

Straightness Centrality (SC)

Closeness centrality is defined as

$$SC(v) = \frac{1}{(N-1)} \sum_{i=1}^N \frac{deuc_{vi}}{d_{vi}}$$

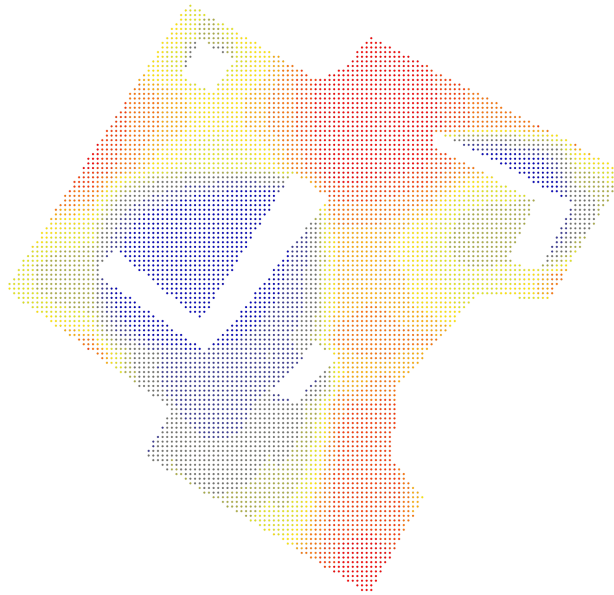
where d_{vi} is the distance between node v and node i , $deuc_{vi}$ the euclidean distance between v and i , and N the total number of nodes in a graph G . Therefore, straightness centrality is defined as the average ratio between the euclidean distance and the shortest path. The normalization formula is defined as

$$(N-1)/(S-1)$$

where S is number of nodes in the graph containing the node (therefore the normalization is important if you have disconnected graphs). As a result, if the graph is not completely connected, SC values are computed for each connected part separately.

The **normalization** of the results is defined by the formula presented in the previous section.

In a building, straightness centrality can be used to assess the average visibility of one point in space. On the figure hereunder, grid cells with high SC values are represented in red.



Straightness centrality on a grid