

MA 2233 Data Structures and Applications Lab
Team Project 3 - R-Trees in Spatial Searches
11.11.2021

R-trees are tree data structures used for spatial access methods, i.e., for indexing multi-dimensional information such as geographical coordinates, rectangles or polygons. When the information is of spatial nature, then to obtain nearest neighbours of given queries, an R-tree is typically used.

Typically different sets of points are bounded by hyper-rectangles. Given a query point \mathbf{q} , only those bounding boxes that intersect with the bounding box containing the query point \mathbf{q} are searched to find the nearest neighbour of \mathbf{q} .

Do the following:

- Create 2000 points from $[-10, 10]^{20}$, i.e., the points come from a 20-dimensional space with the max values along any dimension lying between -10 and 10.
- Construct an R-tree of different depths and given an arbitrary query point find its nearest neighbour by searching through the R-tree.
- Also check for which type of distances, the returned nearest neighbour is actually the nearest neighbour of the given query point \mathbf{q} .