A GIS, GPS, Database, Software©

Elshayal Smart GIS Map Editor©

2002 - 2010

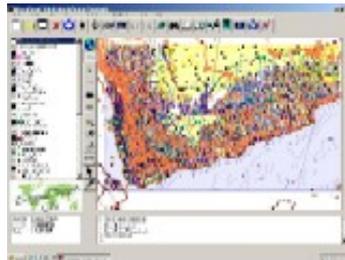Developed By

Mohamed Elsayed Elshayal

http://www.smartwebonline.com

elshayal@smartwebonline.com

elshayal@tedata.net.eg

Cairo - Egypt

Abstract

Elshayal Smart GIS Map Editor© software is an almost First Arabian GIS software© and It is completely developed by individuals (with no financial fund or support from any organization) and It is independent of any commercial software package, and it is free for none commercial use.

The Software Current Features:-

1. Free GIS Map Editor Software
2. Download, and mosaic Google Earth tiles map
3. Convert AutoCAD DXF to shape file
4. Convert NASA ASTER & SRTM DEM to Tin shape file
5. Trace, and save GPS route
6. Geo Reference, and Rectify Raster Images
7. Edit, and make shape files
8. Zoom in & Zoom out, Pan, Identify, and Selecting features
9. Edit, move, and Snap vertexes
10. Attribute Data Base query builder and Analysis
11. Spatial Location query builder and Analysis and Data transfer by location
12. Find Shortest Path.
13. Convert Coordinates Systems
14. Convert Shape type and grouping
15. Edit, and make Data Tables
16. Layer properties
17. Undo, Redo
18. Thematic Color Field
19. Run VB Script
20. Rotate and Scale
21. Delete and Copy and paste selected features
22. Applying VB script
23. 3D View

The Software Expected Features:-

1. Surface Analysis
2. Read Tiger Line Format.
3. Print Preview and Map Layout

Keywords

GIS Software Map Editor, Database Editor, Attribute Data Base query builder, Spatial query builder, Data transfer, and GPS

Introduction

A Geographic Information System (GIS) is a computer program for storing, retrieving, analyzing, and displaying cartographic data.

GIS Software Programming is impacted by various sciences, which are integral to the GIS programming such as geographic, graphic, database, operating research, software engineering, software programming and code enhancement.

By applying those above mentioned sciences and techniques, to the GIS programming activities, we achieved the **Last stable version of Elshayal Smart GIS Map Editor:-**

1. The software is a GIS standalone applications that Read and write Shape files and attribute tables and present them in layers and give the user the full GIS tools such as (zoom in, zoom out, pan, full extend, select, measure distance, edit existing layer, make new layer) and view these layers as 2D & 3D.

2. It also allow the user to query and search map by using attribute data base tables query builder form or by using Spatial Location query builder and data Transfer form.

3. Selection Module allows the user to select, edit, copy, and move features from the map view or from the attribute table.

4. The software allows the user to build a Shortest Network and measure the Shortest Path between 2 points in any poly line layer.

5. GPS tracking Module, which reads from the GPS Device and convert the Lat. & Long. to 23 projection coordinates system such as (Airy , Australian National , Bessel 1841 , Bessel 1841(Namibia) , Clarke 1866 , Clarke 1880 , Everest , Fischer 1960 ,Fischer 1968 , Fischer 1968 , Fischer 1968 , Fischer 1968 , Hough, International , Krassovsky , Modified Airy , Modified Everest ,Modified Fischer 1960 , South American 1969 , WGS 60 , WGS66 , WGS-72 , WGS-84)

6. The software also provide the users by the important tools to Downloads , mosaic Google Earth tiles Map, Covert AutoCAD DXF to Shape file, Convert NASA ASTER and SRTM DEM to tin shape file, Run VB script .

7. Feature and vertexes editing module allows the users to snap, rotate, scale, divide, and combine features with unlimited capability to undo and redo all editing

8. Data Table Editing Module allows the users to deal with table cells by copy, cut, past, clear, fill past, fill series with unlimited capability to undo and redo all editing. And it allows also dealing with rows by Sort rows, select, unselect, delete, and undelete functions.

9. Layer Properties Module allows the users to control the layer appearance such as view color, selection color, editing color, label, networking settings, modify dbf field date structure, and thematic field colors.
10. The software also allow the user to open and rectify (geo-reference) most of the raster images such as bitmap, jpeg, gif, tiff, png files.

Objectives
Developing a GIS, GPS, Database, software with the following features
1. Developed by using VB6.
2. Independent of any commercial software package, or code library.
3. With no support of any governmental Organization.
4. Divided into separate modules (up to 30 main modules), And all of these modules can be easily upgraded to be used in building Internet CGI application or Smart Devices VB.net application.
5. Free for none commercial use.

Methodology
Elshayal Smart GIS Map Editor development process model is "water fall model" or software life cycle. The fundamental development activities of Elshayal Smart GIS Map editor software are divided among the following stages:-

1. Requirements analysis and definition stage
a. Reading, writing, modifying shape files, and data base files.
b. Search and query attribute data base tables and spatial data and Transfer data according to its spatial location.
c. Select features from attribute data tables, and drawings
d. Finding the shortest path between 2 points in any poly line network
e. Tracking and saving the GPS route.
f. Converting between Lon.& Lat. and 23 projection coordinates system such as (Airy , Australian National , Bessel 1841 , Bessel 1841(Namibia) , Clarke 1866 , Clarke 1880 , Everest , Fischer 1960 ,Fischer 1968 , Fischer 1968 , Fischer 1968 , Fischer 1968 , Hough, International , Krassovsky , Modified Airy , Modified Everest ,Modified Fischer 1960 , South American 1969 , WGS 60 , WGS66 , WGS-72 , WGS-84)
g. Download satellite Images from Google, and download ASTER and SRTM Digital Elevation Module (DEM).
h. Strong Edit features and vertexes tools, with snap, rotate, scale, divide, and combine, undo, and redo functions

     i.   Strong Edit Tables tools, with copy, cut, past, clear, fill past, fill series, undo, redo, sort rows, select, and delete functions
     j.   Control the layer appearance such as view color, selection color, editing color, label, networking settings, modify dbf field date structure, and thematic field colors.
     k.   Open and rectify (geo-reference) most of the raster images such as bitmap, jpeg, gif, tiff, png files

2. Software design stage

8 main menus, 30 toolbar buttons, and 20 main forms have been designed to reflect the above-mentioned requirements and to give the user the full control of the Software and its functions. Each menu, and form are designed to work with one requirement or function according to the integration and coherence of the functions.

3. Software implementation and testing stage

30 main modules contain all formulas and calculations. Each module are written individually and tested by itself. Each module is designed to work with one requirement or function, according to the integration and coherence of the functions.

4. Software integration stage

Combining the above-mentioned modules, menus, toolbar buttons,and forms in one complete system, which achieves the above mentioned system requirements.

5. Operation and maintenances stage

The system has been used in several international projects as assistance GIS software in parallel with other international well known GIS software.

The System is offered as free None commercial use for more than 10,000 users to install it and put it into practical use. Many errors have been discovered and corrected.

Discussion

From scratch GIS software developing, consumes a lot of efforts, and dedicated time and money, while importing ready-made software save a lot of efforts, time, and money, but it put us in the audience seats.

Results & Conclusion

As can be seen from the preceding discussion, developing from scratch GIS software is very expensive, very exhausting, and academic research centers and institutes must support and endorse those efforts.

References

- Sommerville, Ian (2001). *Software Engineering.* Addison Wesley.
- Robert M. Itami and Robert J. Raulings (1993)*, SAGE Introductory Guidebook.* DLSR, Melbourne, Australia.
- ElShayal Smart Web on Line Software http://www.smartwebonline.com

List of menus

File menu:
- New, Start a New Empty map view
- Open, and retrieve a saved map on the map view
- Save, a set of layers as a map project
- Save as, a map with different name
- Print Map, that appear in the map viewer
- Save Image, of the map as an image
- Close Project the current map
- Exit the program

Edit menu:
- Undo Drawing Map
- Redo Drawing Map
- Insert Vertex
- Delete Vertex
- Delete Part
- Delete Feature
- Divide Feature
- Combine Feature
- Edit Feature Data
- Move Distance
- Move to X , Y
- Move Settings
- Set Pivot Point

- Rotate – Scale
- Rotate – Scale menu
- Go to Feature in Google Earth
- Bring Part to Front
- Send Part to Back
- Invert part Direction
- Add New Vertex in Editing Part
- Add New Part in Editing Feature
- Length
- Area
- Stop Edit
- Feature Properties

View menu:
- Full extend
- Zoom in
- Zoom out
- Center
- Pan move
- Start Pan mode
- Map Scale
- Map Projection and Unit
- Zoom Previous
- Zoom Next
- Refresh map
- Copy Map to Clipboard

Layers menu:
- Move up, the selected layer up
- Move Down, the selected layer down
- Show all Layers
- Hide all Layers
- New Layer, Build a new Layer
- Add Layer, add an existing layer on the map viewer
- Save Layer
- Save Layer as, save the layer with different name
- Rectify Image (2 points)
- Un Rectify Image

- Validate Layer boundaries
- Go to Layer in Google Earth
- Remove layer
- Remove deleted features
- Import structure from
- Reload Layer
- Set Layer Data Source
- Data Table
- Layer Properties
- Zoom to Layer

Selection menu:
- Find by Data
- Find and Data Transfer by Location
- Cut & Past Selected Features to
- Copy & Past Selected Features to
- Delete Selected Features
- Copy & Combine Selected Features into Parts in one new Feature
- Copy & Separate Parts of selected Features into new Features
- Combine Parts of Selected features into one part
- Close edge of selected features
- Invert Selection
- Clear Selection
- Terminate All running Functions
- Zoom to selected features

Network menu:
- Snap Vertexes to
- Divide Poly Line on
- Divide Polygons on
- Combine parts into one part
- Build Shortest Path Network
- Shortest Path Network menu
- Clear Shortest Path

Tools menu:
- 3D View Turn On
- 3D View Turn off

- GPS Trace on; show the GPS point in the map viewer.
- GPS Trace off, hide the GPS point in the map viewer
- GPS Settings menu.
- Convert Shape Type and Grouping
- Convert Layer coordinates System
- Convert coordinates System Calculator
- Convert ASTER & SRTM DEM to tin Shape File
- Convert AutoCAD DXF to Shape File
- Download from Google Earth
- Move Settings

Help menu:
- Smart Web on Line Software, http://www.smartwebonline.com .
- Misr Consulting Engineers http://www.mce-eg.com/
- About, Show about menu which contain the author information

List of Toolbar buttons

Zooming and Panning Functions

	Full extent of all the layers in the map viewer.
	Zoom In to the center of a particular area on the map vie
	Zoom Out from the area or the position you click.
	Pan drags and drops the map to display the rest of the map.

Information Functions

	Select Area, highlights selected features in the map view and in table view with a different color.
	Clear Selection..
	Locate, finds features using direct search or query builder
	Edit Table, Start Editing the table of the selected layer
	Info, gives information about one feature on the map.

	Hyper Link Connection, Open a related web site or software of every feature.
	Measure Length between two points on the map view.

Editing Functions

	Edit Feature, vertex
	Draw Feature
	Undo Drawing
	Redo Drawing

Tools and Route and Tracking Functions

	Download From Google Earth with High resolution
	Convert coordinates System Calculator
	Shortest Path finds the shortest path between 2 points on a line layer network and provides description for the path.
	Track GPS, connects to GPS and read coordinates and draw it on the map view.

Layers Controls and Properties

	Add Layer, adds a layer on the map viewer.
	Delete Layer, removes layer from the map viewer.
	Layer Properties, displays the selected layer properties
	Moves the selected layer up.
	Moves the selected layer down.

Map Control and Functions

	Start a New Empty map view
	Open, and retrieve a saved map on the map view.
	Save, saves a set of layers as a map files.
	Print Map, prints the map view
	Save Image, saves the map view as an image
	3D view Turn on or turn off