Supporting Global Knowledge Sharing using Cross Language Information Retrieval

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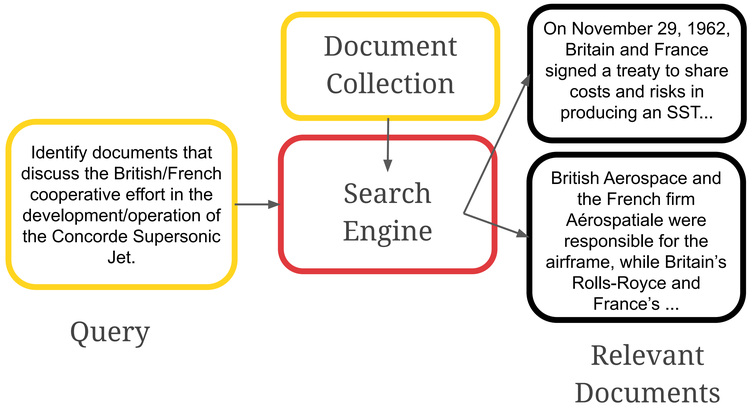
Information Retrieval

Information retrieval is searching for the relevant documents in a large collection of documents using a query input by the user. The aim of the search engine is to return documents relevant to the query.

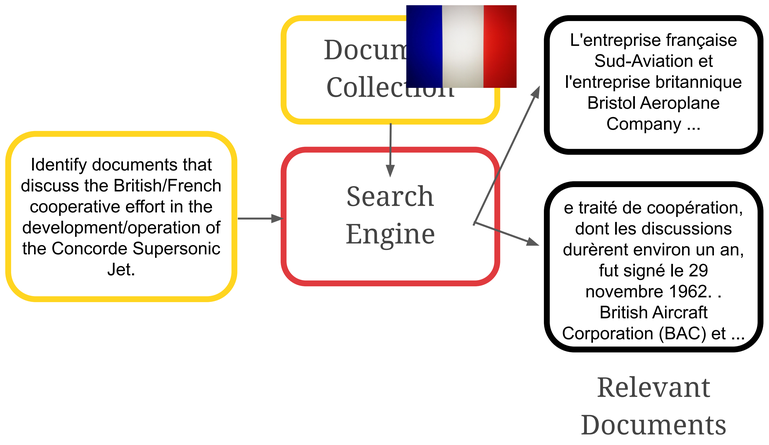


Possible Applications

- Chinese technical publications might be of value to NASA engineers working on similar problems.
- Understanding the global reaction to NASA's activities would benefit from systems that could process Hindi and French as easily as English.
- Allowing search in the oral history archives. The interviews in the Shuttle-MIR oral history collection were conducted in English; people who could speak only Russian simply weren't interviewed,

Cross Language Information Retrieval (CLIR)

CLIR is a special case of Information retrieval in which the language of the documents differs from the language of the query.



CLIR Architecture

- Documents or queries are translated into compatible representations using machine translation or dictionaries.
- Search engines can handle ambiguity and translation errors well using multiple translation variants.
- Ranking based on embeddings (dense vector representations) of terms, sentences or segments.
- Ensemble methods can improve robustness.

CLIR vs. Monolingual IR

System	Mean Average Precision
Monolingual IR (Russian queries) BM25	0.345
Cross-Language IR (English queries) Document translation + BM25	0.336
Cross-Language IR (English queries) Document translation + embeddings	**0.434**

Table 1. Comparison of the monolingual and crosslingual retrieval on the Russian 2003 and 2004 collections. Documents are in Russian, queries are either in Russian or English.

Beyond CLIR

- "Documents" might be speech or video.
- Text might be printed or handwritten.
- Content or queries may include several languages.
- Queries might be structured or simple.
- Information need might be narrow or broad.
- Summaries of relevant documents might be needed.
- Summaries and documents may need translation.
- How quickly can we build systems?

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