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metalib.herokuapp.com

UKRAINE

MetaLib - web service for organization and search for book information

UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION

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Introduction

In time of modern technology, people forget about reading paper books and there are quite a number of people who want to read a real book, not it's electronic version. For such people, this web service will help you easily find books to read and show a list of libraries where you can get them.

Representation

The purpose of the work

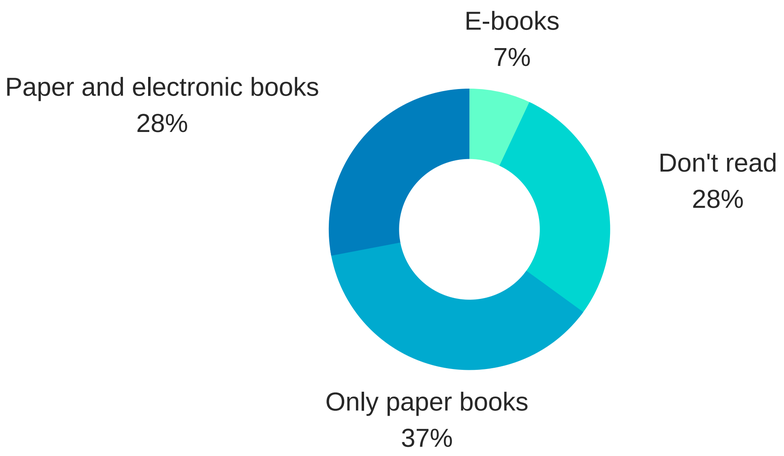
Create a web service to easily and quickly find books, view a list of books, view a list of libraries and books available in libraries. Leave book reviews and be able to leave comments. Get recommendations based on the reader's previous preferences. Also, one of the goals was to facilitate the work of librarians in maintaining paper forms.

Object and subject of research

Internet and web technologies - creating a web service for finding books in libraries.

Actuality

According to research by American scientists in 2019, 37% of respondents said they read only paper books and 28%, both paper and electronic. These data show that most people still prefer paper books.

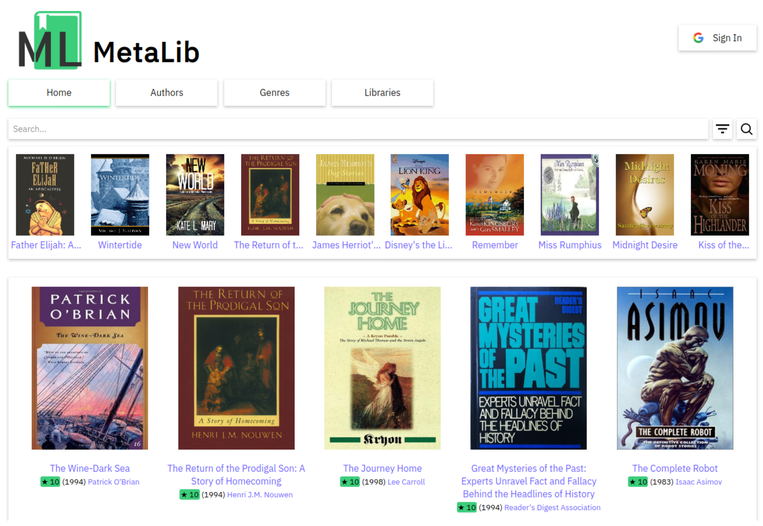


Analogs

Exploring library sites and just similar services that already exist, the main problem with these solutions was the awkward and often confusing interface that scared away potential users. Also, no solutions were found that would give all the features of this project.

Freatures

Interface



The main pages of the web service:

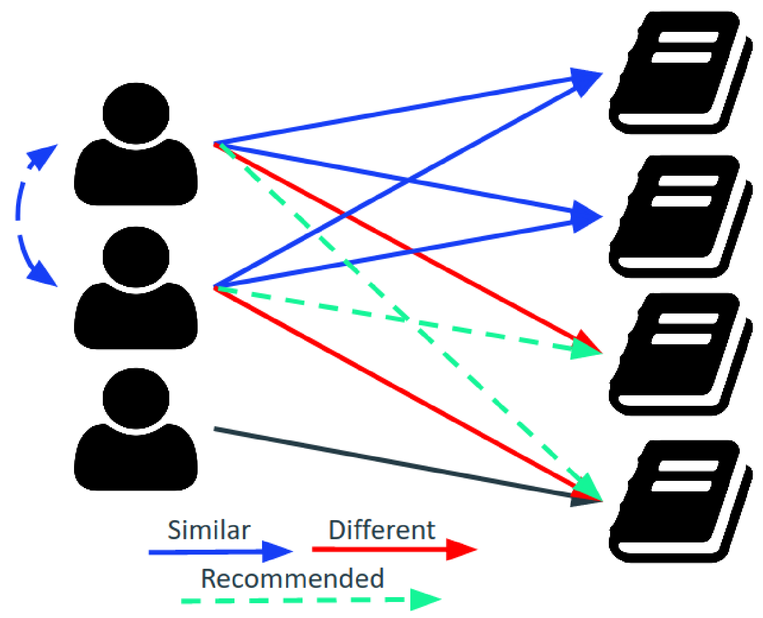
- list of books
- list of libraries
- list of authors
- list of genres
- user profile
- search page
- book page

Interface elements:

- navigation menu
- search bar
- recommendation panel

Recommendation system

A user-based collaborative filtering method is used.



The principle of work

1. Normalization of readers' ratings by comparison with the average rating.

	book_id	user_id	rating_x	rating_y	adg_rating
0	188	1	10	8.557692	1.442308
1	295	1	10	8.557692	1.442308
2	201	1	7	8.557692	-1.557692

2. Find similar users using the value of the cosine of similarity.

user_id	1	2	3	...	20	21	22
user_id				...			
1	0.000000	-0.010039	-0.018180	...	-0.015507	0.065620	-0.012744
2	-0.010039	0.000000	0.016818	...	-0.022389	-0.030579	-0.018843
3	-0.018180	0.016818	0.000000	...	0.050850	0.009947	-0.020191

3. Finding a limited number of similar users.

user_id	top1	top2	top3	top4	top5	...	top18	top19	top20	top21	top22
						...					
1	13	21	16	12	7	...	11	15	18	19	10
2	7	18	13	14	9	...	11	21	6	4	16
3	9	16	7	20	19	...	1	22	17	13	4

4. Calculation of possible estimates of readers based on similar to them by the formula:

$$s(u,i) = \overline{r_u} + \frac{\sum_{v \epsilon V}(r_{vi} - \overline{r_v}) * W_{uv}}{\sum_{v \epsilon V} W_{uv}},$$

where **s** - possible evaluation, **u**, **v** - users, **i** - books, **r** - ratings given by users to books, **w** - similarity between two users.

5. Sorting recommendations by estimates and saving them in a database.

Result of the recommendations

Get fairly accurate recommendations for readers that improve as users like them.

Technologies

GO, Python, PostgreSQL, GORM, Pandas, NumPy, GORILLA, AJAX, jQuery, HTML, CSS, JS, Logrus, HEROKU

Conclusions

A convenient and intuitive web service has been developed for search for new books to read, view a list of books, libraries, authors, genres, etc. The developed recommendation system will help readers find new books. Created a search page where users can find books by filters. To implement the project, new technologies were used, which are increasingly needed in the development market, which also adds to its relevance.