

AUTOMATIC SELECTION OF THE ROADS USING NETWORK STRUCTURE IN TRANSPORTATION GENERALIZATION

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ABSTRACT:

Modeling and representing the real world at several scales for different requirements and purposes are among the main goals of the cartography discipline. Therefore, generalization has been assessed as one of the priority research topics for the cartographers and the researchers who have involved in related disciplines. Lots of studies have been carried out so far. And quite promising results have been got about the implementation of automatic and semiautomatic generalization techniques in digital environment, by the help of rapidly developing computer and science technology. Because of the high production costs, updating problems, and increasing needs for the geographical information and maps; data providers are forced to construct one basic geographical database and derive other products from this database through generalization methods as much as possible.

In this paper, linear road data required for the production of 1:50.000 scaled maps is tried to be automatically selected from the 1:25.000 scale data, through developed generalization approach in order to reduce the production time and maintain the standardization in the production and results. For automated selection process of the roads, junction points at intersection of the roads are created and the selection operation is done by using these junction points.

1. INTRODUCTION

Due to the requirement of information and analysis in several levels in different subjects (especially in engineering applications), maps and geographic information systems at various scales and resolution are needed. Spatial and attribute information of the geographic features and the relations between these features can elaborately be stored in high resolution geographic databases. However, these databases can be insufficient for minor scaled application. Thus, models that contain less information and convenient for different purposes must be derived by generalization.

In this study, it is aimed to perform automatic selection of line road data, which will be represented at target scale, by the help of network structure. Linear road data required for the production of 1:50.000 scaled maps is tried to be automatically selected from the 1:25.000 scale data.

2. AUTOMATIC SELECTION OF THE ROADS

Digital vector maps are constituted from 9 different feature classes in General Command of Mapping (GCM). Each class is divided into 3 coverages as point, line and polygon, while annotation features are stored in a different class. Table 1 shows 10 classes which form the digital map. 1:25.000 scaled digital cartographic vector data in Esri geodatabase format is used as input data in this software for selection of line road data. It is aimed to increase the accuracy of the map and save time with the opinion of derivation of the target scale from the master data. Automatic selection software has been developed with visual

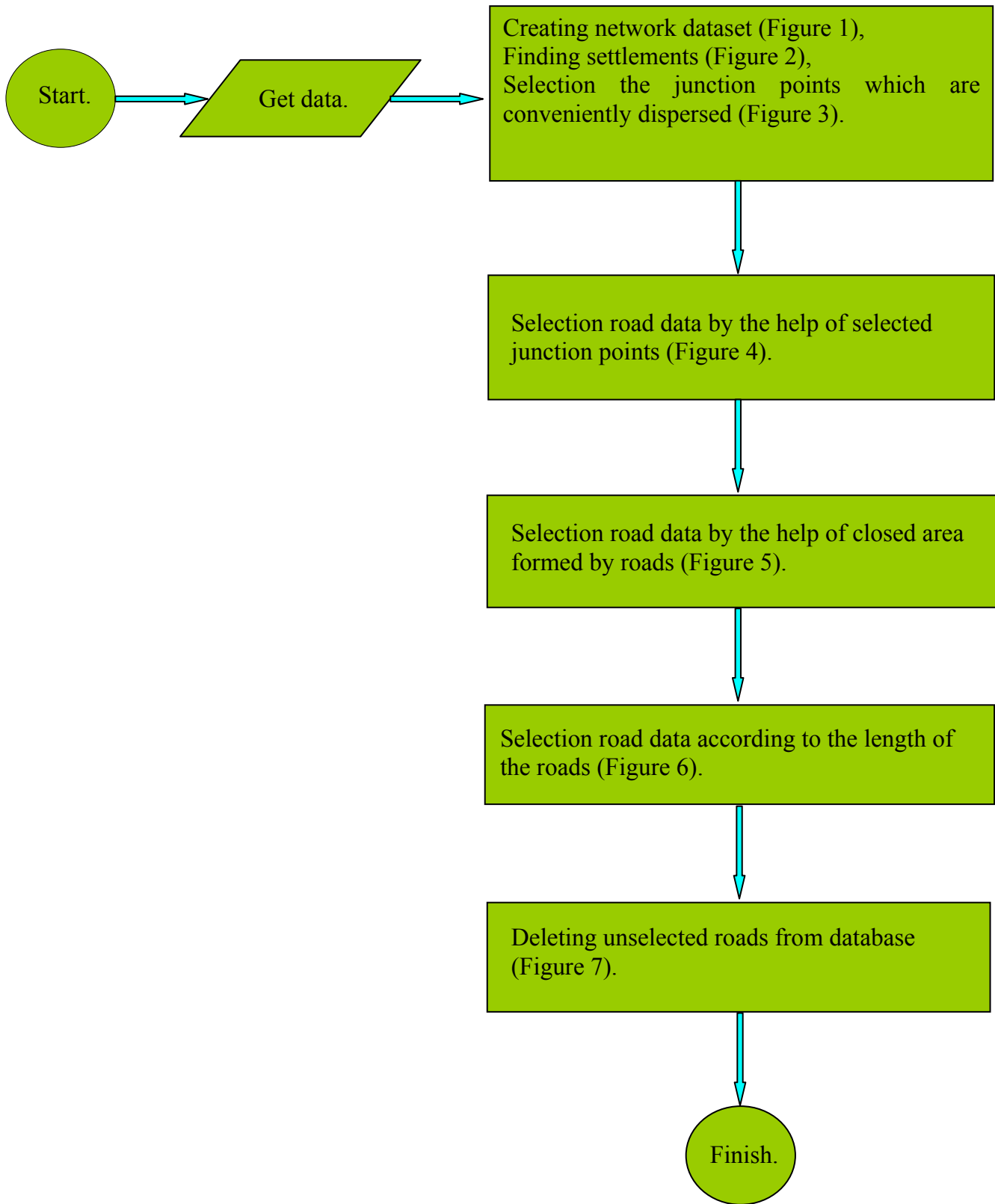
basic programming language by using the objects at ArcObjects software components library of the ArcGIS Desktop software.

CLASS (English)	CLASS (Turkish)	Abbreviation
Annotation	Yazı	yazi
Boundary	Sınırlar	bnd
Elevation	Yükseklik	ele
Hydrography	Hidrografya	hyd
Industry	Endüstri	ind
Physiography	Fizyografya	phy
Population	Yerleşim	pop
Transportation	Ulaşım	tra
Utilities	Tesisler	uti
Vegetation	Bitki Örtüsü	veg

Table 1. Feature classes

Before the selection of the roads which will be represented at the target scale, junction points are created at intersection points on line segments of the road data. In order to make selection on roads; firstly junction points are weighted, conveniently dispersed junction points are tried to be selected and then analysis is performed. To perform the best selection at the different road density levels, it is tried to create closed areas which are formed by roads and according to the areas of these polygons selection for the roads is improved.

Those are algorithms used in road selection;



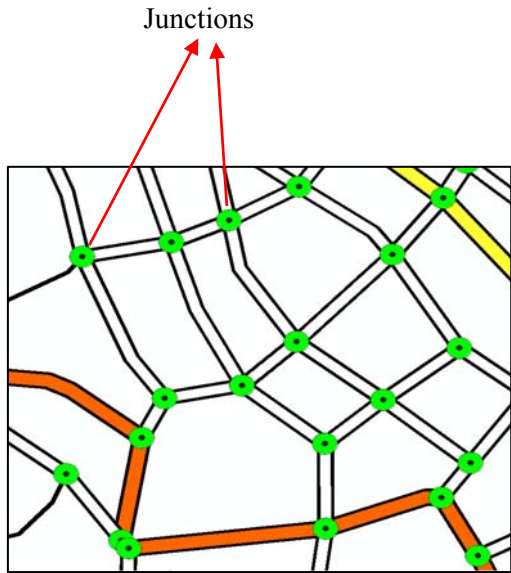


Figure 1. Creating network dataset and junction points

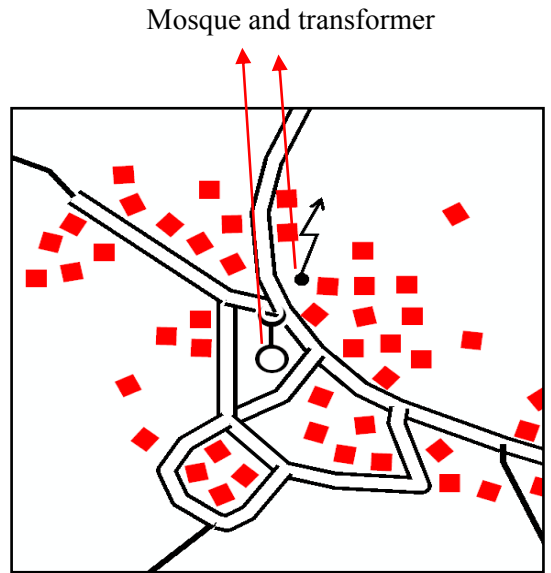


Figure 2. Finding settlements by the help of mosque and transformer data

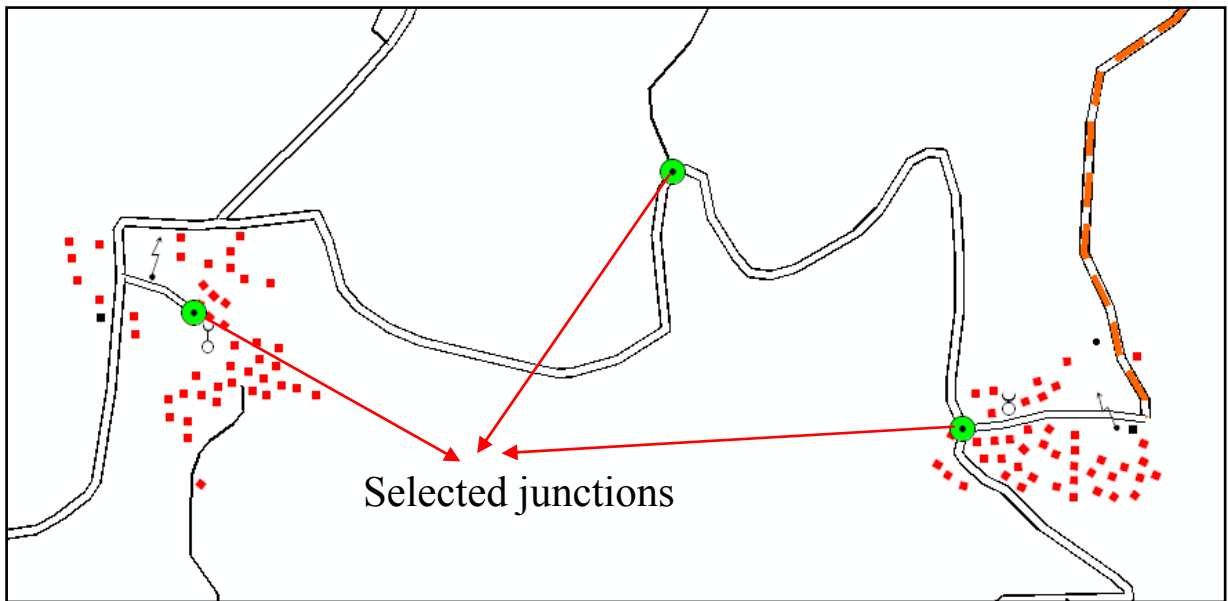


Figure 3. Selected junction points

3. CONCLUSION

In this study; for transportation generalization, automatic selection of line road data from database is performed.

Compared with the interactive selection, in automatic generalization an important time saving is gained.

Better results can be obtained by creating the junction points feature class while producing the 25.000 scaled vector map and by giving some attributes like direction, route to the junction points.

In order to get better results, databases should be enriched and using of artificial intelligence techniques in generalization should be researched.