GeoTextMESS: Result Fusion with Fuzzy Borda Ranking in Geographical Information Retrieval

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Abstract. In this paper we discuss the integration of different GIR systems by means of a fuzzy Borda method for result fusion. Two of the systems, the one by the Universidad Politécnica de Valencia and the one of the Universidad of Jaén participated to the GeoCLEF task under the name TextMess. The proposed result fusion method takes as input the document lists returned by the different systems and returns a document list where the documents are ranked according to the fuzzy Borda voting scheme. The obtained results show that the fusion method allows to improve the results of the component systems, although the fusion is not optimal, because it is effective only if the components return a similar set of relevant documents.

1 Introduction

Result fusion has been studied as an option for obtaining better results in Information Retrieval (IR) by taking advantage from the combination of existing methods. Many fusion method have been proposed, such as linear combinations [1,2] and voting schemes like the Condorcet [3] and the Borda [4] schemes. Aslam and Montague [4] concluded that the Borda fusion is a simple, unsupervised method that is capable to exceed the performance of the best component system. The fuzzy Borda voting scheme is an improvement of the standard Borda voting scheme that was introduced by [5,6]. This is the first time it is used in the IR task, although it has been used in the Word Sense Disambiguation task at Semeval[1] with good results [7].

[1] http://nlp.cs.swarthmore.edu/semeval

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Table 4. O, $R_{overlap}$, $N_{overlap}$ coefficients, difference from the best system (*diff. best*) and difference from the average of the systems (*diff. avg.*) for all runs

run ID	MAP	diff. best	diff. avg.	O	$R_{overlap}$	$N_{overlap}$
TMESS01	0.226	0.001	0.013	0.315	0.698	0.459
TMESS02	0.227	0.001	0.014	0.346	0.692	0.496
TMESS03	0.219	0.007	0.013	0.317	0.693	0.465
TMESS05	0.235	0.009	0.014	0.358	0.692	0.508
TMESS06	0.226	**0.010**	0.012	0.334	0.693	0.484
TMESS07A	0.286	0.002	0.016	0.356	0.775	0.563
TMESS08	0.216	0.004	0.013	0.326	0.690	0.475
TMESS10	**0.289**	0.005	0.007	0.485	**0.854**	0.625
TMESS11	0.285	0.005	**0.018**	0.475	0.796	0.626
TMESS12	0.287	0.003	**0.018**	0.356	0.822	**0.356**
TMESS13	0.271	−0.009	0.003	0.475	0.796	0.626
TMESS14	0.282	−0.002	0.009	0.284	0.751	0.429
TMESS15	**0.289**	0.005	0.016	0.277	0.790	0.429

Table 5. Results obtained with the fusion of systems from the same participant. M_1: MAP of the system in the first configuration, M_2: MAP of the system in the second configuration.

run ID	MAP	M_1	M_2	O	$R_{overlap}$	$N_{overlap}$
EXP1+EXP4	0.289	0.284	0.275	0.792	0.904	0.852
NLEL0804+NLEL01	0.261	0.254	0.256	0.736	0.850	0.828
TALP01+TALP02	0.283	0.280	0.272	0.792	0.904	0.852

7 Conclusions and Further Work

We combined different systems by means of the fuzzy Borda voting scheme. The implemented method allowed to improve in most cases the results of the combined systems, although the improvement was limited. The best results with this method were obtained when the systems returned a similar set of relevant documents, which means that the method needs to be improved in order to better combine sets of different relevant results. This could be done by assigning to the unknown documents a weight different from 0.5, calculating the similarity of these documents with the ones that have been retrieved by the system. This will be the focus of future research efforts.

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