

Building an Automatic Raster to Vector Digitizing Application with GIS Capabilities

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Key words:

SUMMARY

Using GIS for storing and analyzing spatial data requires spatial features in vector format. Most of the available maps in Egypt and the third world are in hardcopy or raster format. The available techniques to convert the hardcopy maps or satellite images into vector features to be used in GIS are either manual digitizing using a digitizer, on screen manual digitizing, or expensive to buy and to maintain commercial software that perform digitizing and there is a need to buy extra extensions to perform other GIS features. Also, manual digitizing is not accurate enough in tracing all the details of the features and takes a long time to accomplish.

The objective of this paper is to build and test an application that could accurately convert scanned color maps and satellite images from raster format into vector format. This application would be used as the base for a Geographic Information System (GIS) where this application has a built-in database to contain all the attribute data of the vectorized features and with query analysis capabilities.

The resulted vector files would be in a format compatible and acceptable to other major GIS products and the resulted spatial data would be geo-referenced according to the used universal or national coordinate system such as Egyptian Transverse Mercator (ETM).

Several examples are presented in the paper for hardcopy maps and satellite images converted into vector format to show the advantage of implementing this developed application. Part of a recent hardcopy map of scale 1:50,000 from the Egyptian Survey Authority is scanned and then digitized automatically using the developed application and attribute data from the map is added to the geo-database of the application. Another example from a recent satellite image used by the National Water Research Center is digitized automatically by the developed application.

This paper discusses and shows the importance of developing new applications that matches the commercial applications and could be used on the national scale. That application has the flexibility to be modified and developed for extra features and to be customized for specific needs of the National Water Research Center, the Egyptian Survey Authorities, or any other department in the Ministry. The advantages of this software is being developed by experts from the National Water Research Center and free to share with other departments, in addition to building up local expertise in the Center to develop other needed applications for the Ministry.

This application would help in speeding up the process of digitizing and building up attribute in the geo-database without the need for purchasing new software, and that in turn would help

in the completion of the Egyptian base map in all fields. This would lead to the phase of analysis of the available spatial data as an important step for the decision makers to make informative decisions, in addition to, helping the researchers of the National Water Research Center.

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