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Book Discussion Web Application Based on Django Framework with UI/UX Design for Senior Citizens and Inexperienced Users

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April, 2013
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Abstract

With the Internet becoming available and affordable to more people, the number of Internet users among older generations is rapidly growing. However, most websites on the web are confusing to this age group, due to lack of experience, as well as disabilities coming with age. The purpose of this project is to create an easy to use, self-explanatory web application, taking into account this specific target group. It is a platform where one can discuss various books. The online book club can substitute a traditional book club by ignoring the time and geographic limitations. The process of the creation of this application included exploring a new web framework, Django, which is one of the trends in web application development.

Introduction

According to Pew Internet and American Life Project recent report [1], Baby Boomers and seniors are steadily increasing their use of Internet. Seventy-seven percent of the people aged fifty to sixty, and fifty-four percent of people aged sixty-five and older are now currently Internet users. Moreover, these age groups are the fastest growing group of Internet users [2]. What are they using the Internet for? Studies that report about the online activities of the elderly suggest that they do much the same online as most other age groups – that is, communication and information searches as well as using online services [7]. The top websites that people over fifty use are Google, Facebook, Yahoo and YouTube. A lot of them also seek health related information online [3]. While some of the people in this age group have some experience with Internet usage, many of them are new and inexperienced users. In addition, there are a number of commonly accepted limitations that arise during the normal aging process, such as vision decline, hearing loss, motor skills diminishment and cognition effects [7]. Despite all of the above, the special needs for this age group is usually ignored by website designers. Most websites today are not senior friendly. They are often overloaded with information, have complicated navigation structure, main content text is too small, there are many advertisement areas and moving objects.

The purpose of this project is to create a web application, targeting the age group of fifty and older. The web application has an easy to use, self-explanatory user interface. In the design process, considerations specific to senior citizens are taken into account.

My web application, BookReflect.com, is an online book discussion platform, which can be an alternative to a traditional book club. Book clubs are one of the favorite pastimes of many adults. As people get older and have fewer responsibilities, they love joining book clubs to get use of all of the free time and the need to socialize. At the same time, getting older brings difficulties to leave the house for personal commitments. The online book club ignores geographical and time limitations: users can discuss their favorite books and
socialize with people around the globe, at any time convenient for them, sitting on their comfortable couch at home.

**Background and Related Work**

A lot of the online book discussions today are done through web forums and social networking websites. There are also a number of dedicated book discussion websites, and here I list a few (see Appendices 1-3 for screenshots):

1. [onlinebookclub.org](#) – With this online book club users get to choose the book and find the forum that best suits their interests. While I like how the discussion part is set up, the user interface is really hard to use, especially for first-time users. There are a lot of navigation items, the destinations of which are not always easy to predict. The pages are crowded with too much text and unrelated items. The book lists do not show the book cover photo, which would help to faster recognize the book without reading the title. (Appendix 1)

2. [goodreads.com](#) – This website allows users to make their own customized book clubs within the site. This is one of the most popular of its kind and has more than 4 million users. Goodreads.com is visually pleasing compared to most online book discussion platforms, however the home page is too crowded with extra items such as quizzes, quotes and ads. While it’s a great platform for many purposes, it is not easy to use for those with little experience with the Internet. (Appendix 2)

3. [bookclubit.com](#) – Has a nice and simple interface and offers an easy way to create a book club for a group of members. However, the discussion topics are not directly associated with a book, which make it hard for a user to find the discussion about a specific book. (Appendix 3)

Exploring various existing similar platforms, I have gathered ideas of book discussion platform features to combine in a new web application, with special attention to usability for older adults.

**Program Requirements**

The main purpose of BookReflect.com is to share opinions about various books, and my main goal is to create an easy and straightforward way to do this. The user finds a book, selects one of the discussion topics or creates a new one, and posts comments about the topic.

At the start of the project, several potential users were interviewed to create a list of requirements suitable for the target group. All of the interviewees were either traditional book club members or book lovers who would be interested to join an online book club. The interview questions were to find out how often they
use the Internet, what they use the Internet for, and what they would want to be able to do with an online book club.

**The interface**

Because the target group of the website is fifty and older, an important requirement of the website is an easy-to-use interface. All of the features that the user might use have to be easily accessible, simple and self-explanatory. The user has to know what to anticipate from each feature and where exactly each link will take them. In case of an accidental click on a link, the user needs to have an easy way to go back to where they were.

Overall, the website has minimal features, to help the user easily use the website for its main purpose, without the distracting extra features.

Because a large percentage of users today own smartphones and tablets, the layout needs to be responsive. Responsiveness allows the user to use the website’s full functionality on a smaller screen, without having to zoom in on various parts of the website. The website will be as easy to use on a smartphone and tablet, as on a regular computer.

**The home page**

The home page of BookReflect.com features several important functions that the users might be looking for when they first visit the website. It has a large search bar, 3 featured popular books and 3 featured recently added books. If the user is not logged in, a graphic banner is displayed at the top of the page to show a summary of some easy steps one has to perform to get started. A more detailed guide to using the website is contained on “How it works” page.

**“How it works” page**

This page contains basic instructions on how to create an account and login, how to find a book and how to join a discussion. Considering the target age group, plain language is used for instructions, assuming the users’ little experience and unfamiliarity with technical terms. The instructions include hyperlinks, for a quicker access to various sections of the website.

**Authentication**

An important part of the system is user authentication. A user has to create an account and login to be able to add a discussion topic or post a comment about a topic. However, the user can search for books, and look at the existing discussions without logging in. Because people often get discouraged and leave the website when they are prompted to login to proceed, BookReflect.com only requires authentication for posting
things, but they can still see other people’s posts without logging in. This way, they will be interested in the topic, will be motivated to join the discussion and will not mind to register or login.

The registration process is fast and easy. It asks for minimal information: a username, password, password confirmation and email address. An activation link is sent to the email address to eliminate fake users. If login is prompted for posting something, the user is redirected to the same page after logging in. This way, the user will not have to search for the book and discussion topic again.

Finding a Book

There are several ways to find books:

- **Search bar**: The Search bar lets users search for a book using the book title, the author, the ISBN or some keyword about the book. In addition to searching through the titles and authors, the search function will also search the book description for keywords. A keyword can be a name of a main character, place or other word describing the book. This option is particularly important for the target age group, due to the fact that the user might not necessarily remember the book title or author, but might remember other names from the book. The other use of this feature is finding a book by a theme. For example, if the user searches the word *love*, all the books containing the word in the description will come up in the search results.

- **Authors**: All the authors of the books on the website are alphabetized on Authors page. To find an author even easier, they are grouped by first letter of last name. Each author has their own page, with their biography and books listed.

- **Genres**: To search for a book by genre, the user can go to the Genres page. A number of genres are listed here, and each one shows how many books on the website are listed as that specific genre. By clicking on a particular genre, the user can see a list of all the books in that genre.

The book lists in search results, authors and genres pages only show 9 items at a time. A convenient pagination lets users navigate through pages. Each item has a picture of the book cover, the book title and the author’s name.

There are some alternative ways to find a book:

- **Popular books**: The home page features 3 books that have the most discussions, hence are most popular among users.

- **New additions**: The home page features 3 books that were recently added to the website database.

- **Sidebar authors**: The sidebar shows 8 authors that have the most books on the system. There is also a link to show the full author list.

- **Sidebar genres**: The sidebar shows 8 genres that have the most books on the system. Like authors sidebar, there is a link to show the full genres list.
The Book Page
Each book has its own page, which shows the title, a picture of the book cover, the author, the book description and all of the discussion topics. There is also a link to take the user to the author page, to be able to see other books by the same author.

Discussions
Each book has its own list of discussion topics. Only 5 discussion topics are displayed at a time and user can easily navigate through pages to see other topics. Each item displays the topic title, which can be a question or general discussion idea, which is a link to the discussion page with the comments. The items also display the number of comments each discussion has, who started the discussion and the date it was started. If the user is already logged in, a text area will be shown at the top of all the discussions to start a new topic. However, if the user is not logged in, they will see login and registration links to be able to perform one of those actions, then be able to add a new discussion topic. The user can still see all of the discussion topics and their comments without logging in.

After clicking on one of the discussion topics, the user is redirected to a page with all the comments about the topic. There are 5 comments displayed per page. The user can navigate through all of the comments through a simple pagination system. The last comment is always displayed first. The user can read all of the comments without logging in, however the user will not see the comment submission box unless they login. In this case, they will see links to login or to register. The users will be more encouraged to register at this point rather than in the beginning, because they have seen the discussions and have already found something that interests them, or already have a great discussion idea on their mind.

Implementation
Technology
For the implementation of the project, several technologies were considered. While I had some experience in several of them, I chose to use a new to me technology Django, which is a python web framework. Django focuses on automating as much as possible and adhering the DRY (Don’t Repeat Yourself) principle. It lets you build high-performing, elegant Web applications quickly [4]. I chose Django, because it has some really nice features that make working with a database fast and convenient. It has easy data types, which lets you quickly setup the models and concentrate on the business logic, instead of basic implementation details. Django lets you create a nice and easy admin backend with multiple features for handling the data. Django also has a large developer community, which made it easy for me to learn a new technology.

Django is an MVC framework, however it doesn’t use the standard names for all 3 components (Figure 1).
The URL dispatcher (urls.py) maps the requested URL to a view function and calls it. The view function checks if a cached version of the pages exists before proceeding to further steps. The view function (views.py) performs the requested action, which typically involves reading or writing from the database or other tasks. The model (models.py) defines the data in Python and interacts with it. Templates typically return HTML pages. The Django template language offers a simple to use syntax, while providing all the power needed for presentation logic. After performing any requested tasks, the view returns an HTTP response object (usually after passing the data through a template) to the web browser. The view also saves a version of the HTTP response object in the caching system for a specified length of time [4].

To support reusability, parts of the system are constructed in separate apps. In the case of my project, the book listings and the discussions are different apps in the project. If needed, the discussions app can be plugged into a different project to discuss other items, or the books app can be used in another project by on its own. Registration is also a separate app, and can be used for different projects.
Database
The database used is PostgreSQL, which is one of the several object-relational databases supported by Django. Some of the database tables are automatically generated upon Django installation with its default apps. These tables take care of the authentication and permissions, the admin log, content types, sessions, etc. Registration_registrationprofile table is created by the registration app, which supports user login from front-end site. The other tables that are more specific to my project are the books app tables and discussions app tables.


*Discussion* app consists of 2 tables: discussions_topic and discussion_post. The discussions_topic table contains the id, title, related book, author of the topic, and start date. The book field is a foreign key to the book_book table, while the author field is a foreign key to auth_user table containing the user information. The discussions_post table contains the id, post content, topic id, author of the post, and post date. The topic id and author are foreign keys to discussion_topic and auth_user respectively.

Figure 2 shows the detailed data model.

Designing the User Interface
To make the interface senior-friendly, I used guidelines from several online resources [6-12].

**Interaction Design:** Navigation bar has minimal items. No pull down menus is used as those difficult for many seniors to use. Extra space is added between navigation menu items, to avoid accidental click on an adjacent item. Menu items change color on mouse hover, also when the page is active.

Each book in the book lists is contained in a white box with grey border, with a sufficient space between books. This reduces the probability that the user will accidentally click on a one book instead of another because of confusion with the boundary between them.

**Information Design:** The pages are kept short, so the user will not have to scroll too much through pages. All book lists only show 9 items at a time, and all discussion items show 5 items at a time to keep the pages short. All booklists have a grid layout, which is easier to scan through, than regular lists.
Figure 2. Detailed data model

All images have titles and links and buttons have alternative text, to be fully usable and understandable for those who use screen readers.

**Visual Design:** All the fonts used are Sans Serif, which is easier to read. The main content font size used is 15px with 23px line-height, which also contributes the ease of reading text, as older users generally prefer larger text. Body text is left justified which is optimal for older adults.

The color scheme consists of grey and white backgrounds, black text, green buttons and links, orange navigation bar and home page headings. A graphic of books on a shelf was created in the same color scheme. The website is limited to several colors, which are warm, but not too overwhelm the user. Only minimal items on the website are meant to be differentiated by color to, so it is still fully usable even for
people with color vision deficiencies. The color change of the active menu item will still be visible to the latter, since the active menu item also uses inset shadow.

Each book in the book lists features an image of the book cover. Cover pictures are very important in book lists, since many people recognize books by cover – the graphics on it, colors, fonts, without even reading the title of the book. The image height is 200px in the boxes: big enough to see details and recognize the book, and small enough not to distract the users attention to one bright looking book.

Responsive design approach was used to provide optimal viewing experience across a wide range of devices: from desktop computer monitors to smartphones. Because mobile devices have smaller screens, not all the details of the website will display on it. Because we don’t want to shrink all the items to fit on a small screen, the only other optimal way to display everything would be by placing all the items one after another in a long page. In the example of BookReflect.com home page, the sidebar will show first, then the banner, the search, and then only the popular and new book lists. The user would have to see the Popular Authors and Popular Genres first, then get the search or book lists. Analyzing what is really important for the user on the home page, I decided not to show the sidebar information on any screen smaller than 480px.

The other big change between screens is the navigation menu. On any screen smaller than 979px the top navigation bar turns into a collapsible menu, as the navigation items will not fit on a narrow navigation bar. With the only button in the navigation bar the collapsible menu gets activated, the bar extends vertically, and the navigation items are displayed as a list, with the Login button on the bottom. The collapsible menu button has 3 bars on it, resembling a list. This kind of buttons appear in a lot of mobile applications, so people who use mobile as their primary Internet device, will be familiar to this button and will be able to predict what it is for.

Figure 3 shows some screenshots of the layout on different screen sizes, where A is a regular desktop computer screen, B is a tablet screen, and C is a smartphone screen. The last screenshot shows the collapsible menu activated on a smartphone view.

For the layout, I have used Twitter Bootstrap, which is a front-end framework for faster web-development [13]. It uses a 12-column responsive grid. I have used Bootstrap for my project for several reasons. First of all, it saves time as Bootstrap libraries offer ready-made pieces of code for web layouts. Bootstrap is customizable and you can pick and choose the features to use. Bootstrap helps make components consistent throughout the project, so the results are uniform across platforms [14].

**Hosting**

BookReflect.com is hosted on an Amazon EC2 instance, which runs Ubuntu 12.04 Linux distribution. Depending on the future usage requirements, this will allow horizontal and vertical scaling.
Figure 3. Responsive Layout
Results, Evaluation, and Reflection

The process of the project has been a great learning experience. Because I was new to Django and could not predict what my learning curve would look like, I limited my requirements to the most important features when choosing from many interesting ideas. Django proved itself to be a good fit with my project and learning it was worth getting out of my comfort zone.

While potential users were involved in the process of my project right from the beginning, the most important and final usability evaluation was done at the end, after the completion of the first version of the website.

The usability evaluation was conducted with 10 potential users, 6 of which were older adults (50+) and 4 were middle-aged people (40-50). Several background questions were asked to them in the beginning of the process to be able to reflect their Internet experience with the evaluation results. According to their answers, the average Internet usage between all participants was 1 hour per day. The average years of Internet use was 10 years. In general, people who use the Internet more often on a daily basis, had less difficulties performing tasks, however the years of experience did not seem to be a major factor effecting their performance.

The participants were asked to perform several simple tasks without any assistance. The tasks that were asked to be performed included finding the book they recently read, finding a discussion they are interested in and post a comment about it, finding a new discussion. Some searches were specifically by author or by genre. The participants had to create an account and activate it from their email account. While middle-aged people were able to perform the tasks much faster than older adults, everyone was eventually able to perform all of the tasks. Four out of ten participants clicked on to the How it works page and read the instructions before starting to do anything. Two others opened the instructions page in the process of performing specific tasks. The ones who read the instructions performed with fewer difficulties, compared to the ones who did not.

Some significant but fixable problems were noted during the evaluation process:

- During registration process the form has an email address field, which is used to send the activation email to the user. One of the participants thought that they will be creating a new email address with BookReflect.com and put a new email address, before she realized she had to put her existing one. The participant who made this mistake is a long time Internet user, however she does not use social networks, hence the lack of familiarity with registration forms. I mitigated this problem by adding short instructions on the top of the registration page, highlighting a line about what the email address field is, and why the users need to provide an email address.
Another problem that was noted was again in the registration process. After registration the user get a message to check their email for an activation letter. Two participants overlooked the message and tried logging in without the activation email. After not being able to login, they realized they missed a step. Even though this step is specified on the How it works page, I also highlighted it on the post-registration message, so it can catch the user’s eye.

Overall, the evaluation participants had very positive comments about the project. The ones who are current book club members, expressed a big interest in using this website once it’s all ready to use.

Conclusions and Future Work

BookReflect.com is an easy to use web application. The usability evaluation with potential users shows that an average person aged fifty and older with little experience with the Internet will not have a difficulty using any of the features.

Because it was only possible to fulfill a limited number of requirements due to the time limitations, there are many ideas for improvement to be implemented in the future:

- Because it is hard to keep up with new books and always update the database, the user will be able to add a book, if the book isn’t already there. An easy form will be created to allow this process to be easy and encourage users to add new books.
- The search bar will be improved to provide search suggestions and ability to detect spelling errors and still perform the search task with the right spelling of the input. This will be an important step towards being more senior-friendly, since older adults mistype things without noticing it.
- Amazon API will be used to allow users to buy books directly from the website.

Big changes on any web application usually cause negative first reaction from the users. They take it as something new they have to get used to. For this reason, it is important to be careful when adding new features. Because people with little Internet experience take more time to adapt to new things, the new features will be added gradually, giving the user ample time to adjust.
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Appendices

Appendix 1 – onlinebookclub.org
Appendix 3 – bookclubit.com