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A New Enhancement to the R-tree Node Splittin

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Abstract: Abstract. The performance of spatial queries depends mainly on the underlying index structure used to handle them. R-tree, a well-known spatial index structure, suffers largely from high overlap and high coverage resulting mainly from splitting the overflowed nodes. Assigning the remaining entries to the underflow node in order to meet the R-tree minimum fill constraint (Remaining Entries problem) may induce high overlap or high coverage. This is done without considering the geometric features of the remaining entries and this may cause a very non-optimized expansion of that particular node. This paper presents a solution to the above problem. The proposed solution to this problem distributes rectangles as follows: (1) assign m entries to the first node, which are nearest to the first seed; (2) assign other m entries to the second node, which are nearest to the second seed; (3) assign the remaining entries one by one to the nearest seed. Several experiments on real data, as well as synthetic data, show that the proposed splitting algorithm outperforms the efficient version of the original R-tree in terms of query performance.