



Thinking about the Quality Evaluation System and Model Design of GIS

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Content

2

- 1 Introduction
- 2 Some Reflections upon Quality Evaluation of GIS
- 3 The Quality Model Design of GIS
- 4 Conclusion



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1. Introduction



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1. Introduction

□ **Background**

- *the geo-information industry in China has experienced a rapid growth. the annual output value will exceed 200 billion Yuan by the end of 2015*
- *GIS has entered the stage of rapid development and also gained popularity in a variety of governmental organizations and industries, providing technical support for the decision-making process*
- *software and hardware has covered a complete series of products ranging from large-scale basic platforms to various application systems*

□ **Significance**

- *more efforts should be made to accelerate the system construction process of the GIS quality evaluation so as to promote the industrialization of the application software, intensify the management of the GIS product as well as push forward the healthy development of GIS*



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2. Some Reflections upon Quality Evaluation of GIS



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2.1 Tasks of Quality Evaluation

□ GIS Quality

- *should be reflected in various features, also refers to the capability of GIS to satisfy the explicit or implicit requirements*

□ Quality Evaluation of GIS

- *should be based on the quality model and specific procedure, aims to offer a systematic survey and overall evaluation of the GIS quality*

□ Major Tasks

- *study the evaluation technologies such as the quality model, quality element, sub-element and quality evaluation process*
- *draw up the evaluation standards of GIS quality*
- *establish the basic guarantee system for the GIS quality evaluation from the perspective of the technology, standards and environment*



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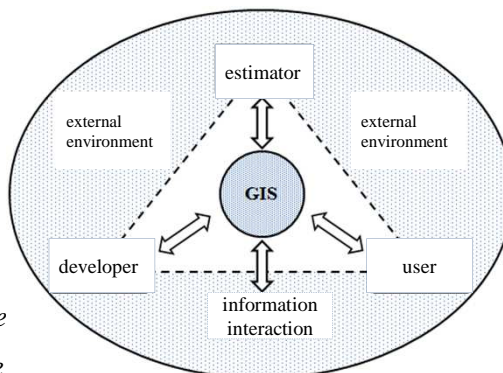
2.2 Mathematical Model

7

Mathematical Model for the Quality Evaluation of GIS

$$Z = \{E, P[S, M, W], Q, F\}$$

- *Z*—quality evaluation
- *E*—estimator
- *P*—evaluation object
- *S*—GIS structure
- *M*—GIS quality model
- *W*—weight of index
- *Q*—evaluation objective
- *F*—evaluation principle



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8



3. The Quality Model Design of GIS

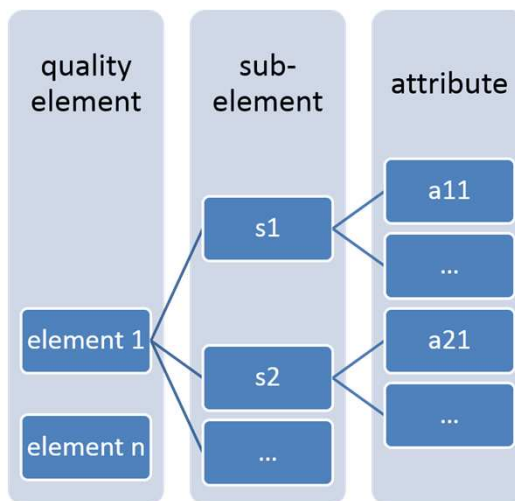


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3.1 Model Framework Design of GIS Quality ⁹

■ **The Quality Elements of GIS are Known as a Series of Features of those Entities Making up the GIS**

- quality elements
- quality sub-elements
- attributes of quality sub-elements



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GIS Quality Model			
1. Function	Function integrity Accuracy of function realization Compliance of function and standard	System interface and visualization Database building and management Spatial query and analysis Drawing and data output	Attributes
2. Safety	Physical safety Access controllability Data security Backup and recovery	Physical environment Authority and access control Log management and key strategy Backup and recovery	Attributes
3. Efficiency	Time feature Resource utilization Efficiency compliance	Load pressure test Response time and throughput Concurrent performance Memory and resource utilization	Attributes
4. Reliability	Fault tolerance Recoverability	Mean time between failures Mean downtime Mean recovery time	Attributes
5. Usability	Intelligibility Easy to learn Easy operation Attractability	User's manual Help file Installation test Interface test	Attributes
6. Compatibility	Across operating system ability Across network server ability Across browser ability	Support and compatibility of data format	Attributes
7. Normativity	Rationality of technical design process Advancement of hardware network Originality of overall system	Quality system certification Development and testing file Hardware system performance Network system performance	Attributes
8. Benefitability	Economic benefit Social benefit	Scientific value Decision-making ability	Attributes
9. Satisfaction	User unit Satisfaction System operator Satisfaction	User unit Satisfaction System operator Satisfaction	Attributes



4. Conclusion



4.1 Application Demonstration

□ *Some Application Demonstrations Based on the Model*

- *applied in testing and quality evaluation on the production software for surveying and mapping , such as:*
 - *unmanned aerial vehicle (UAV) systems for surveying and mapping*
 - *basic statistical software systems for National Geographic Conditions Census, etc.*
- *system testing on some emergency geo-information system*
- *testing and quality evaluation on internet mapping services and automobile navigation systems*



4.2 Conclusion

□ Challenge to the Quality Guarantee of GIS

- *the growing scale and function complexity of the GIS in China*
- *systems have been different from one another in terms of software and hardware system, database content, function performance and system safety*

□ Great Significance to Carry Out the Quality Evaluation of GIS

- *evaluate the quality in an objective and scientific manner*
- *measure the quality of industrial product*
- *promote the healthy development of geographic information industry*



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Thanks for your attention!

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