



Urban Spatial Growth and Thermal Environmental Effects Simulation



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Editorial

With the rapid progress of urbanization, urban environmental problems have become increasingly complicated, dynamic and challenging. Many studies have been developed to address these problems by using the simulation of urban spatial growth, such as, cellular automata model [1,2], multi-agent model [3,4] and the integrated application of other models. Study on thermal environment is the main method of single channel, including atmospheric correction method [5,6] and single window method. The Single window method consists of Single window algorithm [7-9], Universal single channel algorithm [10], Split window method, Multi channel algorithm [11] and Single channel multi angle and multi channel multi angle method [12]. Along with, the regression analysis was used to analyze the urban thermal environment, and the construction, land use and other factors were used as regression analysis [13,14], etc. Simulation of urban thermal environment effect mainly concentrated Soil Vegetation Atmosphere Transfer model [15], ENVI-met model [16-18], Community Land Model [19] and General space model [14], etc.

Therefore, this study will use geospatial data and statistical surveys and other data sources, combined with technology and methods of cellular automata and geographic information systems, urban spatial systems to simulate the growth of urban and its thermal environmental effects [20]. We intend to focus on three perspectives:

- The three-dimensional space-time urban spatial growth differentiation and driving mechanism;
- Methods of three-dimensional model of urban spatial growth simulation; and
- Three-dimensional growth of urban spatial thermal environment effects on the spatial differentiation law and mechanism of action.

The primary aims of Urban spatial growth and thermal environmental effects are to

- Three dimensional urban spatial pattern analysis feature factor and pattern classification system;

- Knowledge mining of 3D urban spatial pattern;
- 3D urban spatial and temporal growth process knowledge mining;
- Simulation and prediction of 3D urban spatial growth;
- Knowledge mining of urban thermal environment;
- 3D urban spatial and temporal growth and thermal environmental effects.

Approach

- Spatial autocorrelation analysis;
- Spatial clustering analysis;
- Spatial trend surface analysis

Developing a model of urban spatial growth simulation

- 3D urban spatial data collection and data processing
- Driving factors and evolution mechanism of three dimensional urban spatial and temporal growth process
- 3D urban space time growth process simulation model design and 3D visualization
- Simulation and prediction of 3D Urban Spatial Growth

Developing a simulation model of urban space growth thermal environment effect

- Knowledge mining of urban thermal environment
- Three dimensional urban spatial and temporal growth and thermal environment effect
- An empirical study on the temporal and spatial variation of urban thermal environment

Outcomes of the urban spatial growth and thermal environmental effects

- To complete the simulation system of urban space growth and thermal environment effect

b) To complete the construction of the urban space growth and thermal environment effect simulation system, including factor, neighborhood transformation rules, transition probability matrix, parameter correction, etc.

c) To complete the “urban space growth and thermal environment simulation software”

d) To complete the “urban space growth and thermal environment effect simulation” monograph.

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