Nowadays, indexing has become essential for fast retrieval of results. Spatial databases are used in many applications which demand faster retrieval of data. These data are multi-dimensional. Designing index structure for spatial databases is current area of research. R-Tree is the most widely used index structure for multi-dimensional data. Many variants of R-Tree has evolved with each performing better in some aspect like query retrieval, insertion cost, application specific and so on. In this work, state-of-art of variants in R-Tree is presented. This paper provides an idea of the present development in spatial indexing and paves way for the researchers to explore and analyze the difficulties and trade-offs in the work. The R-Tree variants are classified according to the way they are different from the original R-Tree either in the process of construction or whether it is a hybrid of R-Tree and some other structure or whether it is an extension of R-Tree to support many other applications.

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**Index Terms**

Computer Science  Communication Systems

**Keywords**

R-tree  Spatial Index  Spatio-temporal Index  R-tree Variants