Approximate Nearest Neighbour Search

1. Cross-Platform Compilation

Can be compile on Windows, Linux and MacOS.

1. High Performance Implementation on CPU

Parallel loop which iterates through the layers of Graph.

Enhance the efficiency of certain operations that involve searching for neighbors and modifying the graph structure.

Neighbour Search and Graph Modification: Within each layer, several tasks are performed simultaneously for different nodes in the graph. The “for” loop within the parallel section conducts tasks such as searching for neighbours, adding edges, and adjusting the graph structure.

1. High Performance Implementation on GPU

Cosine Similarity with GPU for benchmarking.

1. Illegal Input Handling

Should be able to open the Input file.

The first line of the input file must have Dimensions, Base Vectors and Number of Query Vectors

Actual Base and Query Vectors should match the sizes defined on first line.

K should be a positive integer, and should be no greater than the total number of base vectors

1. Language Support – C++
2. Non – Trivial Optimization Techniques

Implemented HNSW (Hierarchical Navigable Small World), which refers to a data structure and algorithm used for approximate nearest neighbor search in high-dimensional spaces. It's a method designed to efficiently search for approximate nearest neighbors in large collections of high-dimensional data.

Referred the following paper for algorithm:

https://arxiv.org/ftp/arxiv/papers/1603/1603.09320.pdf