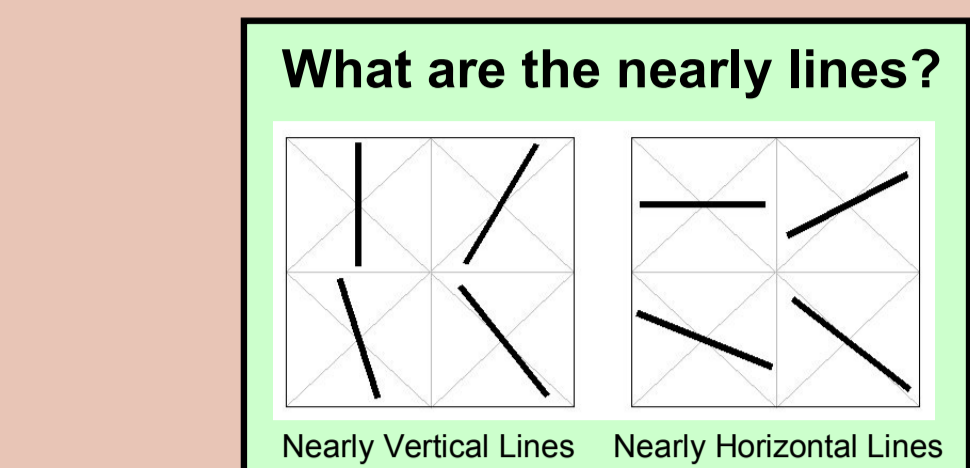
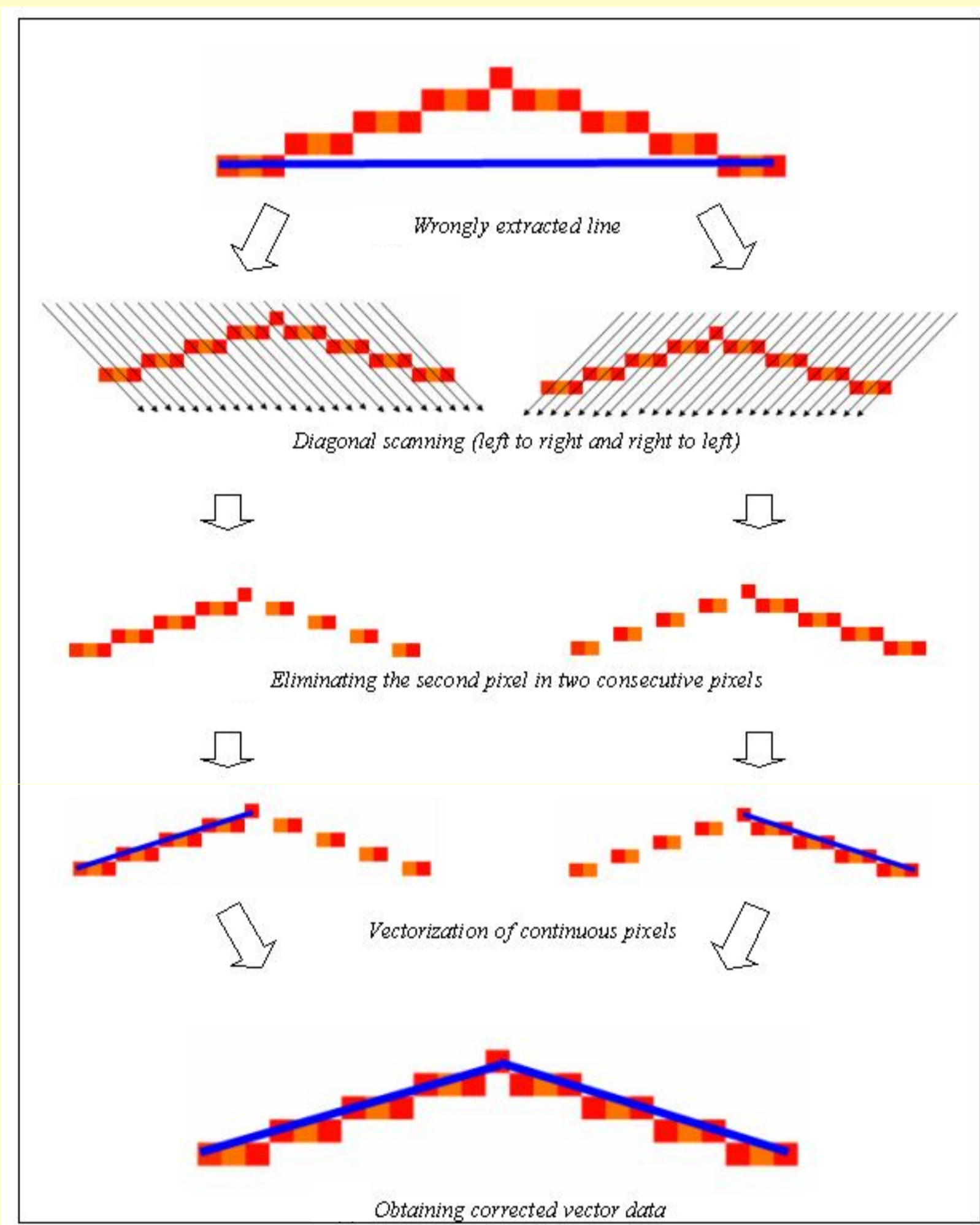


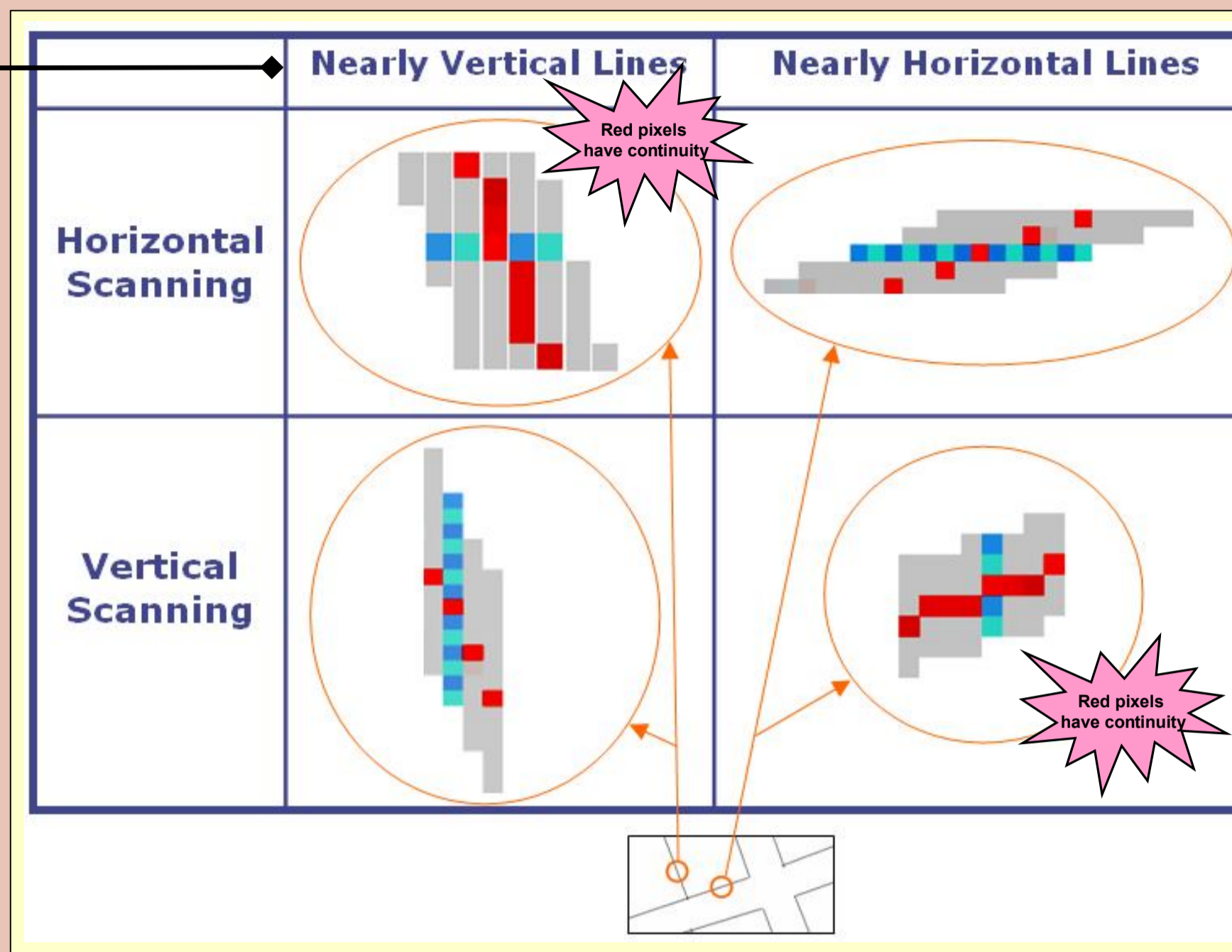
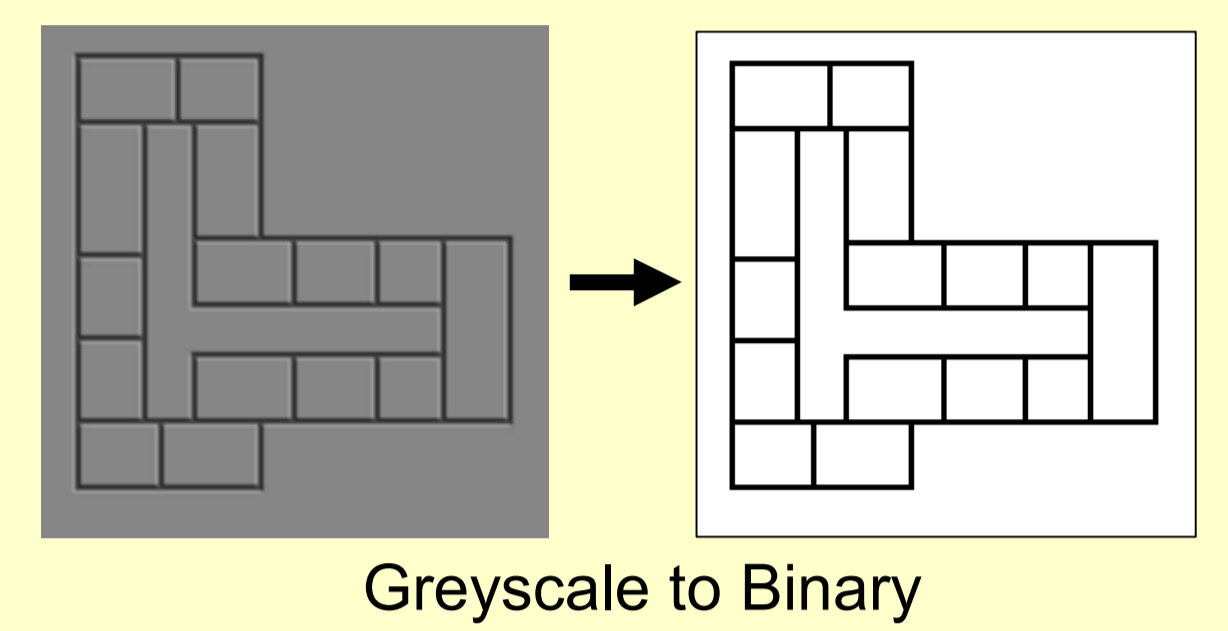
### The MUSCLE-M

- Is an image processing method...
- Was developed to vectorize the lines through the raster images...
- Unlike traditional vectorization process, only line thinning and simple neighborhood analysis (without line following, chain coding and vector reduction stages) were used.

### Correction of wrongly vectorized lines by diagonal scanning



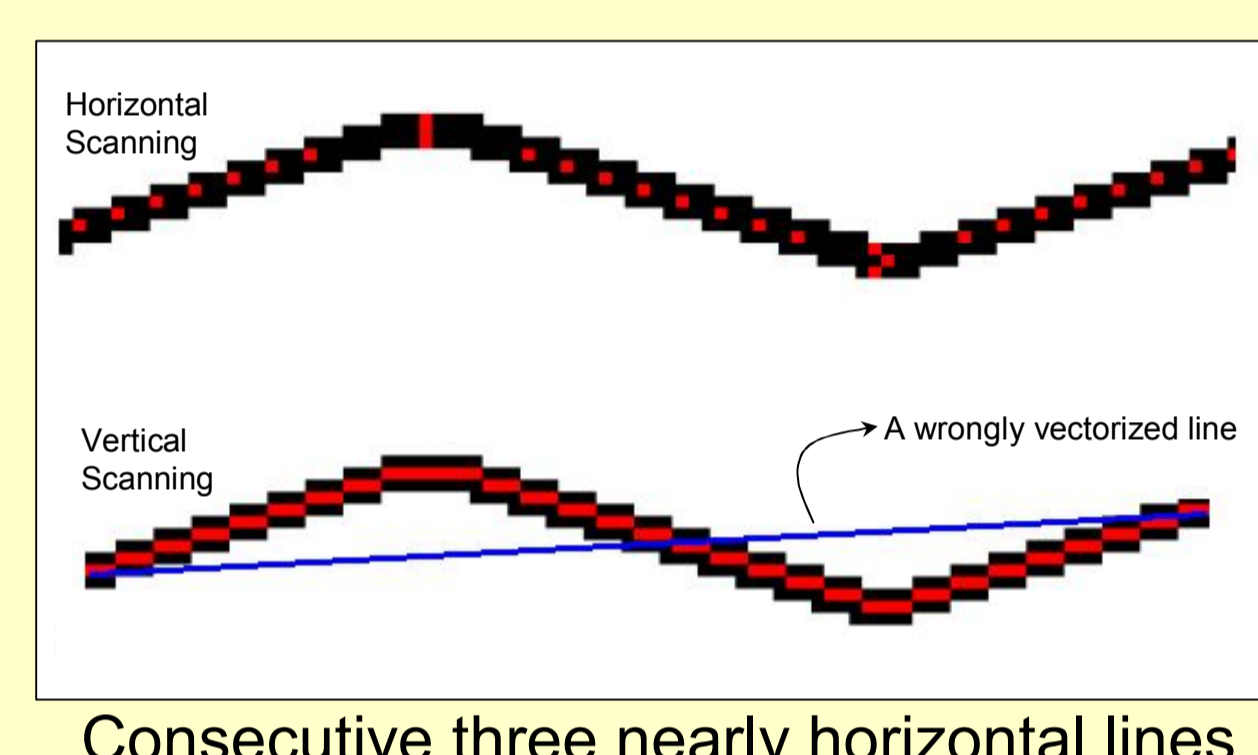
### Threshold Process



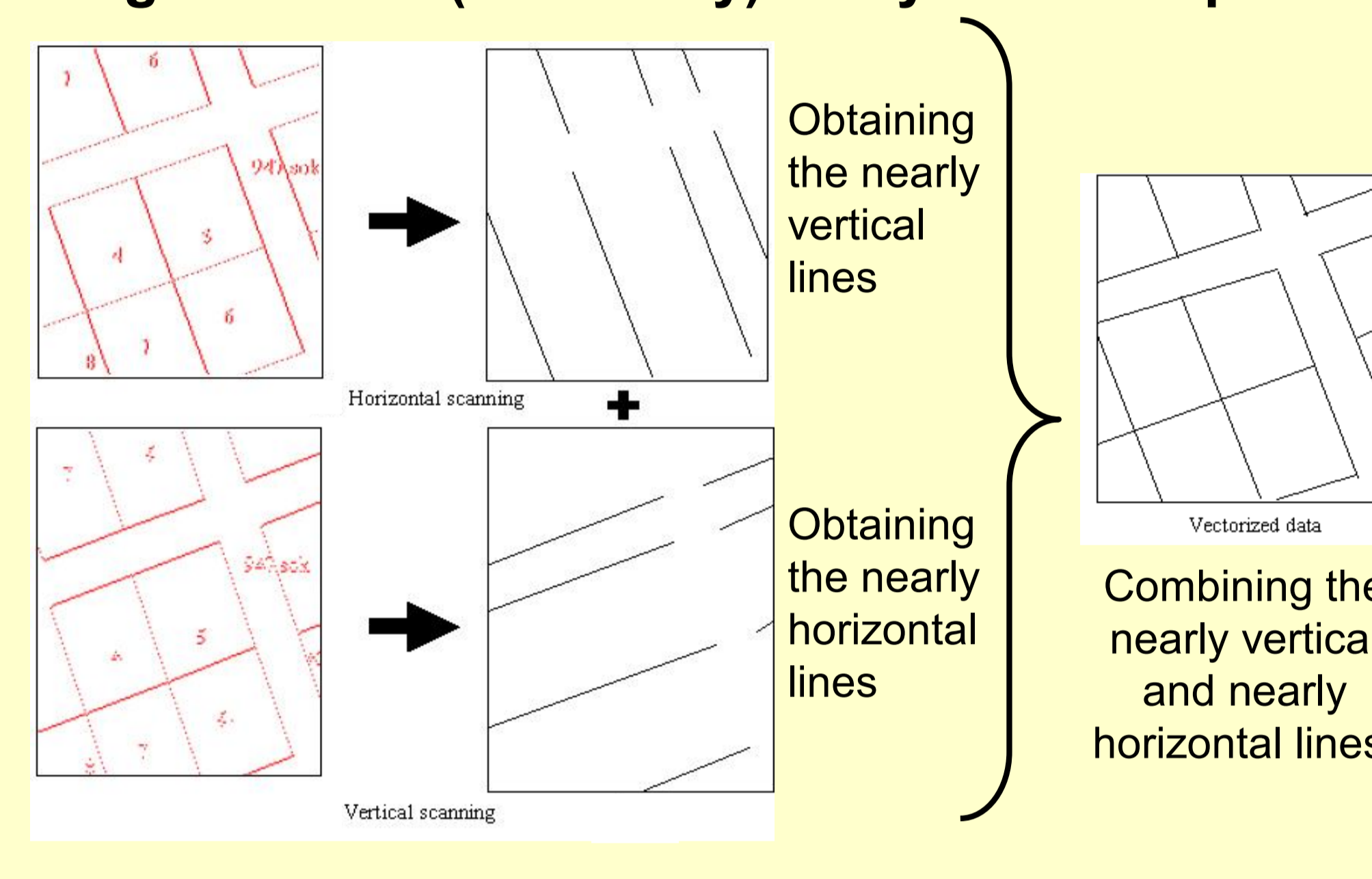
Determination of the middle (red) pixels of the lines by dual scanning of the image

### THE MUSCLE-M (Multidirectional Scanning for Line Extraction Model)

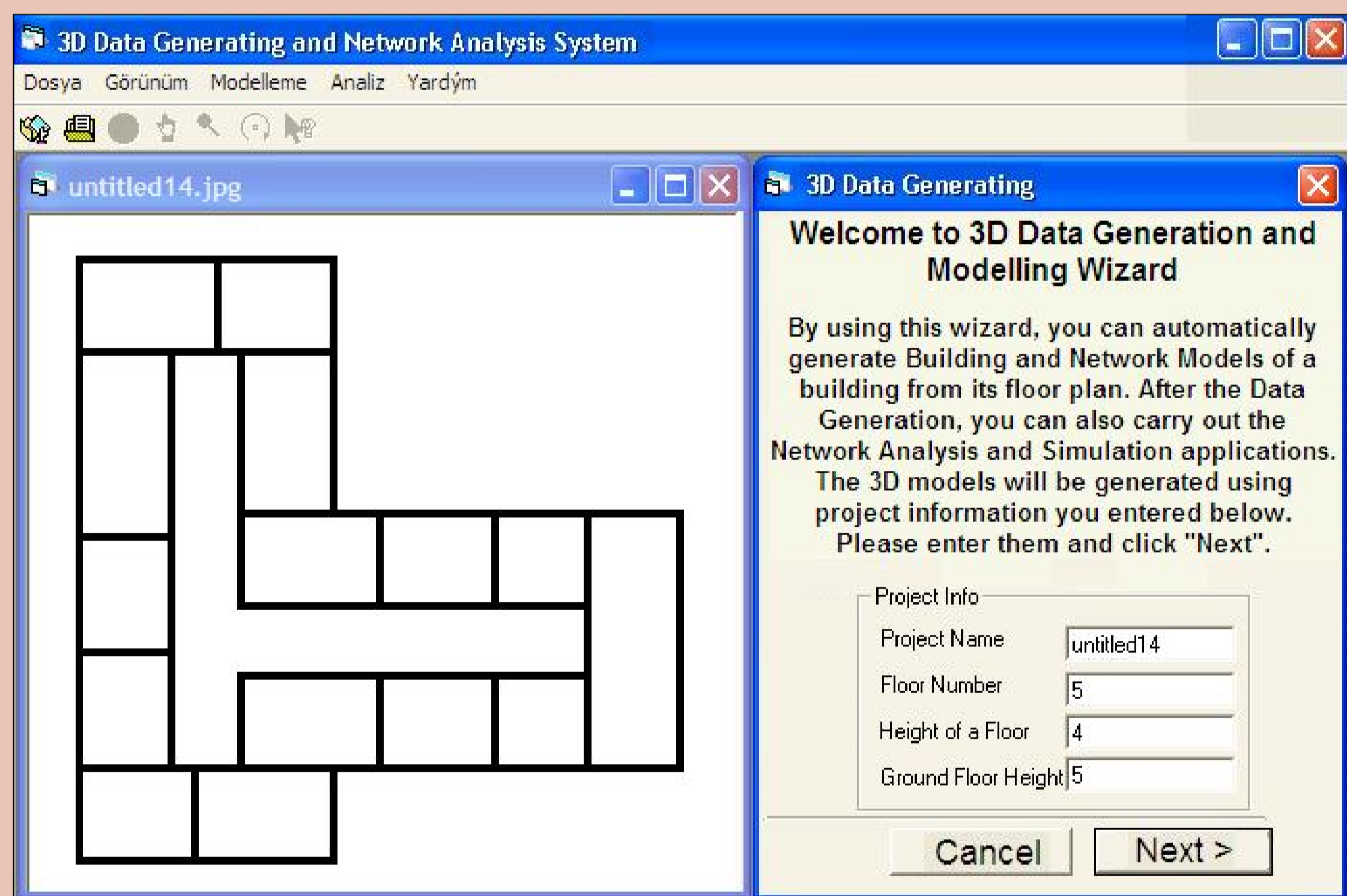
#### Wrong vectorization possibility after dual scanning



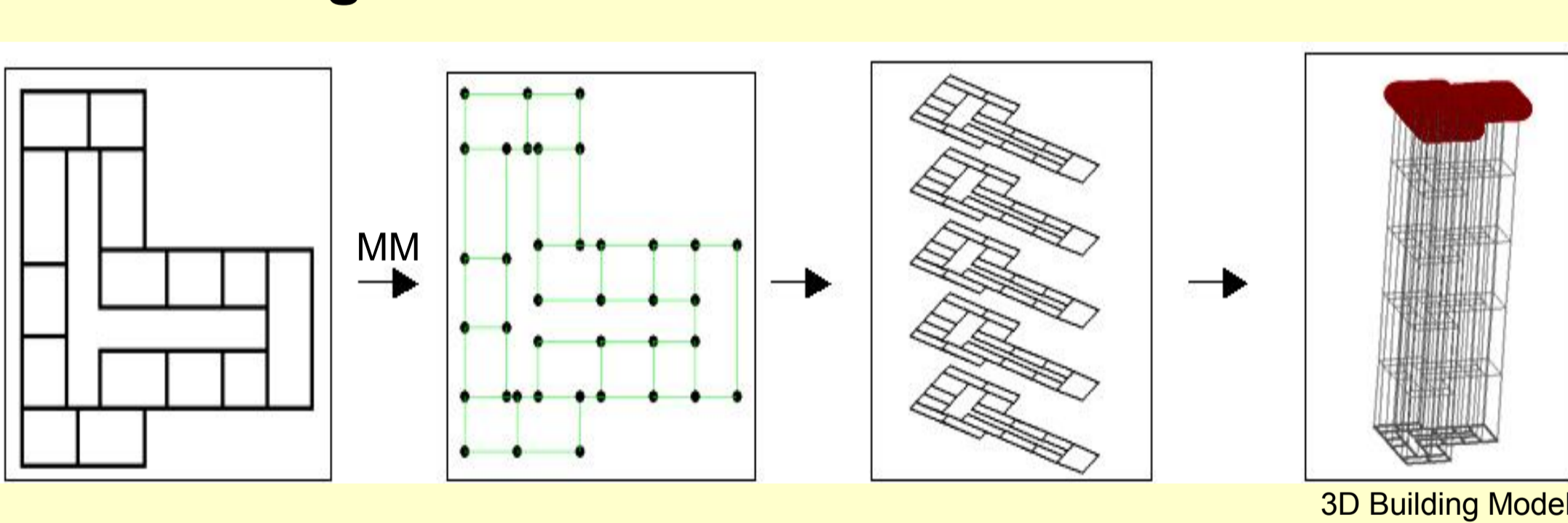
#### Neighborhood (continuity) analysis of red pixels



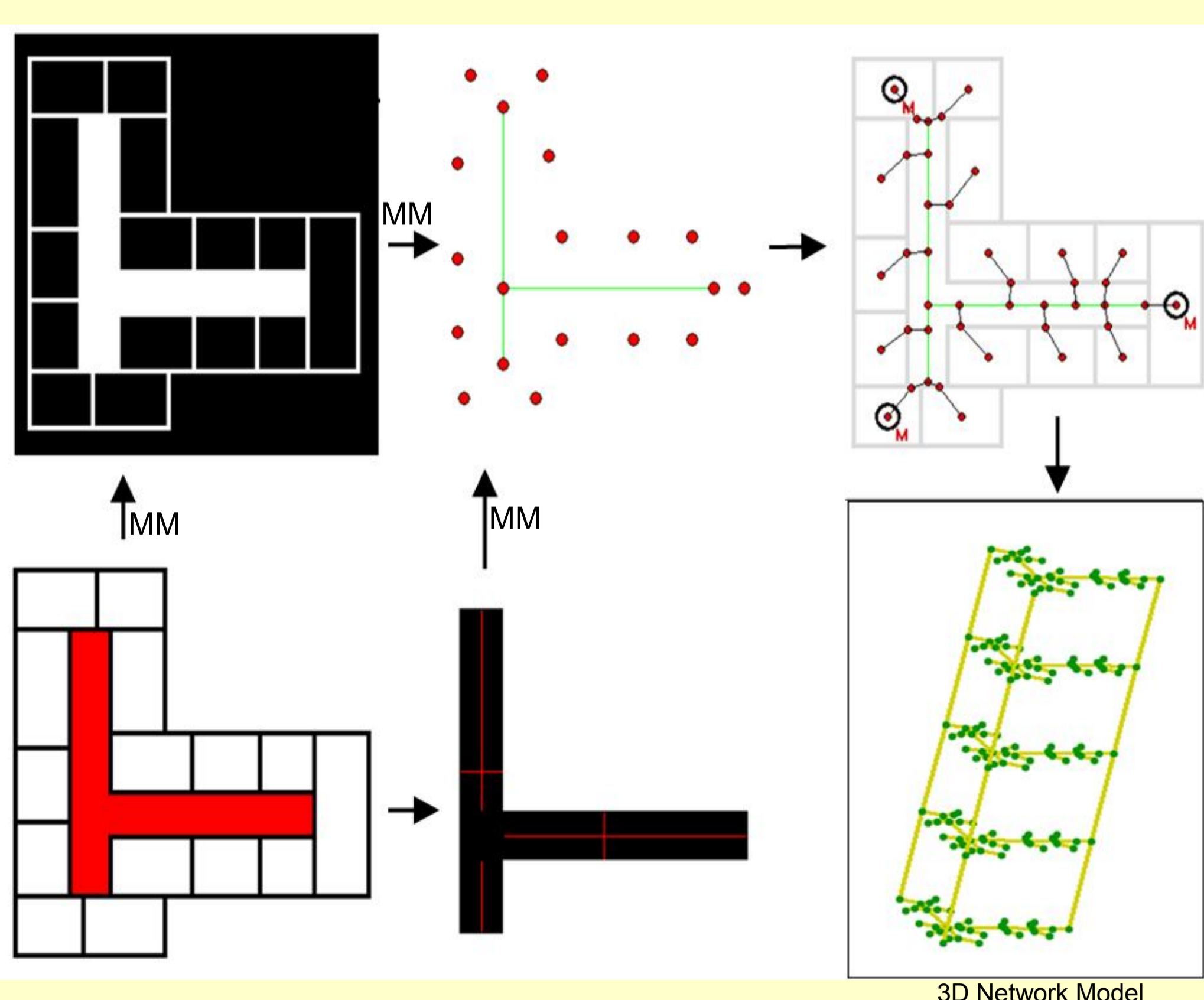
### 3D Building and Network Models Generation Using MUSCLE-M



#### 3D Building Model Generation



#### 3D Topological Network Model Generation



#### 3D Geo-Database Creation

Point ID	x	y	z
1	26.001046512	343	5
2	98.001046512	343	5
3	26.00102197		
4	74.00102197		
5	26.00103636		
6	74.00103636		

Start_Point	End_Point
1	2
3	4
5	6
7	8

Node ID	x	y	z
1	92.001347826	145	5
2	286	145	5
3	92.001	293	5
4	91.999870229	145	5
5			
6			
7			
8			


  

FromNode	ToNode	Distance
1	2	8
3	4	6
1	5	6
6	3	3
7	8	4
8	3	8

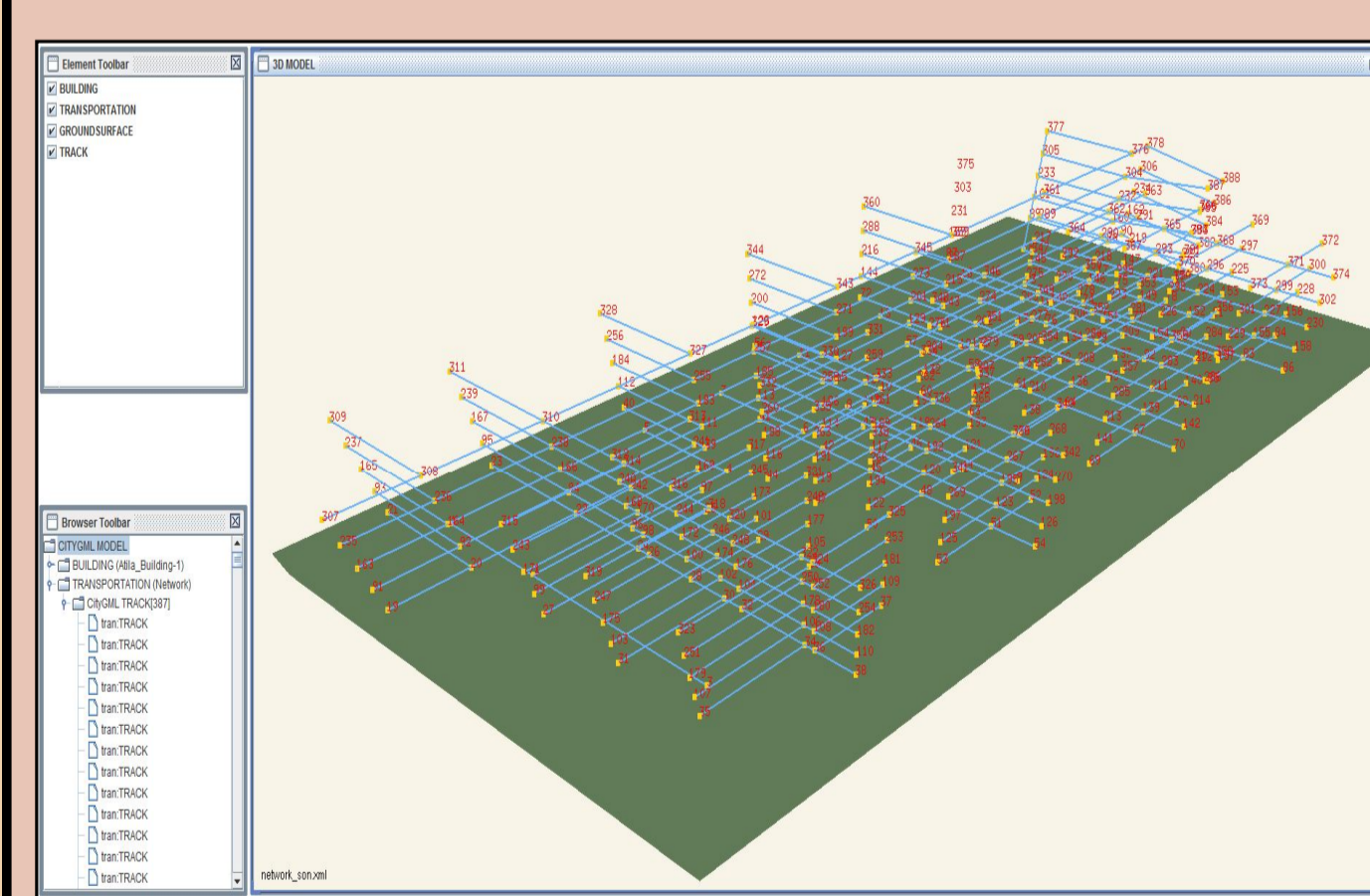
Shortest Path Table for Node 44

Network Model

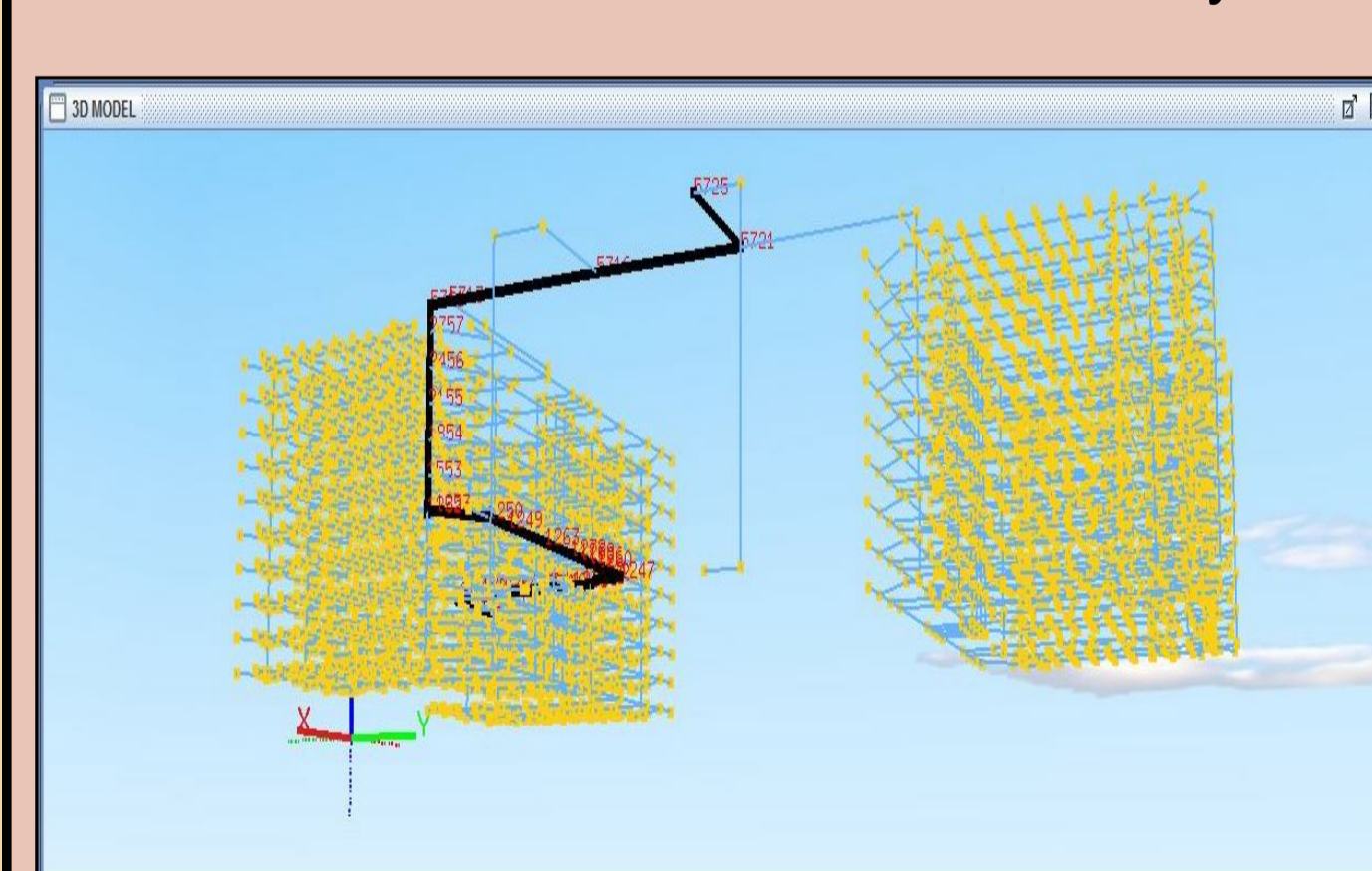
### Network Model into CityGML Format



Network model represented in LOD-0 linear network in CityGML file



Visualization of Network Model from CityGML



3D Network Analyses on the Network Model in CityGML file