Projecting of the text document searching system: indexation using graph structures.

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22 September 2008
Agenda

Introduction
Conceptual Graphs
Our approach
Abilities
Conclusion
✔ Current information searching methods;
✔ Role of wikipedia in current world;
✔ One website to rule them all.
Introduction to the topic
Case study: HowTo startup

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Case study: HowTo startup

✔ Navigation searching (categories, links);
✔ Attribute searching (tags, date created, author);
✔ Full text searching.
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✔ Might be fast...
✔ ...might take much resources...
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Let’s try graphs!
What about conceptual graphs?

Conceptual graphs are well described, both for saving knowledge and searching systems.

There are many disadvantages of auto-creating CG’s from pure text:

✔ Takes much resources.

✔ Disambiguations can occur.

✔ Best current available ideas bases on other semantic solutions.
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There are many disadvantages of auto-creating CG’s from pure text:

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Our approach to the searching.

Users will sacrifice accuracy for speed.
Our approach to the searching.

Users will sacrifice accuracy for speed. We want to simplify the idea of conceptual graphs.
Our approach to the searching.

Users will sacrifice accuracy for speed.

We would like to have vertices as terms, connected themselves with edges labelled by value of frequency and neighbourhood. To make searching easier, those weights will be normalized and quantified.
Conceptual graphs compared.

John is going to Boston by bus.
Tom believes that Mary wants to marry a sailor.
Core indexation functions

\[ \delta : D \rightarrow S' \] - document \rightarrow subset of set of words which are in language with repetitions.

\[ \phi : S \rightarrow T' \] - basic form of each word in document is being found.

\[ \gamma : T' \rightarrow G \] - basing on terms our graph structure is being created.
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Search engine bases on user’s query, and all queries (such as boolean queries) can be adopted for proposed system.
Recommendation system based on graph comparing.

Two types of measures: similarity and inclusion.
Recommendation system based on graph comparing. Two types of measures: similarity and inclusion.
Combination of conceptual and relational similarities - comparing vertices and edges.

\[ \theta_s(G_1, G_2) = \frac{1}{2} \left( \frac{2n(G_i)}{n(G_1) + n(G_2)} + \frac{2m(G_i)}{m_{G_i}(G_1) + m_{G_i}(G_2)} \right) \quad (1) \]

Continuous, defined on range \([0, 1]\), with value 1 when graphs are conceptually identical, and 0 when they are completely different.
Modification of similarity measure.

\[
\theta_c(G_1, G_2) = \text{floor}\left(\frac{n(G_i)}{n(G_1)} + \frac{m(G_i)}{m(G_1)}\right) - \text{floor}\left(\frac{n(G_i)}{n(G_2)} + \frac{m(G_i)}{m(G_2)}\right)
\]

Digital, with results within $-1, 0, 1$. If intersection is identical to $G_1$ it's 1, $G_2$ - $-1$, and in all other cases 0.
Conclusion

✔ Presented indexation method bases on different types of basic index.

✔ First implementation tests confirmed usefulness of the system.

✔ Developed recommendation system has various ways of usage.

Further work

✔ Recommendation system as proposed after small changes can be useful while searching for plagiarisms.

✔ Size of neighbourhood and weights of edges could depend on the document (it’s size, diversity).