Alleviating Media Bias Through Intelligent Agent Blogging

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ABSTRACT

Consumers of mass media must have a comprehensive, balanced and plural selection of news to get an unbiased perspective; but achieving this goal can be very challenging, laborious and time consuming. News stories development over time, its (in)consistency, and different level of coverage across the media outlets are challenges that a conscientious reader has to overcome in order to alleviate bias. In this paper we present an intelligent agent framework currently facilitating analysis of the main sources of online news in El Salvador. We show how prior tools of text analysis and Web 2.0 technologies can be combined with minimal manual intervention to help individuals on their rational decision process, while holding media outlets accountable for their work.

Categories and Subject Descriptors

I.2.11 [Artificial Intelligence]: Distributed Artificial Intelligence—Intelligent agents; J.4 [Computer Applications]: Social and Behavioral Sciences; H.3 [Information Storage and Retrieval]: Information Search and Retrieval

General Terms

Design, Human Factors

Keywords

Media Bias, Agents, Web 2.0, Text Analysis, Latin America

1. INTRODUCTION

In a democratic system the news media plays an essential role: provide to the public a comprehensive, timely and balanced collection of information, that reflects the plurality of views for both individual and collective decisions. The news media, however, is widely considered as biased. El Salvador, a young democracy in Central America, does not escape this issue. Even though a more independent media is considered fundamental to the process of democratisation, the media companies with the biggest circulation in the country are owned, primarily, by businessmen whose capital comes from other economic activities which influence the media’s content and coverage. Journalists and analysts agree that popular mainstream media provides information influenced by ideological, political and business bias that favours the interests of the owners and advertisers. On the other hand, El Salvador also enjoys the benefits of the Web 2.0 paradigm shift. Blogging has become very popular, Blogger.com for example, ranks number nine on the sites of major traffic in the country above any newspaper electronic edition. In this work, we aim to provide an intelligent agent based system that combines prior tools for text analysis, with minimal manual processing, to facilitate analysis of news media coverage over time.

The media can help individuals to make better decisions in their everyday lives. Those decisions could pertain to health, safety, product selection, politics, employment, personal finance, the environment, or other issues about which individuals make purposeful decisions. However, if the decision process is rational, the consumers of mass media must have a comprehensive, balanced and plural selection of news to get an unbiased perspective. Mullainathan and Shleifer present a theory of media bias based on the distribution of preferences of readers. They showed that the crucial determinant of information accuracy is not competition, per se, but consumer heterogeneity. According to their economic model, on topics where reader beliefs diverge, e.g., political or financial issues, news providers slant and increase bias rather than clear up confusion. Yet in the aggregate, a reader with access to all news sources could get an unbiased view of the facts. To achieve this unbiased perspective can be very challenging, laborious and time consuming. News stories development over time, its (in)consistency, and different level of coverage across the news outlets are challenges that a conscientious reader has to overcome in order to alleviate bias. We present our first work toward this end, an intelligent agent framework currently facilitating analysis of the main sources of on-line news in El Salvador.

2. INTELLIGENT AGENT BLOGGING

The architectural view of the multi-agent based framework consists of three layers (Fig. 1): (i) The first layer is composed by reader agents, whose main task is to retrieve news articles from the predefined media outlets. (ii) The media analyst agents, in the second layer, automatically organize (cluster) the digested news articles into thematic categories and identify the latent topics present on the documents. Finally, based on the preprocessing of the previous layer, (iii) the blogger agent on the third layer posts related news articles summaries in a blog, tagging each entry of related issues with the topics identified, so as to facilitate future search and retrieval.

2.1 Data acquisition

In order to analyze the different news offers, reader agents (one per media outlet), first collect the headlines from the RSS feeds of three salvadorean on-line newspapers: La Prensa Gráfico.

http://www.alex.com/
http://www.cuscatlan.org/
http://www.LaPrensaGrafica.com/
El Diario de Hoy[^6] and Diario Co Latino[^4]. Diario Co Latino is considered left-leaning meanwhile the other two newspapers range from right-leaning to ultra-right[^4]. After collecting the headlines, reader agents parse the news articles’ HTML source, extracting their title and corresponding text. Then, they input this data to the analyst agents responsible for text analysis.

2.2 Text Analysis: key phrases, topics and clustering

*Analyst agents* extract automatically organize small collections of news articles into thematic categories using Carrot[^11], a search results clustering engine. The agents also extract the latent topics from the texts using the state-of-the-art latent Dirichlet allocation (LDA) algorithm implemented in Mallet[^6]. Currently, one specialized agent per task is used, but more can be instantiated to achieve a better degree of parallelization. The results of the text analysis form the basis for the blog entries to be posted.

2.3 Intelligent Agent Blogger

The *Blogger Agent* is responsible for posting the summaries of the news articles, where a single entry in the blog corresponds to the clusters found. That is, each post contains the summaries of the news articles that are related, with their corresponding link to the sources. The latent topics identified are used as tags for the blog post, in order to create a more coherent classification and to facilitate search. Here Blogger Data API[^1] was used for blog entry creation.

3. DISCUSSION

The multi-agent framework, which in the end interface with the user through a blog, is successful in aiding the discovery of inter-related news stories across media outlets, facilitating the ideal scenario where a user is able to access all sources of information to get an unbiased perspective. We opted to use a blog because its format emphasizes *participatory journalism*, which in this case Intelligent Agents play an active role in the process of collecting, analyzing and disseminating information. Furthermore, a blog facilitates user participation and discussion through comments, and it also helps to keep track of news stories development over time.

Not surprisingly, the textual analysis tools are not optimized for the Spanish language, and some special configuration, and small modifications were required to achieve the desirable performance.

While several systems aim to provide a global aggregation of news[^3], and analysis of worldwide news stories development[^2], we focus on the niche of local news of El Salvador, exploiting available tools of text analysis to cope with the bias exhibited by the local mass media in their coverage. We consider our focus not a limitation, but rather an answer to *The Long Tail* phenomenon exhibited by those services.

Adapting the system to a different country or sources of information would not involved a great effort, basically it would require the implementation of new reader agents.

4. CONCLUSIONS AND FUTURE WORK

We presented ongoing work towards alleviating media bias: an intelligent agent based system for the analysis of news articles. We focus on a set of media outlets from El Salvador, approximating the conditions of an ideal scenario where a reader with access to all news sources could get an unbiased perspective. We present a coherent organization of related news article within a blog, which is automatically updated on a daily basis; easing the task for the users of finding related information across multiple sources through a single location, keeping track of the evolution of opinions and news development over time, e.g., using an easily accessible blog archive, and allowing them to participate through comments and discussions.

As future work, we plan to integrate sentiment analysis techniques to help us determine the polarity of the news articles towards predefined entities, e.g., political parties, political figures or organizations. Besides that, we plan to provide Personalized Recommendations of blog posts according to the reader’s particular interest. Furthermore, we plan to use our framework to also monitor media partisan-bias during the coming elections in El Salvador, which will provide us with a good opportunity to carry out a deeper user study.

Although our preliminary empirical evaluation is promising and support the validity of our approach, which is also sustained by a solid economic model of market for news[^7], we believe that our contribution is an initial step on how the current Web 2.0 paradigm and readily available AI technology impact processes of democratization, e.g., providing the individuals with better tools for their rational decisions, while holding media outlets accountable for their work. Additional research in this field is still to be explored.

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