



# Google PageRank Algorithm

An Application of Linear Algebra

Manish Patel

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# 1 Introduction

Humans, the most successful species on the planet, used to pass on their knowledge through books, music, art, and so on. This knowledge transfer continues to this day, but with the most popular, innovative, and easily accessible source that is also a reliable alternative, you guessed it, the Internet. One can conduct a search. What exactly are prime numbers? Google returns  $n$  related pages, with the most relevant appearing first.

The process of searching within a document collection for specific information is known as information retrieval (called a query).

An information retrieval challenge for any document collection, especially the Web which concerns precision. The amount of accessible information continues to grow, a user's ability to look at documents does not. Users rarely look beyond the first 10 or 20 documents retrieved. This user impatience means that search engine precision must increase just as rapidly as the number of documents is increasing.

The Web is such a unique document collection which is huge, dynamic, self-organized, and hyperlinked. The Web's self-organization means that, in contrast to traditional document collections, there is no central collection and categorization organization. The web document collection lives in a cyber warehouse, a virtual entity that is not limited by geographical constraints and can grow without limit.