Abstract

Locality Sensitive Hashing (LSH) is an index-based data structure that allows spatial item retrieval over a large dataset. The performance measure, $\ell$, has significant effect on the computational complexity and memory space requirement to create and store items in this data structure respectively. The minimization of $\ell$ at a specific approximation factor $c$, is dependent on the load factor, $\lambda$. Over the years, $\ell=4$ has been used by researchers. In this paper, we demonstrate that the choice of $\ell=4$ does not guarantee low computational complexity and low memory space of the data structure under the LSH scheme. To guarantee low computational complexity and low memory space, we propose $\ell=5$. Experiments on the Defense Meteorological Satellite Program imagery dataset have shown that $\ell=5$ saves more than 75% on memory space; cuts the computational complexity by more than 70% and answers query two times faster on the average compared to that of $\ell=4$. 
Optimal Load Factor for Approximate Nearest Neighbor Search under Exact Euclidean Locality Sensitive Hashing


**Index Terms**

Computer Science  
Algorithms

**Keywords**

Approximate Nearest Neighbor  
Exact Nearest Neighbor  
ApproximationFactor  
Performance Measure  
Optimal Load Factor