



Converting DWG to Geospatial data

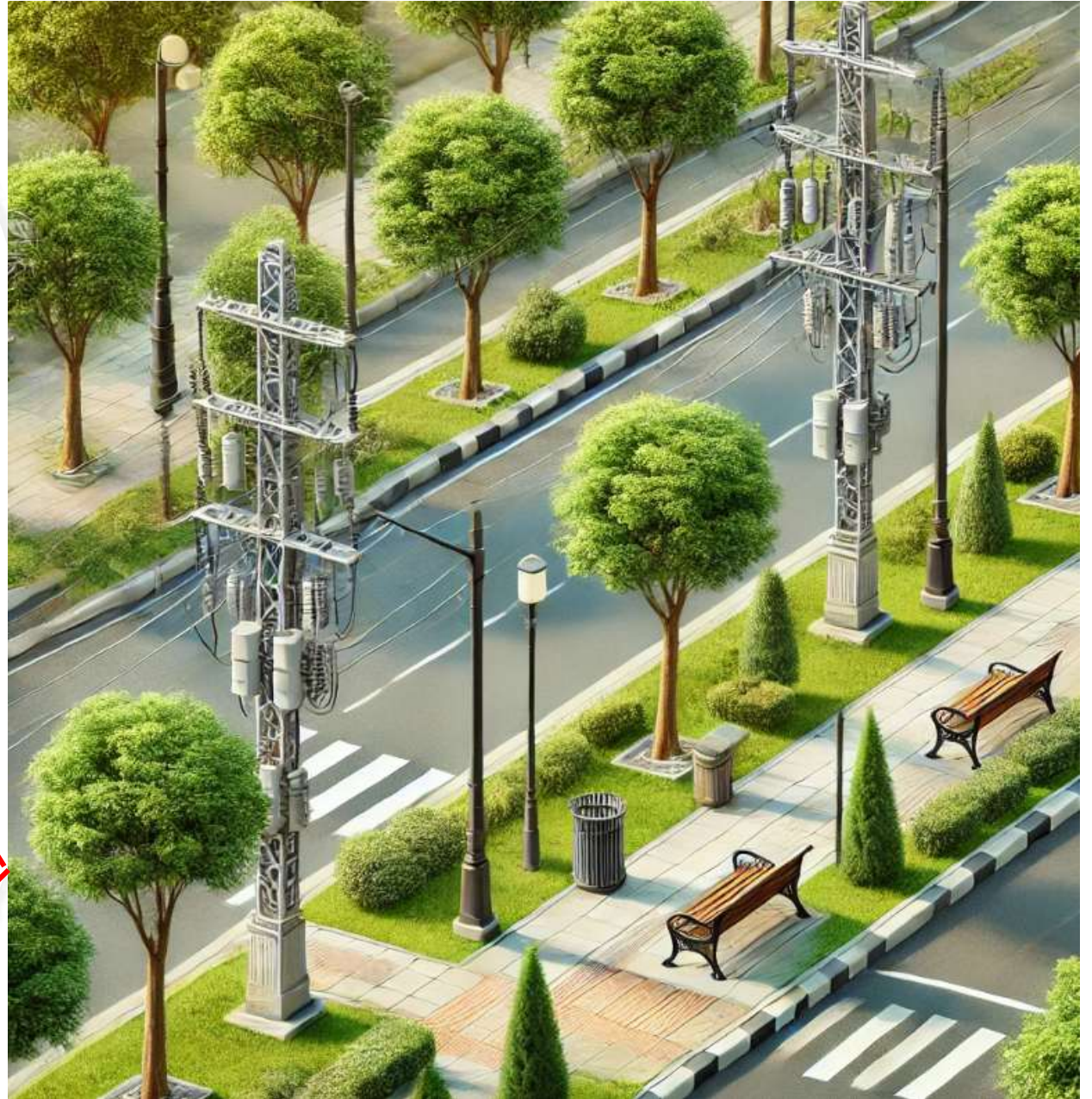
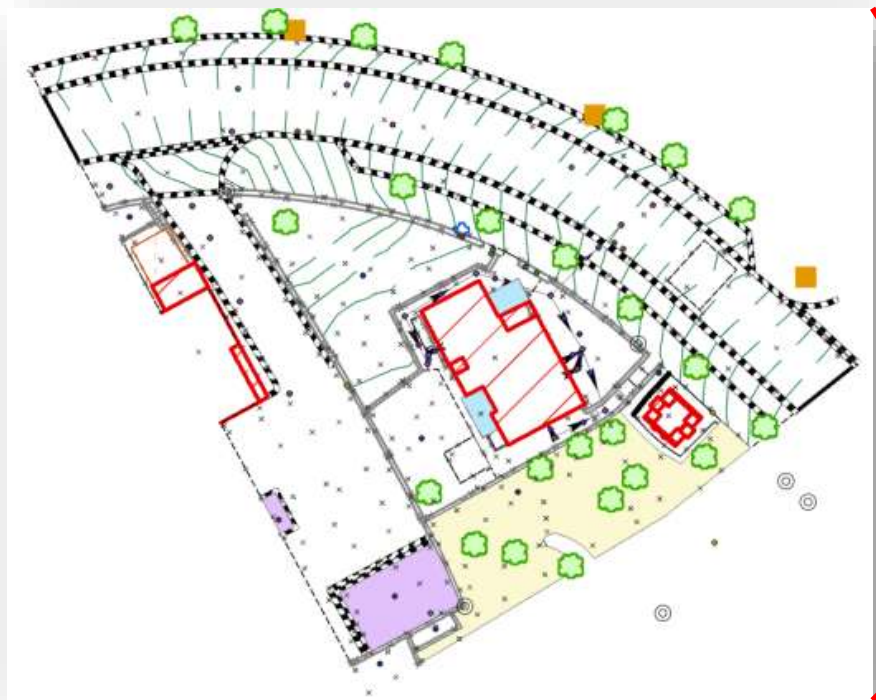
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What?

As-Made (DWG) files are the most used data among surveyors in Israel



Today?

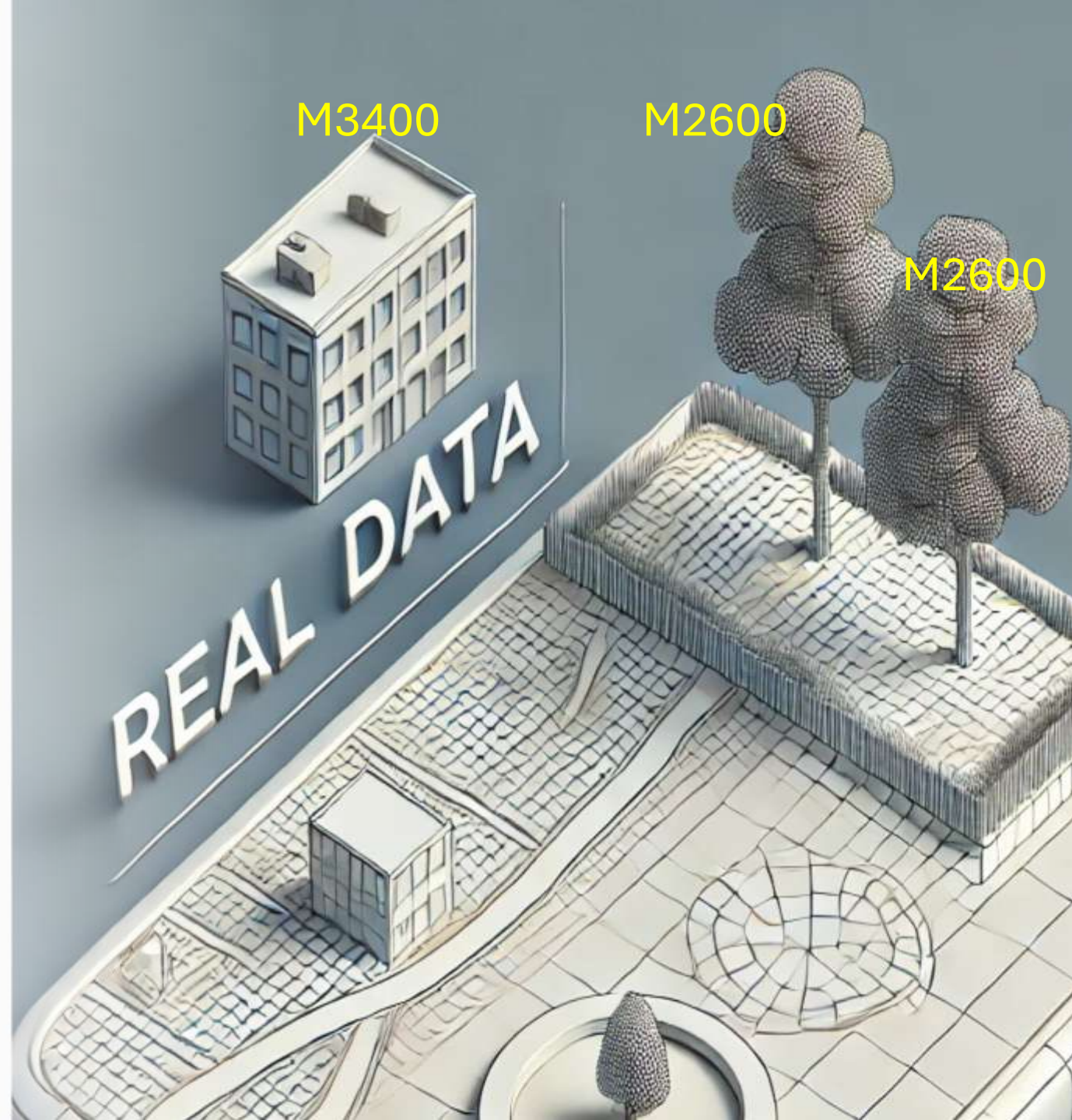
Survey data is often discarded after it fulfills its intended purpose, leading to potential loss of valuable information.



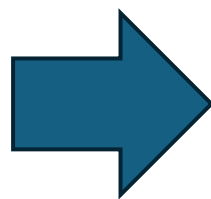
Why?

Extracting data from drawings is inefficient, even when layers follow agreed-upon specifications and layer names

	A	B	C	D	E	F	G	H
1	LAYER	GEOMETR	BLOCK_NAME	LAYER	BLOCK_NAME	FC	ERROR	NOTES
2	M4600	POINT	M4600_E			M46 NOTE		תאור
3	M4601	POLYLINE		M4601	M4601_A	M46 PIPE		קו עילי
4	M4601	POINT	M4601_P			M46 GROUND		
5	M4602	POLYLINE		M4602	M4602_A	M46 PIPE UNDERGROUND		קו תתק
6	M4602	POINT	M4602_P			M46 GROUND		
7	M4609	POINT	M4609_E			M46 WATER TAP		מזנק
8	M4609	POINT	M4609			M46 WATER TAP		מזנק
9	M4610	POINT	M4610_E			M46 WATER METER		שעון
10	M4610	POINT	M4610			M46 WATER METER		שעון
11	M4611	POINT	M4611_E			M46 HYDRANT		הידרנט
12	M4613	POINT	M4613_P			M46 GROUND		באר
13	M4613	POINT	M4613_E			M46 WELL_P		
14	M4613	POLYGON	M4613_S			M46 WELL		
15	M4613	POINT	M4613			M46 WELL_P		
16	M4614	POINT	M4614_E			M46 CONECTOR		חיבור מקורות
17	M4614	POINT	M4614			M46 CONECTOR		חיבור מקורות
18	M4615	POINT	M4615_P			M46 GROUND		יחולת גוב מים
19	M4612	POINT	M4612_E			M46 GROUND		יחולת גוב מים
20	M4612	POINT	M4612			M46 GROUND		יחולת גוב מים

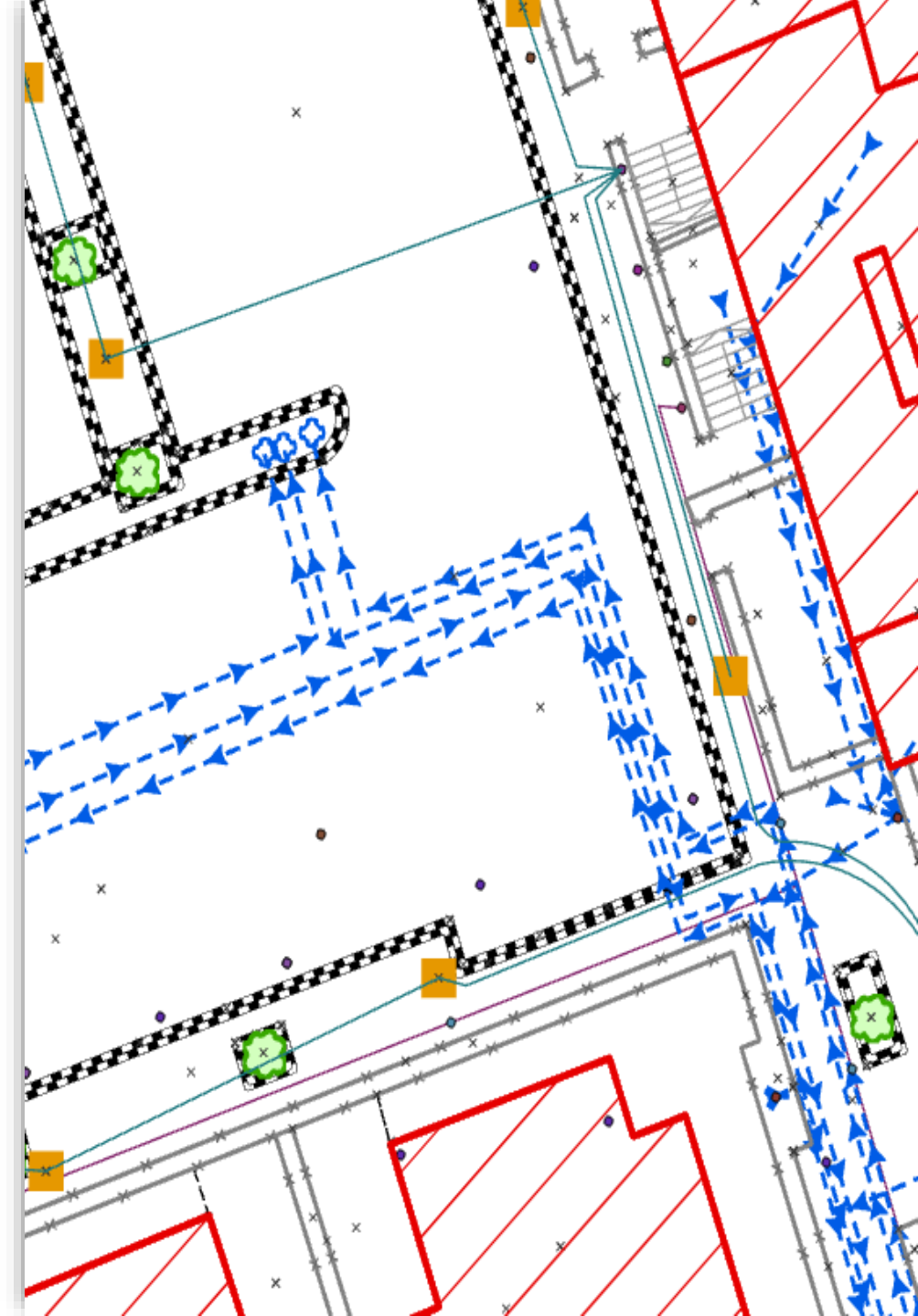


How?



SmartCAD

- No need QGIS and ArcPro
- Converting DWG to GIS by Given Specification
- Connecting Data from Blocks to Layers
- Removing Graphic Layers
- Closing Polylines to Polygons (If Possible)
- Building a Continuous Database from Multiple Files
- Creating a DEM
- Ensure All Lines Start from Highest Point
- And More



Tool activity

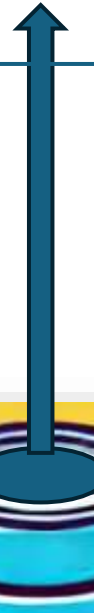
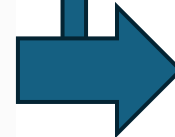
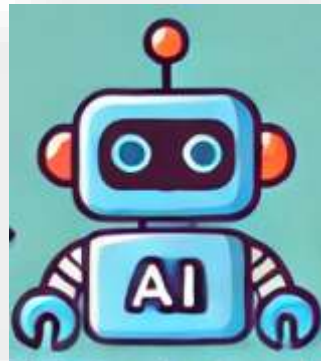
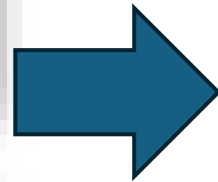
outputs



PDF report

GDB \ GPKG

Process



Explained

Check angle in polyline vertices

Distance from frame

Elevation Irregularities

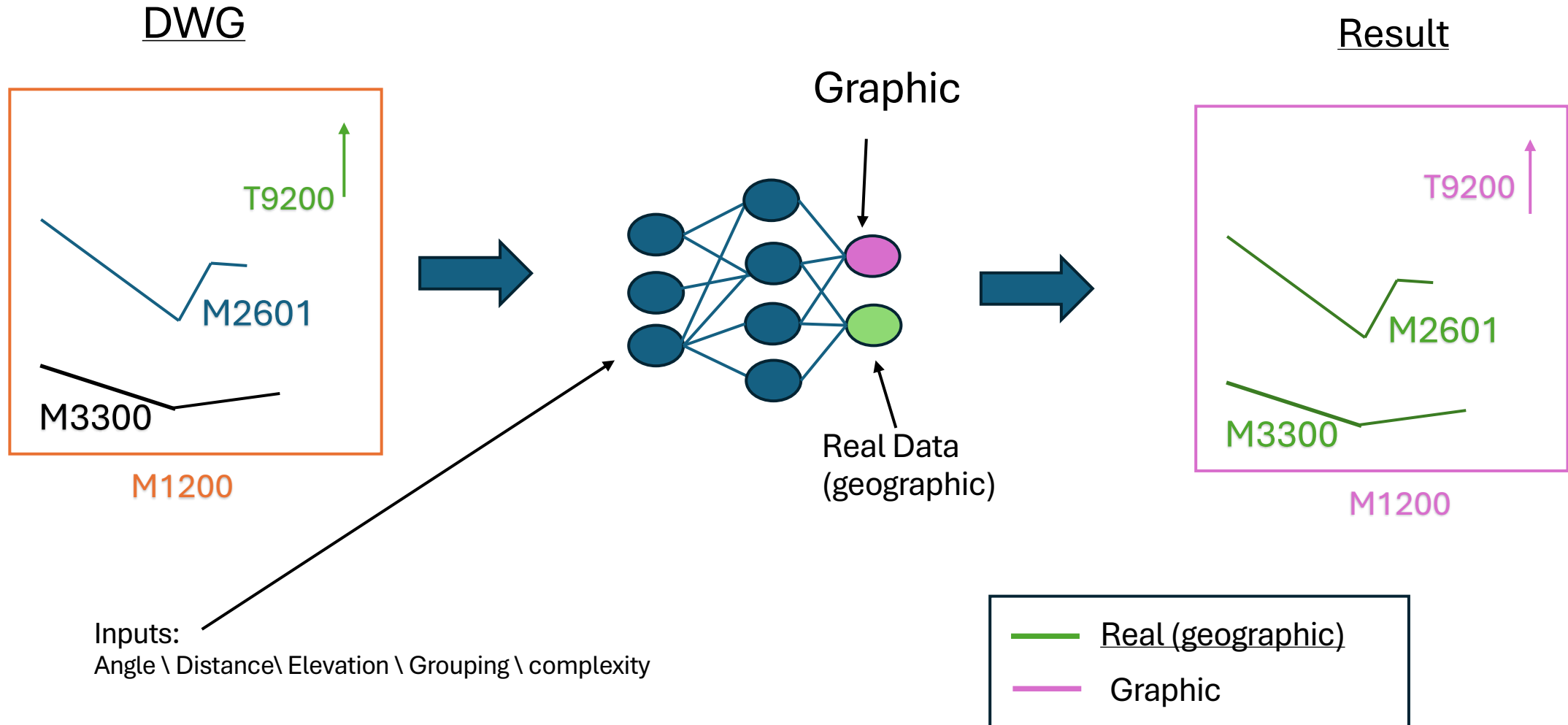
Grouping of vortexes(KNN)

Shape complexity

Layer	Angle	Distance	Elevation	Grouping	complexity	isGeom
TREE	0	0.11	0.02	0.77	0.45	True
BUILDING	1	0.21	0	0.01	0.2	False
WALL	1	0.21	0.18	0.92	0.9	False
WALL	0	0.7	0.02	0.8	0.1	True

* Normalized values

Stage 1 – remove graphic layer



Stage 2 – compare
with format

Format

Layer Code	Layer name
M2601	Pipeline
M1200	Frame
99000	wall

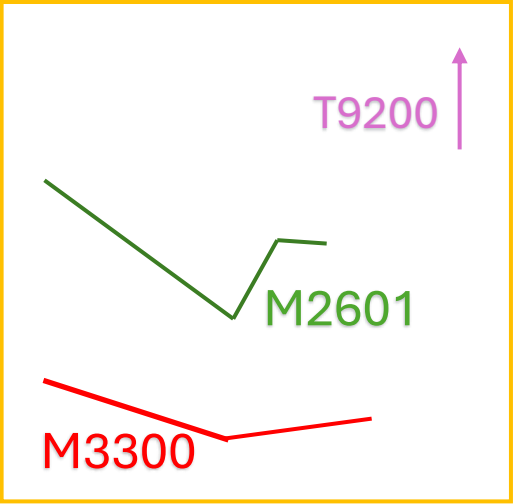
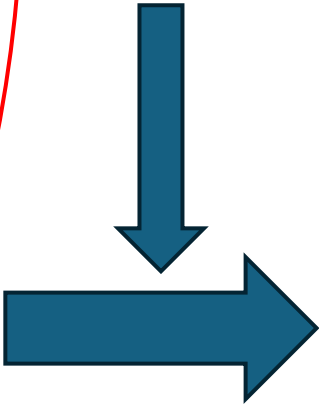
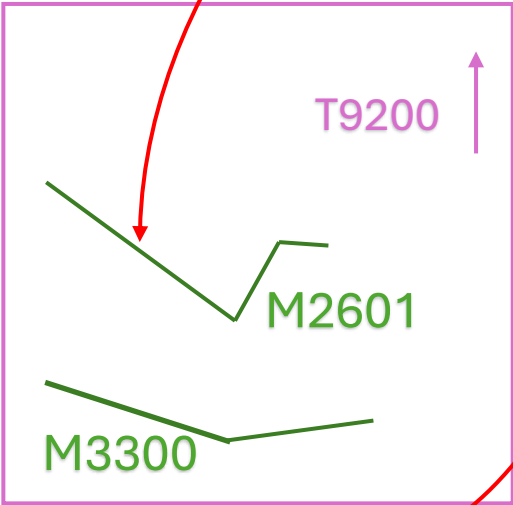
Format + real

Not in Format + real

Not in Format + Not real

Format + Not real

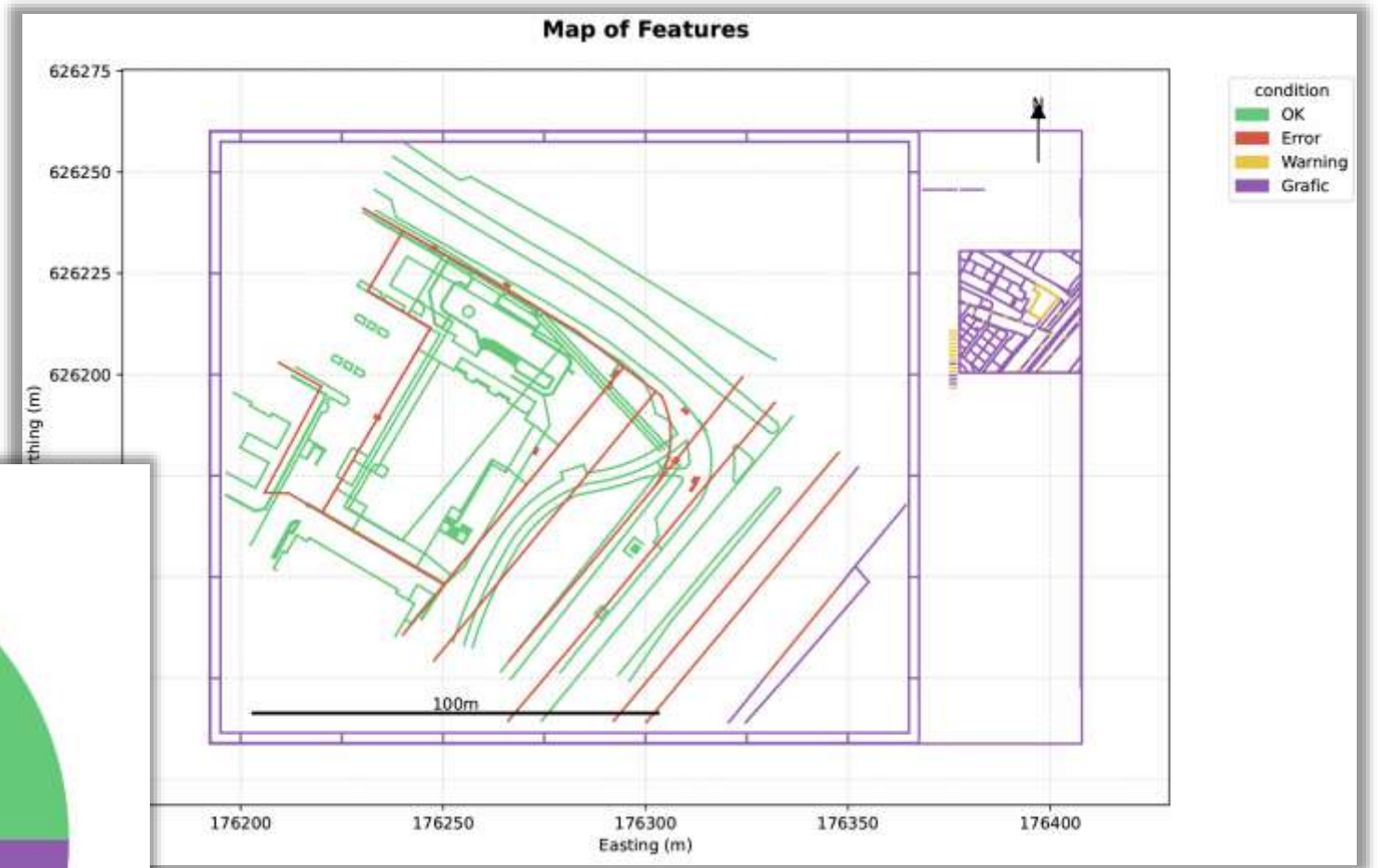
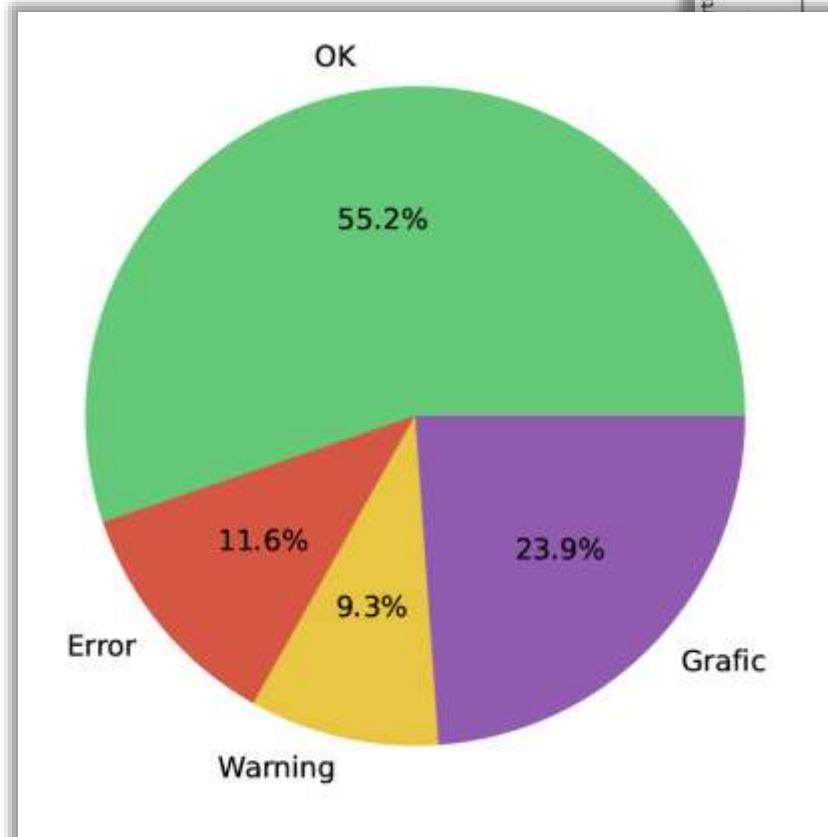
Result (graphic \ real)



	Found as Graphic (AI)	Found as Real (AI)
In format	Not passing to Database	Pass to Database
Not in format	Not passing to Database	Not passing to Database

Result

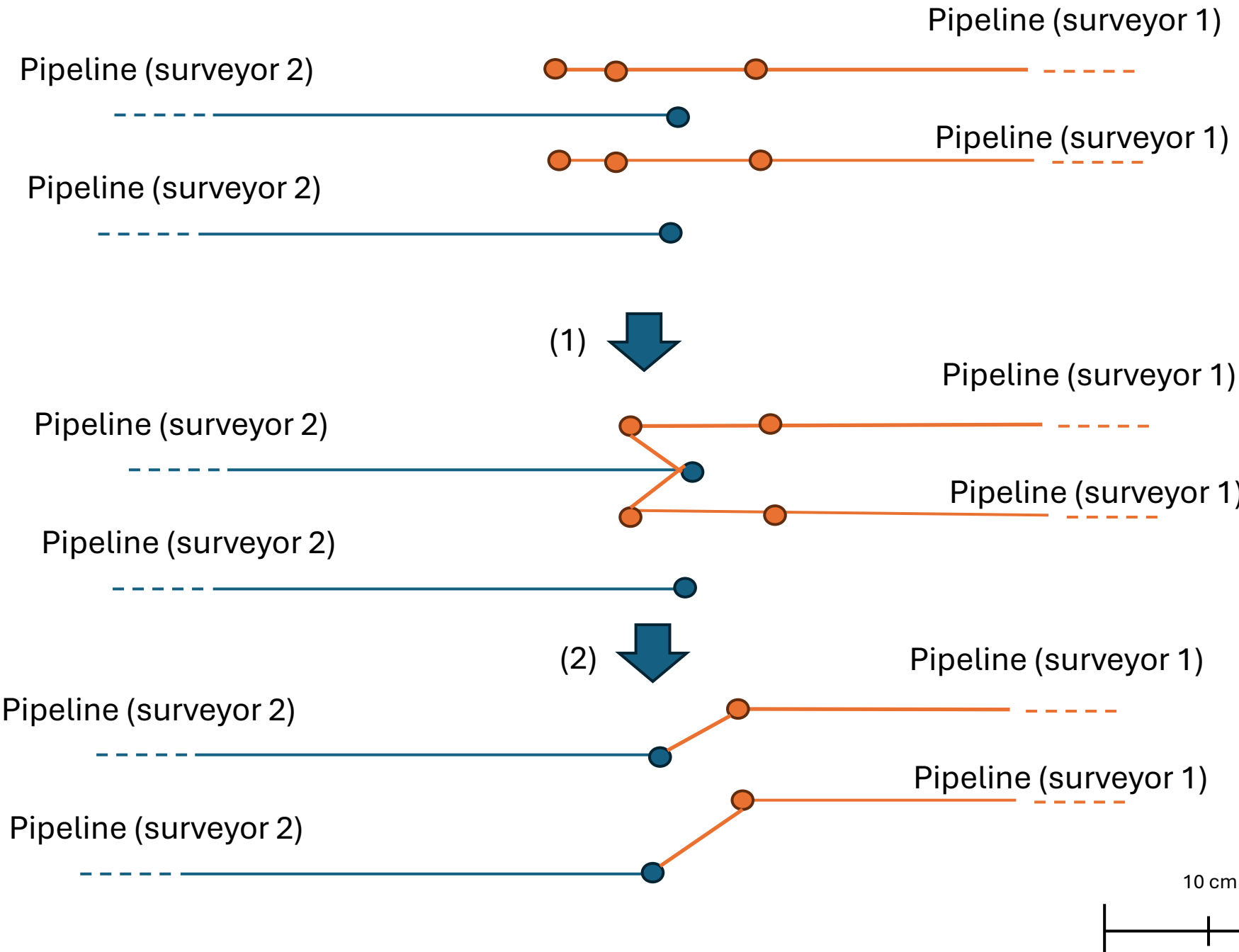
Report – Layers
based on MAVAT
specifications.



Update database automatically

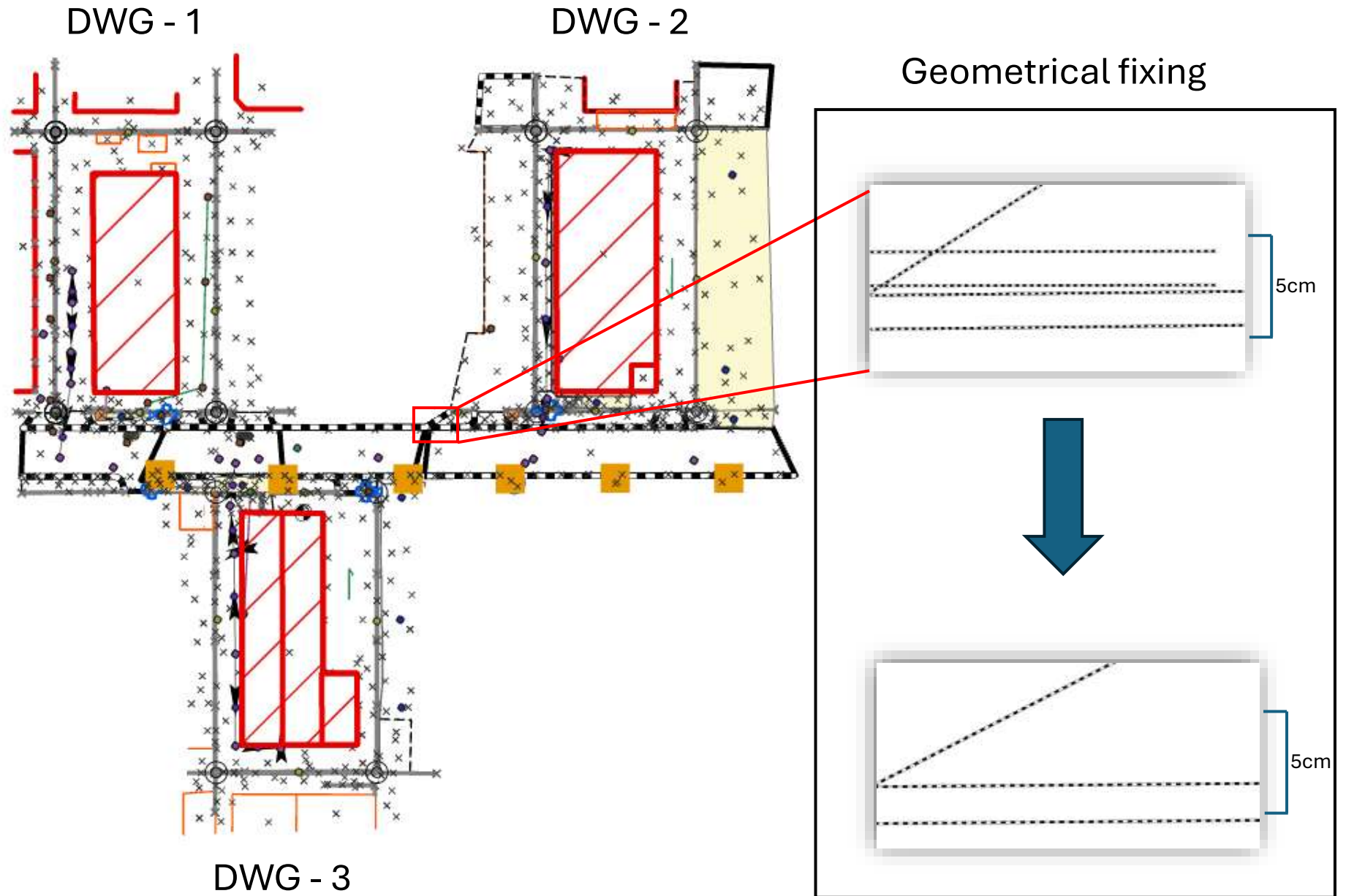
So how do we do it?

- 1) Checking the closest vertices from similar type
- 2) Only 1 connection between nodes are allowed
- 3) Checking angel of vertices before, if angel changed to much, deleted



Example

After extracting the DWG layers into geographical layers, a following algorithm will be activated to integrate data from various surveyors into a unified, continuous database.



Database result -

All your layers from DWG, with only the relevant columns in 1 continuous Database.

The screenshot displays a GIS application interface. On the left, the 'Contents' panel shows a layer named 'main.M26_FANCE' under the 'Map' group, which is currently selected. A red arrow points from this layer to a data table window titled 'main.M26_FANCE'. The table contains the following data:

	fid *	geom *	Entity	Layer_NUM	Inside_Israel	FC	Sheet_Name	Elevation
1	1194	Polyline	LWPolyline	2601	1	M26_FANCE	FENCE	229.5
2	1197	Polyline	LWPolyline	2601	1	M26_FANCE	FENCE	229.5
3	1201	Polyline	LWPolyline	2601	1	M26_FANCE	FENCE	229.5
4	2058	Polyline	LWPolyline	2601	1	M26_FANCE	FENCE	229.5
5	2061	Polyline	LWPolyline	2601	1	M26_FANCE	FENCE	229.5
6	2065	Polyline	LWPolyline	2601	1	M26_FANCE	FENCE	229.5
7	1200	Polyline	LWPolyline	2601	1	M26_FANCE	FENCE	229.36

Below the table, a map view shows several purple line segments representing fence features. To the right of the map, a layer list for 'line.gpkg' is visible, showing various layers such as 'main.ASFALT', 'main.AVNEI_SHEFA_ACHERIM', 'main.BAYITAN_ASHPA', 'main.default_POLYLINE', 'main.DESHE', 'main.EVEN_SHEFA', 'main.EVEN_SHEFA_MESHUFAT', 'main.EVEN_SHEFA_MONMEKET', 'main.EVEN_TAALA', and 'main.EVEN_TZAD_GANANIT'.

Thanks for listening...



For more GeomAI work:

ArcPro + ChatGPT

<https://www.youtube.com/watch?v=pF17FTzHR68&t=197s>

Nnetwork analysis:

<https://www.youtube.com/watch?v=zfWg2aXYZV0>

web:

<https://gisdocs.netlify.app/>



Linkedin:

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