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UDESC

GeoLab

Digital Cartographic Generalization for Database of Cadastral Maps

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Digital Cartographic Generalization for Database of Cadastral Maps

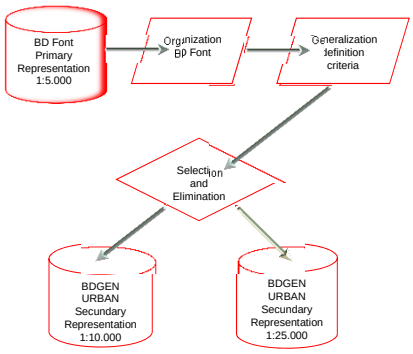
This paper aimed to develop **methods of cartographic generalization using GIS (ArcGis-ESRI)**. Thus, the generalization models were generated, evaluated, and presented through different criteria. Among these criteria, the structure of the digital data storage, the effectiveness of the recovery operations in the generalization process, and the necessity of a spatial perception for applying the operations. This study used the Criciuma cadastral cartographic base maps (scale 1:5.000, year 2003). The method was applied through the following steps:

- Evaluation of the scientific and technical knowledge development in the cartographic generalization
- Development of automated cartographic generalization models
- The applying of generalization processes, multi-scale spatial data base generation (1:10.000 and 1:25.000)
- Evaluation of the geometric and topological quality data derived and finally
- Validation of the methodology as a support to territorial planning and management.

Digital Cartographic Generalization for Database of Cadastral Maps

DEVELOPMENT AND IMPLEMENTATION OF A TEMPLATE FOR NETWORK GENERALIZATION

The model to be described is the method for network generalization



The method developed the goals:

a) Decrease visual elements density in certain scales;

b) Maintain the topology between the elements;

c) Keep the geometry of the elements in relationship to the original database (the primary representation).

Digital Cartographic Generalization for Database of Cadastral Maps

DEVELOPMENT AND IMPLEMENTATION OF A TEMPLATE FOR NETWORK GENERALIZATION

Criteria for the network generalization

It was considered the precision parameters graphics, stipulated by national legislation-IBGE (2007) and technical standards, ABNT NBR 13133 (1994) which considers the smaller perceived by the human eye graphics and smaller able to be represented on a map.

Calculation of selection criteria and Elimination lines network

SCALE	*N x 1 cm*	*Smaller size*
1: 10.000	10.000 x 1 cm = 10.000 cm	10 m
1: 25.000	25.000 x 1 cm = 25,000 cm	25 m

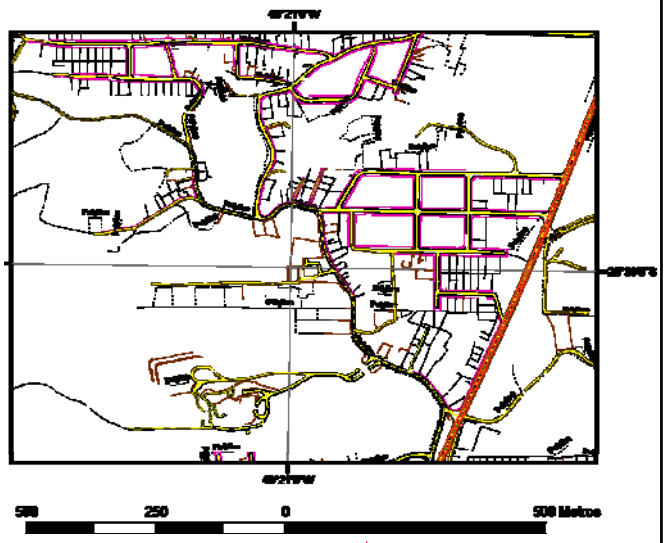
Within the parameters lay down in the table, developed "scripts":

- to scale 1: 10.000, the function “select” linked to “analysis tools” the arctoolbox and developed a “script” - “Length” <= 10 m”, which applied to layers and deleted all the elements less than 10 meters.
- to scale 1: 25.000, the function “select” linked to “analysis tools” the arctoolbox and developed a “script” - “Length” <= 25 m”, which applied to layers and deleted all the elements less than 25 meters.

Digital Cartographic Generalization for Database of Cadastral Maps

Representation of the density of original layers

Layers	*Scale 1:5.000*	*Scale 1:10.000*
Cerca	336 arcs	257 arcs
Eixo de logradouro	525 arcs	446 arcs
Limite de bairro	3 arcs	3 arcs
Limite de setor	13 arcs	13 arcs
Quadra definida	65 arcs	60 arcs
Quadra indefinida	2 arcs	2 arcs
Lote	593 arcs	360 arcs
Muro	143 arcs	80 arcs
Rua pavimentada	114 arcs	101 arcs
Caminho	168 arcs	140 arcs
Rua sem pavimentação	270 arcs	227 arcs
Rodovia estrada	2 arcs	2 arcs
Muro de arrimo	46 arcs	23 arcs



Scale 1:5.000 → Scale 1:10.000

Digital Cartographic Generalization for Database of Cadastral Maps

Representation of the density of layers after generalization

Layers	*Scale 1:5.000*	*Scale 1:10.000*
Cerca	336 arcs	257 arcs
Eixo de logradouro	525 arcs	446 arcs
Limite de bairro	3 arcs	3 arcs
Limite de setor	13 arcs	13 arcs
Quadra definida	65 arcs	60 arcs
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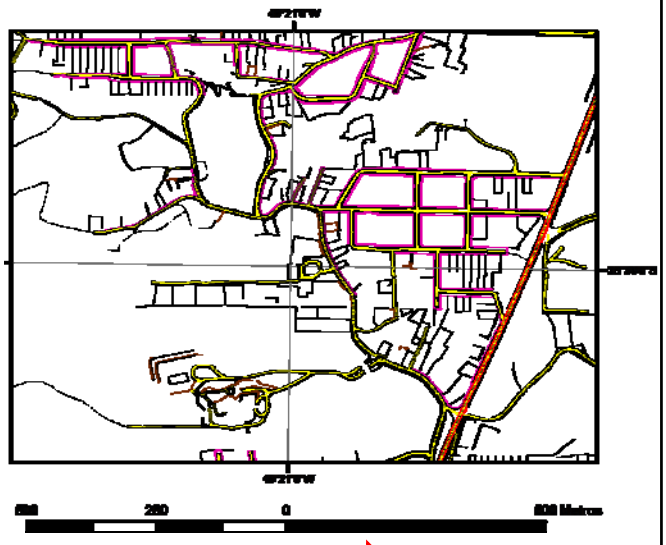
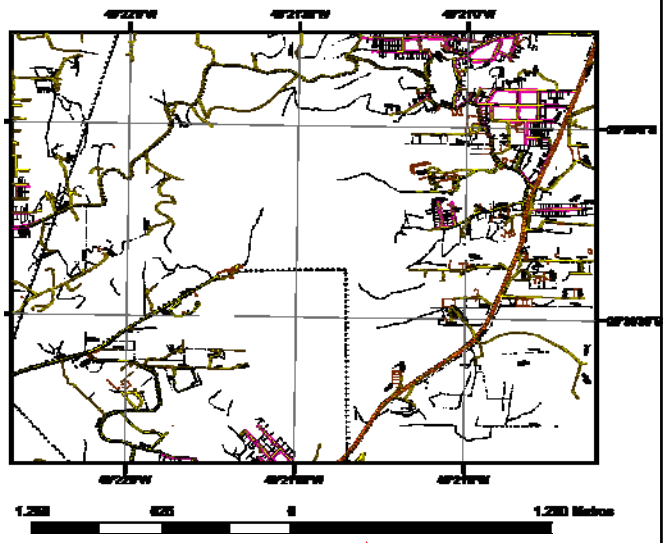


Scale 1:5.000 → Scale 1:10.000

Digital Cartographic Generalization for Database of Cadastral Maps

Representation of the density of original layers

Layers	*Scale 1:5.000*	*Scale 1:25.000*
Cerca	336 arcs	166 arcs
Eixo de logradouro	525 arcs	316 arcs
Limite de bairro	3arcs	3 arcs
Limite de setor	13 arcs	13 arcs
Quadra definida	65 arcs	58 arcs
Quadra indefinida	2 arcs	2 arcs
Lote	593 arcs	44 arcs
Muro	143 arcs	34 arcs
Rua pavimentada	114 arcs	84 arcs
Caminho	168 arcs	90 arcs
Rua sem pavimentação	270 arcs	202 arcs
Rodovia estrada	2 arcs	2 arcs
Muro de arrimo	46 arcs	7 arcs



Scale 1:5.000 → Scale 1:25.000

Digital Cartographic Generalization for Database of Cadastral Maps

Representation of the density of layers after generalization

Layers	*Scale 1:5.000*	*Scale 1:25.000*
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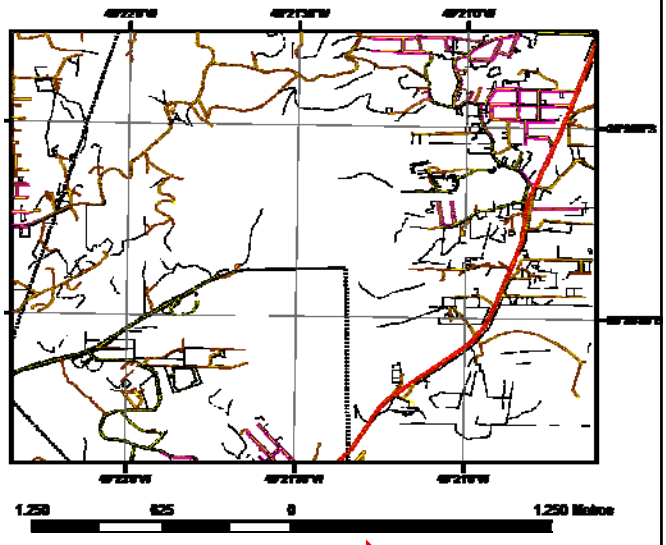

Scale 1:5.000 → Scale 1:25.000

Digital Cartographic Generalization for Database of Cadastral Maps

Conclusions

The development of the methodology was based an intuitive and interactive process to coordinate the different stages of work to be performed.

As the use of GIS, this contacted streamlines the process of generalization. Implement a simple implementation of algorithms no answer 100% generalization of elements. This approach is still necessary analysis found the results and cartographer interference in the final result of generalization.

Regarding the products, in the form of widespread databases, it emerges that followed the principles of accuracy, decrease the density of information and relations topological.

Looking to develop a model that can be applied to other locations, and with the use of other software, study area for the development of this work, provides various elements of the occupation. In this way using these models, can become viable application by the change of values as the presentation of elements and the desired scale.

It is recommended that databases for the automated generalization are prepared within topological and criteria to facilitate the application of geometry of generalization operators. Examples this can be cited, as a careful vectorizer elements, looking for respect their topological relations, completeness and accuracy of values.