Chapter 14

Recommendation Systems for Mobile Devices

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ABSTRACT

The authors describe three recommendation systems for online articles that are specifically tailored for mobile devices. In order to increase the number of articles read by the average user, an online newspaper could be personalized for each reader. Each user receives a personalized selection of the articles that take into account the limited bandwidth and screen, the user’s preferences, and possibly their geographical position. Two general criteria are followed: a collective intelligence criterion and a content similarity criterion. The suggested articles need to be both popular among the members of the online community, and similar to the articles already read by the user. The three systems address three similar problems. NeoPage is a tool for newspapers’ editors that suggests the position that each article should have on a web page. ARS is a tool for newspaper readers, which recommends the most similar articles to an article just read. MyNews is a tool for the readers, which produces a list of recommended articles by taking into account both the popularity of the article and the previously read articles by the user.

INTRODUCTION

In recent years the market of mobile devices has been blooming because of the request for continuous online connectivity and because of the size and weight of the latest smart-phones, tablet PCs, net-books. People read the news online as never before on mobile devices. They are faced with the problem of quickly finding the news they are interested in. The average user chooses the articles to read by their titles even though the title is not always the best summary of the content of an article. In order to increase the number of articles read by the average user, an online newspaper could be personalized for each reader on a mobile device. Each user receives a personalized selection and ordering of the articles that take into account the limited size of the screen, the limited bandwidth

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of the device (e.g., by removing or compressing images) and the user’s preferences. Moreover, information on the geographical location of the user can be fed into the recommendation system and can be used to improve the accuracy of the selection.

Two general criteria are followed: collective intelligence (Segaran, 2007), such as collaborative filtering and content (Pazzani and Billsus, 2007).

We describe and compare three recently developed recommendation systems for mobile devices that are being used by one of the largest online Italian newspapers. These systems address three similar problems. NeoPage suggests the position that each article should have on the web page of an online newspaper. ARS primarily recommends the most semantically similar articles to an article just read by the user and secondarily takes association rules into account. MyNews recommends an article to a user by taking into account both the popularity of the article and the similarity to previously read articles by the specific user.

BACKGROUND

As mentioned in the previous section, two different criteria are followed in article recommendation systems: collective intelligence and content. The former depends on some explicit or implicit rating given by the users; the latter depends solely on the words contained in the article.

Several recommendation systems have been proposed where different approaches are used (content-based: NewsWeeder (Lang, 1995), Krakatao Chronicles (Bharat and Kamba and Albers, 1998), PersoNews (Banos et al., 2006); collaborative filtering: Google News (Das et al., 2007).

As far as the three systems presented here are concerned we have that NeoPage is a tool for online newspapers that uses collective intelligence; ARS is a primarily content-based recommendation system; MyNews is a hybrid system.

The common goal of the three systems we present here is to increase the total number of articles’ visualizations, which we call “impressions”.

Collective Intelligence

Collective intelligence can be implemented through a popularity measure or through collaborative filtering.

The two collective intelligence systems presented in this chapter use different popularity measures. None of the systems presented in this chapter uses collaborative filtering. In theory it could be possible to implement a collaborative filtering strategy in MyNews but that would only happen at the cost of heavy CPU and memory usage on the server.

- **Popularity measure**: Different popularity measures can be implemented. The simplest form is given by the number of times a given article has been read. More precise measures take into account how recently a given article has been read.

- **Collaborative filtering**: Collaborative filtering is a common approach used by a recommendation system based on collective intelligence. One consider similar readers or similar users: two articles are considered similar if they share some readers; two readers are similar if they have read the same articles. Two general collaborative filtering approaches are the following:
  - **Item-based**: readers are suggested articles similar to the ones they have read (Sarwar et al., 2001)
  - **User-based**: readers are suggested articles read by similar readers (Goldberg et al., 1992)

- **Collaborative filtering (continued)**: Collaborative filtering comes at a very high cost for the server because it implies storing all actions performed by the readers and computing all similarities.