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Geographical Information System for Power Utilities

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Abstract - GIS, Feeder Manager, CCC, SCADA, HT Network, LT Network.

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GEOGRAPHICAL INFORMATION SYSTEM FOR POWER UTILITIES

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Geographical Information System for Power Utilities

Jalpesh Solanki^a & Utkarsh Seetha^σ

Abstract - GIS, Feeder Manager, CCC, SCADA, HT Network, LT Network.

I. INTRODUCTION

The Geographical Information system has been used worldwide for controlling and managing the business process and field operations. It also widely used for automation of the system. In this research we defined the scope of the GIS system in the current scenario and used the same to give maximum input to the current business application.

The major benefit to use GIS will be obtained only after the successful data captured for the entire HT/LT network and all the current electrical consumers. The GIS system gives error free automated inputs to the system for forecasting the future needs related to the electrical network as well as demand. This will generate automated reports to help the engineers to make the system error free and make the system up to date.

Geographic Information System consists of a system for capturing, storing, checking, integrating, manipulating, analyzing and displaying geo data related

to positions on the Earth's surface and data related to attributes of the entities/Customers.

It pertains to both vector and raster GIS

This is achieved through GIS mapping to pre-defined scale, generation of intelligence electrical network maps and super imposing them on the land base GIS maps and through customization and / or development of application software.

Feeder Manager – LT option

1. Select Feeder Manager in the Locator Tool drop down.
2. Select the values in drop down DISCOM, Zone, Circle, Division, Sub Division and Sub Station.
3. Select a feeder in feeder List box.
4. Select 'Only LT' radio button.
5. Select any DT in DT dropdown.
6. Click on Find button.
7. This will highlight the features covered in specified LT and the attributes will be displayed in the results panel.

The screenshot displays the GIS Feeder Manager interface. The 'Locator' tool is active, showing a list of feeders and their attributes. The 'Results Panel' at the bottom displays a table of service points and their associated data.

Highlight	Pan	Zoom	Voltage	PhaseDesignation	PoleID	FeederCode	WorkOrderID	Comments	CreationUser	DateCreated	DateModified	LastUser	ServicePointID	NIN
			0.44 KV		035/013/01/003/B/PL/009				samir.hedulkar	11/16/2010	11/18/2010	samir.hedulkar	284439	
			0.44 KV		035/013/01/003/C/PL/001				samir.hedulkar	11/16/2010	11/18/2010	samir.hedulkar	284488	
			0.44 KV		035/013/01/003/C/PL/005				samir.hedulkar	11/16/2010	11/18/2010	samir.hedulkar	284576	
			0.44 KV		035/013/01/003/C/PL/005				samir.hedulkar	11/16/2010	11/18/2010	samir.hedulkar	284616	
			0.44 KV		035/013/01/003/C/PL/002				samir.hedulkar	11/16/2010	11/18/2010	samir.hedulkar	284688	

Feeder Manager - Features covered in LT

Author ^a : Research Scholar Jodhpur National University (Faculty of Computer Application).

Author ^σ : Restructured Power Development and Reforms Programme.

Feeder Manager – HT option

1. Select Feeder Manager in the Locator Tool drop down.
2. Select the values in drop down DISCOM, Zone, Circle, Division, Sub Division and Sub Station.
3. Select a feeder in feeder List box.
4. Select 'Only HT' radio button.
5. Click on Find button.
6. This will highlight the features covered in specified HT and the attributes will be displayed in the results panel.

The screenshot displays the GIS software interface. On the left, the 'Map Layer - Identify/Selection' panel shows a list of network resources with checkboxes. The 'Locator' dialog box is open, showing the 'Feeder Manager' tool selected. The dropdowns are set to: Diecom: AV/VNL, Zone: AJMER, Circle: AJMER, Division: CD1, Sub Division: 1114, Sub Station: PANCHSHEEL SUBSTATION. The 'Feeder' list shows three options: 310/013/01 A Block, 310/013/02 C Block, and 310/013/03 B Block. The 'Select By' section has 'Only HT' selected. The 'Find' button is visible. The map shows a network of lines with the selected feeder highlighted in cyan. Below the map, the 'Results Panel' displays a table of results.

Highlight	Pan	Zoom	Voltage	ConductorMaterial	ConductorType	RatedAmps	SubTypeCD	Class	PhaseDesignation	NIN	AssetID_Temp	CreationUser	DateCreated	LastUser
			11 KV		Weasel	630	Bus Dropper	Stranded Conductor	RYB	310/013/01		rajiv.lochan	9/10/2010	samir.hed
			11 KV		Weasel	630	Bus Dropper	Stranded Conductor	RYB	310/013/01		rajiv.lochan	9/10/2010	samir.hed
			11 KV		Weasel	630	Bus Dropper	Stranded Conductor	RYB	310/013/01		rajiv.lochan	9/10/2010	samir.hed
			11 KV		Weasel	630	Bus Dropper	Stranded Conductor	RYB	310/013/01		rajiv.lochan	9/10/2010	samir.hed
			11 KV		Weasel	630	Bus Dropper	Stranded Conductor	RYB	310/013/01		rajiv.lochan	9/10/2010	samir.hed

Feeder Manager – HT Trace**Feeder Manager – Both option**

1. Select Feeder Manager in the Locator Tool drop down.
2. Select the values in drop down DISCOM, Zone, Circle, Division, Sub Division and Sub Station.
3. Select a feeder in feeder List box.
4. Select 'Both' radio button.
5. Click on Find button.
6. This will highlight the features of specified Feeder covered in LT and HT network and the attributes of selected features will be displayed in the results panel.

Locator

Locator Tool: Feeder Manager

Discom: AV/VNL

Zone: AJMER

Circle: AJMER

Division: CD1

Sub Division: 1114

Sub Station: PANCHSHEEL SUBSTATION

Feeder: 310/013/01 A Block
310/013/02 C Block
310/013/03 B Block

Select By: ☐ Only LT ☐ Only HT ☒ Both

☐ See Results in separate window

Find

Results Panel

Highlight	Pan	Zoom	Capacity	HighVoltageSideVolts	LowVoltageSideVolts	VectorGroup	PercentageImpedance	HVPProtection	TransformerMounting	LVPProtection	FullLoadLosses	NoLoadLosses
			100 KVA	11 KV	0.44 KV	Dyn11	4.5	Isolator+Fuse	Double Pole	KnifeSwitch+Fuse	1990	230
			100 KVA	11 KV	0.44 KV	Dyn11	4.5	Isolator+Fuse	Double Pole	None	1990	230
			100 KVA	11 KV	0.44 KV	Dyn11	4.5	Isolator+Fuse	Double Pole	None	1990	230
			100 KVA	11 KV	0.44 KV	Dyn11	4.5	Isolator+Fuse	Double Pole	None	1990	230

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Feeder Manager – Both option

a) *Electric Trace*

This functionality allows you to perform electric trace on electric network, save the trace result, load the trace result and calculate the length of Conductors and cable participating in trace

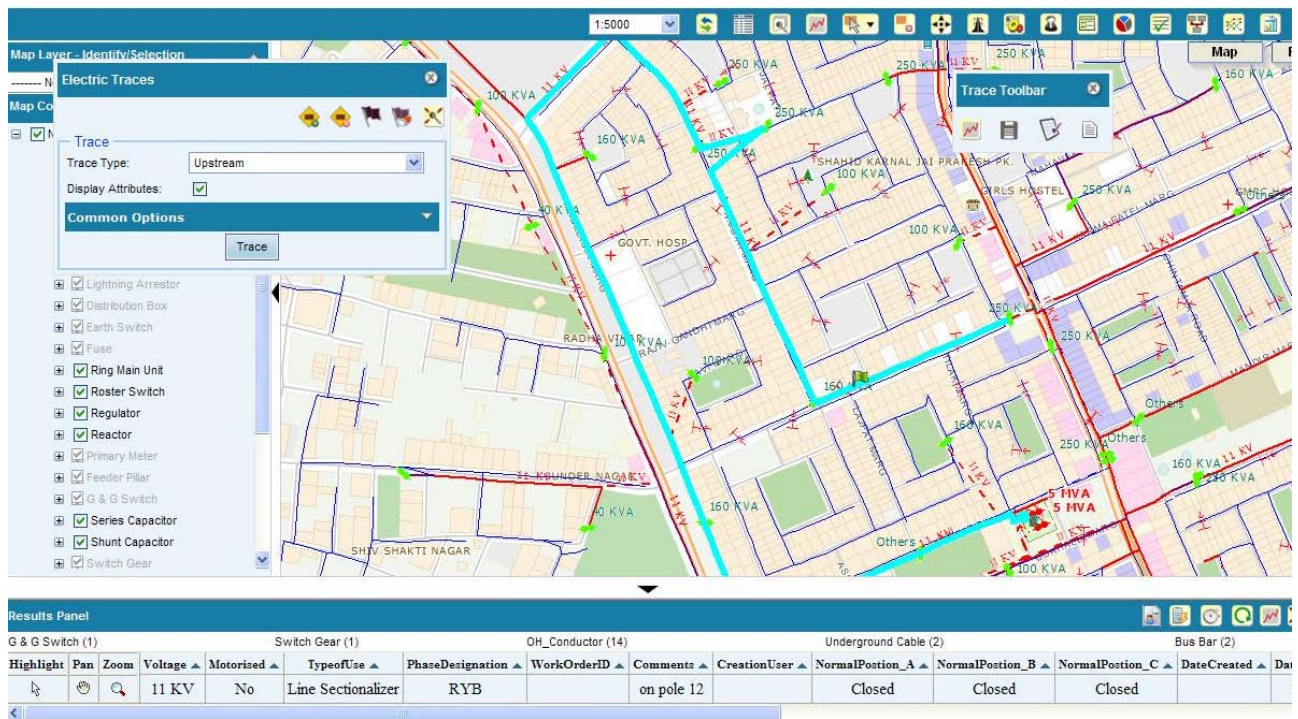
1. Click on Electric Trace tool
2. Trace tool bar open with option for Electric Trace, Save Results, Manage Results and Calculate Length.

i. *Electric Trace*

This functionality allow you to perform Upstream, Downstream, Upstream Protective, Downstream Protective, Distribution and Loop trace.

1. Click on Electric Trace tool.
2. Electric Trace dialogue box open.
3. Select a trace type.
4. Select other option depends upon the trace type.
5. Select trace phase.
6. Place flags and barrier on map.
7. Click on Trace button.

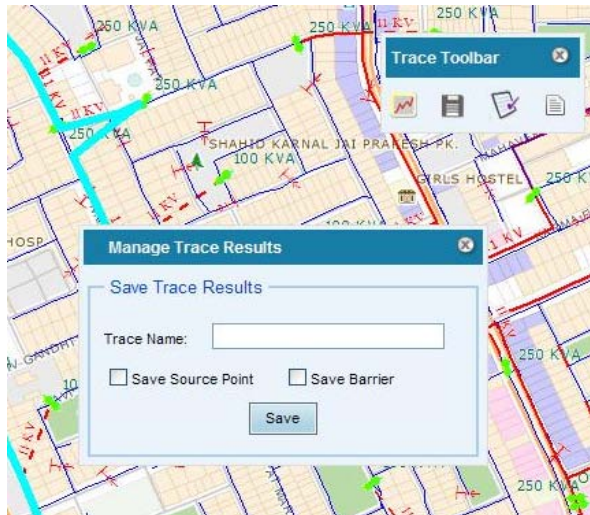
8. Feature participated in trace got highlighted in map and displayed in result panel



ii. Save Results

This functionality allow you to save the trace result with flags and barriers.

1. Perform Trace
2. Click on save results

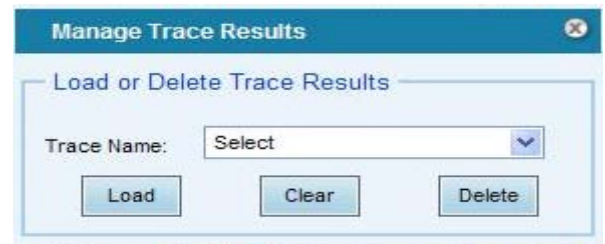


3. Enter Trace name.
4. Select any of the option 'Save Source Point' and 'Save Barrier'
5. Click on save button.
6. Trace result got saved

iii. Manage Results

This functionality allows you to load the saved trace result.

1. Trace result should be saved.
2. Click on Manage Results.



3. Select a Trace Name from Trace Name drop down.
4. Click on Load button.
5. Trace result got highlighted in map.
6. Click on Clear button.
7. Trace result got cleared from map.
8. Click on Delete button.
9. Confirmation message pop up.
10. Click on Ok button.
11. Selected trace result got deleted.

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