Title: Maximum inner-product search

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Maximum inner-product search (MIPS) is a search problem , with a corresponding class of search algorithms which attempt to maximise the inner product between a query and the data items to be retrieved. MIPS algorithms are used in a wide variety of big data applications, including recommendation algorithms and machine learning . [1]

Formally, for a database of vectors x i {\displaystyle x_{i}} defined over a set of labels S {\displaystyle S} in an inner product space with an inner product ■ ⋅ , ⋅ ■ {\displaystyle \langle \cdot ,\cdot \rangle } defined on it, MIPS search can be defined as the problem of determining

for a given query q {\displaystyle q} .

Although there is an obvious linear-time implementation, it is generally too slow to be used on practical problems. However, efficient algorithms exist to speed up MIPS search. [1] [2]

Under the assumption of all vectors in the set having constant norm, MIPS can be viewed as equivalent to a nearest neighbor search (NNS) problem in which maximizing the inner product is equivalent to minimizing the corresponding distance metric in the NNS problem. [3] Like other forms of NNS, MIPS algorithms may be approximate or exact. [4]

MIPS search is used as part of DeepMind 's RETRO algorithm. [5]

References

See also

Nearest neighbor search