

## **ENGINEERING SCIENCES**

### **RESEARCH OF THE POSSIBILITIES OF IMPLEMENTING COLLABORATIVE FILTERING ALGORITHMS IN A RECOMMENDATION SYSTEM FOR A TOURISM ORGANIZATION**

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According to the current level of information technology development, using a computer to store any type of information is becoming the only means of providing extensive information management capabilities. One of the most important roles in today's information retrieval process is the Internet. From the very beginning of its development, it is focused on providing information to users. Regarding this, the development of e-commerce technologies is becoming of paramount importance.

The relevance of introducing online stores, websites that allow you to book train and airline tickets or hotel rooms online is an important task, tailored to the needs of different manufacturing companies and has several advantages over regular stores or regular reservations. Firstly, the use of Internet technologies can reduce the cost of transportation and time spent searching for the right product or number. Internet resources, with convenient navigation and friendly interface, allow you to be acquainted with the full range of services offered by an organization in a minimal amount of time. Secondly, for example, planning a trip minimizes the likelihood of getting into an inconvenient situation when booking a hotel, such as a room mismatch, because Internet resources usually contain detailed information about the number and a certain number of photos that clearly give to understand what the number is.

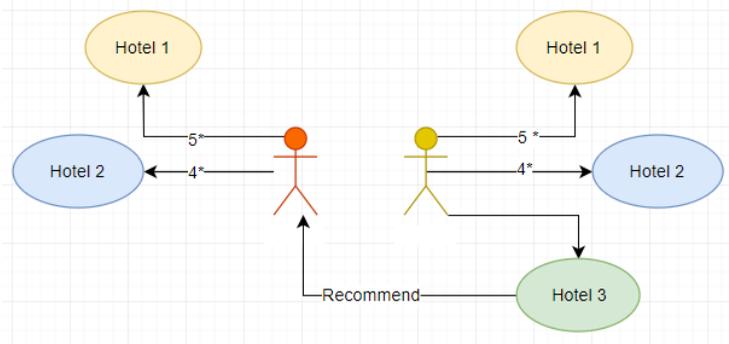
However, despite a large number of existing Internet applications that allow optimization of the hotel's room reservation process, they are all systems that only provide the user with certain information regarding available rooms on the selected dates for the specific hotel. Therefore, in order to select the desired hotel and room, the client needs to review the information related to all hotels, analyze it, on that basis, make certain conclusions for himself, and select most appropriate to his queries.

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This process can take a long time. Therefore, I aim to create a site that contains a directory of available hotels and a sufficient amount of information for each one and has the ability to find the most relevant hotel for the customer based on collaborative filtering.

Collaborative filtering models based on the assumption that people like things similar to other things they like, and things that are liked by other people with similar tastes [1, pp. 61–70] as shown on the Figure 1.



**Figure 1. Collaborative filtering**

Basically, there are two types of collaborative filtering. This is a model-based approach and memory-based approach. For our case, a memory-based approach is most suitable because the closest user or items are calculated only by using Cosine similarity or Pearson correlation coefficients, which are only based on arithmetic operations [2, pp. 76–80]. It is quite suitable for our case because of the lack of parameters.

Let us consider the cosine measure in more detail. The cosine measure for two vectors is the cosine of the angle between them. It is worth noting that the cosine of the angle between two vectors is their scalar product divided by the length of each of the two vectors [3, pp. 363–375]:

$$sim(u, u') = \cos(\theta) = \frac{r_u * r_{u'}}{\|r_u\| * \|r_{u'}\|}$$

We can predict a user’s rating for a hotel by taking a weighted sum of hotel ratings from all other users (u’s) where weighting is the similarity number between each user and user-u:

$$\hat{r}_{ui} = \sum_{u'} sim(u, u') * r_{u'i}$$

As conclusion, we can say that collaborative filtering is really a very powerful tool that can be applied to almost any subject area. It will not only improve the user experience but will also distinguish the web resource from potential competitors. Depending on the specifics of the subject area, you should choose a filtering algorithm and determine the measure of similarity.

#### **References:**

1. D. Goldberg, D. Nichols, B. M. Oki, and D. Terry, «*Using collaborative filtering to weave an information tapestry*» *Communications of ACM*, 1992, vol. 35, no. 12, pp. 61–70.
2. G. Linden, B. Smith, and J. York, «*Amazon.com recommendations: item-to-item collaborative filtering*» *IEEE Internet Computing*, 2003, vol. 7, no. 1, pp. 76–80.
3. A. Ansari, S. Essegai, and R. Kohli, «*Internet recommendation systems*» *Journal of Marketing Research*, 2000, vol. 37, no. 3, pp. 363–375.

## **INNOVATIVE WAYS TO IMPROVE THE PRODUCTION TECHNOLOGY OF MEAT LOAVES**

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Analyzing the food market of Ukraine, it should be noted that sausage products are in high demand and occupy a significant place in the consumer's food basket. Meat loaves are of particular interest in view of expanding the range and improving production technology. They are not only delicious and convenient to use, but also contain a large number of useful substances, which causes their popularity to increase every year [1].

Meat loaves belong to the group of cooked sausages and taste like cooked sausages, but they have a special taste due to baking. For the production of meat loaves, the same raw materials are used as for the production of cooked sausages – beef, pork, lamb, lard, raw fat, dried meat mass, protein raw materials of animal and vegetable origin, starch, dairy products, eggs, wheat flour, and spices. Preparation of raw materials, pickles, grinding and cooking of minced meat is carried out similarly to the production of cooked sausages, except for the addition of less water (10...20% by weight of cutterized raw materials). In general, meat loaves differ from cooked sausages in low humidity (by 2...3%), are made without

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