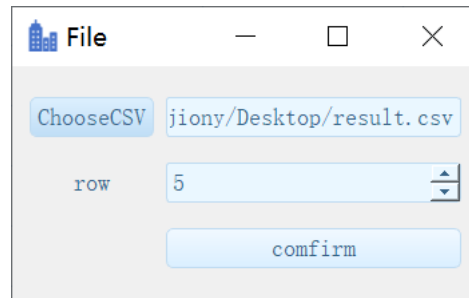
If you need to save the characteristic value details of the current curve, **click** the

"save as text file" button to download it. If the download is successful, you will be

prompted.

Now you can view it.

Results of feature extraction.txt - 记事本

文件(F) 编辑(E) 格式(O) 查看(V) 帮助(H)

Curve feature extraction:
mean=6.4e-05
Median = 7.3e-05
Standard deviation = 1.85418e-05
Standard deviation of Norm Time Series = 0.276744
Range = 6.7e-05
Kurtosis = 38.857
skewness = -13.2204
Burstiness statistic = -0.550729
BCoefficient of variation = 0.289716
BCoefficient of variation = 0.289716
Negative log likelihood =   -0.000618755
RMSE of linear fit =1.48995e-05
RMSE of binomial fit =6.03077e-06
RMSE of trinomial fit =4.27159e-06

The mean of remove the 10% maximum and 10% minimum = 6.6875e-05

第 1 行，第 1 列   100%   Unix (LF)   UTF-8

3. Copyright notice and contact information

If you encounter problems in use, please contact us in time.

UrbanTexture

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