# ESBIR: Extended Semantic Based Boolean Information Retrieval Using Synonyms and Antonyms

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*Abstract* - **Information retrieval (IR) is finding material (usually documents) of associate unstructured nature (usually text) that satisfies an information want from inside massive collections (usually keep on computers). Visiting the cluster of documents over that it tends to perform retrieval because the (document) assortment. It's generally additionally stated as a corpus (a body of texts). The goal of project is to develop a system to handle the unplanned retrieval task. This is often the foremost normal IR task. In it, a system aims to supply documents from inside the gathering that are relevant to an absolute user data want, communicated to the system by means that of a natural event, user-initiated question. A document has relevancy if it's one that the user perceives as containing data useful with reference to their personal data would like. Extended semantic based information retrieval using synonyms and antonyms (ESBIR) aims to retrieve the documents that are semantically similar terms to enhance the Information Retrieval System by improving the recall and precision.**

***Keywords*: Information Retrieval, Semantic, Synonyms, Antonyms, Precision, Recall.**

## 1. INTRODUCTION

The goal of IR is to produce users with documents that may satisfy with the relevant data they need. An information need is the topic regarding which the user needs to grasp additional and is differentiated from a query, which is what the user conveys to the computer in an attempt to communicate the information need. In different words, the question given by the user must match with the accessible index of the document data retrieval did not begin with the web. In response to numerous challenges of providing data access, the sector of IR evolved to allow high-principled approaches to looking numerous types of content. The sector began with scientific publications and library records however presently unfold to different forms of content, significantly those of knowledge professionals, like journalists, lawyers, and doctors. A lot of research project on IR has occurred in these contexts, and far of the continued follow of IR deals with providing access to unstructured data in varied company and governmental domains.

To assess the effectiveness of an IR system (i.e., the standard of its search results), a user can sometimes wish to understand two key statistics regarding the system's came back results for a query information retrieval is employed nowadays in several applications is employed to look for documents, content there from, document information among ancient relative databases or net documents a lot of handily and reduce work to access data.

A document assortment consists of the many documents containing info regarding numerous subjects or topics of interests. Document contents area unit remodeled into a document illustration (either manually or automatically). Document representations area unit worn out some way such matching these with queries is simple. The user rates documents given as either relevant or non-relevant to his/her data would like. The essential drawback facing any IR system is the way to retrieve only the relevant documents for the user's data necessities, whereas not retrieving non-relevant ones. Various system performance criteria like precision and recall are used to gauge the effectiveness of the system in meeting users' data necessities. Recall is that the ratio of (the range) of relevant retrieved documents to the overall number of relevant documents accessible within the document collection. Precision is outlined because the quantitative relation of (the range) of relevant retrieved documents to the overall number of retrieved documents.

Information retrieval is often outlined as a system for representing, classification (organizing), searching (retrieving) and recollecting (delivering) documents. We demonstrate that it is possible to approximate algorithmically the human notion of similarity mistreatment linguistics similarity and to develop methods capable of detecting similarities between conceptually similar documents even after they do not contain lexically similar terms. The shortage of common terms in two documents does not essentially mean that the documents don't seem to be connected. Computing text similarity by classical info retrieval models (e.g., Vector area, Probabilistic, Boolean) [1] relies on lexical term matching. However, two terms is semantically similar (e.g., are often synonyms or have similar meaning) though they are lexically different. Therefore, classical retrieval strategies can fail to associate documents with semantically similar however lexically different terms.

The main goal of the project is data retrieval is finished in an economical manner by increasing the number of relevant

documents, rising the precision and recall, and reducing the time taken for retrieving data. From the accessible resources, only a section or some is needed by the users. Documents that satisfy the given query within the judgment of the user are same to be relevant. The documents that do not seem to be belonging to the given topic are same to be non-relevant. An IR engine uses the query to classify the documents during a given collection and returns a set of documents that satisfy some classification criterion to the user. Generally the relevant documents might not contain the keywords per the query. The shortage of the given term in an exceedingly document does not essentially mean that the document is not relevant as a result of over one term may be semantically similar though they are lexicographically different. In this paper a new algorithm, Extended semantic based Boolean information Retrieval using Synonyms and Antonyms (ESBIR), is projected to retrieve the documents with semantically similar terms to boost the performance of data retrieval system by rising the recall and precision. Precision is the power to retrieve top-ranked documents that area unit principally relevant. Recall is the power of the search to search out all of the relevant things within the corpus.

The paper is organized as follow. Related work of ESBIR is discussed in Section 2. In Section 3 proposed model of ESBIR is explained. The result and discussion contains in Section 4. In Section V conclusion and future work is shown.

## 2. RELATED WORK

The simplicity of mathematician data model is discovered in retrieval system. Most of the knowledge retrieval system is employed to predict the given document has relevancy or not. The SBIR model merges two techniques that is ancient IR model and linguistics net techniques. This model retrieves the document that contains the means of every word in terms of index search by the user.

The linguistics retrieval [9] is employed to find semantically similar terms victimisation Word web. In several works, Word web is employed to spot similar ideas that correspond to document words. In most cases morphological variants of words have similar linguistics interpretations and might be thought about as equivalent for the aim of IR application. In linguistic morphology, stemming is that the method for reducing inflected words to their stem, base or root kind. The Porter stemmer [10] may be a context sensitive suffix removal algorithmic program. Removing suffixes by is an operation that is particularly helpful within the field of IR. Word web enlargement technique was used [10] over a group with stripped matter data.

Philip resniket. al. [11] annotated the Biblical text to make the aligned corpus like Bible for linguistic analysis that additionally includes the automated creation and analysis of translation lexicons and similar labelled text. It is the feature of parallel translations over large range of languages. It additionally represents the comparison with wordbook and corpus resources for contemporary English. Thus, it makes the Bible a polyglot corpus that thought about to be a singular resource for linguistic analysis.

R. Thamarai Selvi et. al. [12] projected an algorithmic program supported mathematician data Retrieval (BIR) that has the importance of its simplicity. During this proposal, mathematician model is employed to predict whether or not every document has relevancy or not. It refers a web lexical reference known as Word web to seek out the semantically similar terms. Stemming is that the method that is employed for reducing inflected words to their stem, root or base kind.

## 3. PROPOSED WORK

This work develops a system to deal with the information retrieval for a data set associates degree to supply documents from the gathering that are relevant to a user information. ESBIR retrieves documents from the document set by finding synonyms and antonyms of the given term using Word web information base to search out a lot of similar documents.

In start the documents are preprocessed. The keyword additionally extracted by removing the stopword. In next step, it retrieving the synsets from word web for the given keyword. After that every term within the similar set checked whether or not the term is prefixed. If so, the prefixes are removed and therefore the antonyms of the words will be found then add “not”. Otherwise, the antonyms of each word are found then the appropriate prefix is added before the antonyms as well as added within the index.

In next step, the stemming method is completed The Porter Stemmer Algorithm implemented in java performs this method. Porter’s stemmer is additional compact and simple to use than Lovins [12]. These words are kept in a vector. These stemmed words is used to retrieve the documents from the info base. The Porter algorithm is a method for removing the commoner morphological and in flexional endings from words in English. Stemming algorithms are used in many varieties of language process, text analysis systems, data retrieval and info search systems. Its main use is for term standardization method that is sometimes done once setting up data Retrieval systems. Word stemming is a crucial feature supported by present day categorization and search systems. The idea is to enhance recall by automatic handling of word endings by reducing the words to their word roots; at the time of compartmentalization and looking out. In, next step documents are retrieved. The relevant documents are retrieved from this information base for each word and make the index for the query term. After that all the documents that are retrieved by this are presented to the user.

## 4. EXPERIMENTATION AND ANALYSIS

This ESBIR rule to boost the exactness and recall of the knowledge retrieval is enforced using Java artificial language and tested on Bible text. This text contains several tiny documents known as verses. These verses square measure regenerate into individual documents and keep within the MySql info. The dimension of the documents is reduced victimization the stop word elimination and every one the key terms square measure keep within the database. The synsets and therefore the antonyms are extracted from Word net mistreatment Java APIs and stored in vectors to check the ESBIR algorithm. Every term within the vector is stemmed to root words and keep in another vector. As an example, the set of words for the word 'accept' are consent, receive, willing, not reject, not refuse, and not decline. These words are stemmed to their base. Once stemming process, the documents are retrieved from the database for all the basis words. As an example, the synsets for the word "impossible" are "not capable", "unacceptable", "unimaginable", "not possible", "not attainable", "not acceptable". These words are stemmed to their root. After stemming method, the documents are retrieved from the information for all the root words. The ESBIR framework is as given below.

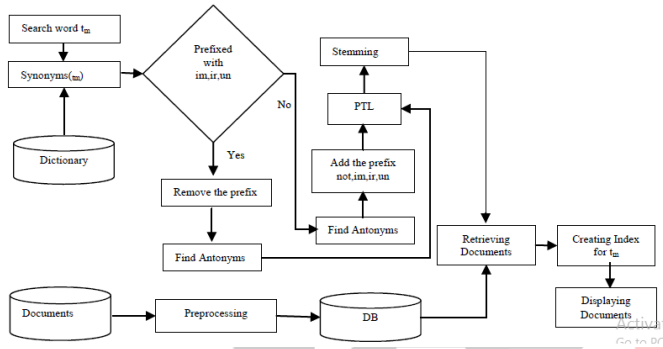


**Fig -1**: Esbir Framework

The number of documents retrieved by ESBIR is larger than the documents retrieved by using the UFSBIR algorithmic program. In info retrieval, precision and Recall are the essential measures utilized in evaluating search methods. Recall is outlined because the range of relevant documents retrieved divided by the overall range of existing relevant documents and precision is outlined because the range of relevant documents retrieved divided by the overall range of documents retrieved by that search. Table shows the systematic and ancient notations of confusion matrix.

**Table -1:** Confusion matrix

| | Relevant | Not Relevant |
|---|---|---|
| Retrieved | TP | FP |
| No Not retrieved | FN | TN |

Here,
TP=True Positive (Correct Result)
FN=False Negative (Missing Result)
FP=False Positive (Unexpected Result)
TN=True Negative (Correct absence of Result)
Recall = TP / (TP + FN)
Precision =TP / (TP + FP)

The values obtained by the two algorithms UFSBIR and ESBIR are entered within the confusion matrix for various keywords and also the preciseness and recall values are calculated.

## 5. CONCLUSION

A ESBIR is enhance the performance of Semantic Based Boolean Information Model. Since the proposed system considers the synonyms as well as the antonyms of the search word, it creates the possibility of retrieving more number of documents. These requirements require that the IR field rethink its basic assumptions and evaluation methodologies, because the approaches and experimental resources that brought the field to its current level of success will not be sufficient to reach the next level.
The next steps for effective user functionality are to incorporate effective user feedback about their information need and to provide readable translations of (parts of) the retrieved documents to support document selection. Systems should also provide better support for query formulation and reformulation based on some set of intermediate search results. Merging retrieval result lists from databases in multiple languages.

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