Department of Informatics
University of Leicester
CO7201 Individual Project

Preliminary Report

Advanced Computer Science

Project Title: Personalized BuzzFeed

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Project Preliminary Report		
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1. Introduction

1.1 Aims and Objectives.

The main aim of the project is to gather various categories of news articles from many places all over the world and present them to the registered users in a more personalized way. More personalization is done to get truly tailored experiences. Personalization is constructed taking both the Contextual and the Behavioral personalization approaches into account to have a holistic vision for the product. Visualized geographic filter to present location-based news reports makes it more unique.

The application is more emphasized on personalization and appealing visualization making it more ideal and unique across other tools. Today's marketplace getting very competitive with enhanced functionalities, hence the application that wins the users mindset and giving a good look and feel with user-friendliness, understanding what every user need makes it outstanding.

2. Requirements

2.1 Top Level Requirements

1. Gather News Feed and Generate User login:

The system must gather news information from various places around the world. The rightmost news dataset or News API selection based on categories and locations and feeding into the database is the initial key part of the application to load sufficient data to show clear outputs on personalization.

The other major thing is to create individual user login and sessions to achieve personalization.

2. Personalization:

The system is majorly focused on many possible ways to customize user personalization aspects. In the current demand for highly personalized experiences for users, the application is expected to achieve this in two possible ways. One is Contextual personalization which considers one or more of the users' personal details which are never changing inputs directly given/taken from users. This includes the below:

- Age
- Gender
- Location (**Prioritized**)
- Preferred Categories while registering (**Prioritized**)

Another is the Behavioral Personalization which takes the users previous history details in the application perspective. This includes:

- Previously hit 'likes'
- Users favorite list of feeds

Additionally, the system is **desired** to have more personalization based on recommendation system which is based on collaborative filtering - Machine learning approach.

3. Visualization

The application is aimed to have a good look and feel for a desirable user experience. This is practically approached using two different ways.

- **Visual Charts**: The system is **configured** to achieve more informative users' profile showing their most favorite categories with a pictorial representation of chart data to give precise view of themselves.
- **Amcharts Globe View**: Along with this, the system is **desired** to have personalized visualization. This produces respective location-based news reports.

2.2 Detailed Requirements

1. Essential Requirements:

1. **User Registration and Login**:

User must register into the application with their location, gender and preferred category list. User has to login to the system and maintain a valid session with a token.

2. **UI Design**:

System must have more appealing UI design for menus and all pages.

3. **News Feed:**
Gather news data with desired fields like location and categories.Find the right dataset or API for newsfeed is a key role.

4. **Database**:
Although gathering news feed from the API or the dataset, it is very critical to maintain the data into the right database and designing the right schema for DB to make the application stable in terms of news-front as well as user-front.
5. **Personalization**:
Making more personalized application for users to make it outstanding and achieve customer-centric product.

2. Recommended Requirements:

1. **User Charts**:
    - The system is designed to show more sophisticated user experience view of their favorite categories on a chart data. This is an add-on experience for personalization to show users' zone of interest.
2. **User Profile**:
    - This page shows user information they entered during user registration process.

3. **Visualization**:
    - This view projects a globe or a map and enables the option for user to select any place and fetch the news based out of that location. This is more helpful in terms of visualization as well as personalization to get area-based reports.

4. Optional Requirements:

1. **Categorized Newsfeed:** The system allows users to load corresponding news under selected category.
2. **Saved/Favorite Feeds**: This system allows users to save news to favorite feeds.
3. **Update User profile:** System allows user to update user profile anytime as required and update the database consequently.
4. **Recommendation System:** The system is desired to have additional user collaborative filtering based on their preferences.

3. MoSCoW Prioritization of Features

SNo.	Features	Priority
1.	User registration	Must
2.	User Login	Must
3.	UI Menu and Pages Design	Must
4.	Gather Newsfeed	Must
5.	Database Design	Must
6.	Design Options to like/Add to favorite	Must
7.	Contextual Personalization	Must
8.	Behavioral Personalization	Should
9.	Visualization	Could
10.	User Profile	Should
11.	User Charts	Could
12.	Categorized Newsfeed	Could
13.	Saved/Favorite Feeds	Could
14.	User Profile Update	Could
15.	Recommendation system	Could

4. Technical Specifications

Specifications	Software	Version	Description
Back-end Framework	Java	8	Used for efficient back-end.
	Spring boot	2.0	Provides supporting framework with in-built dependencies.
Front-end Framework	Angular	12.0	Front-end framework which aids component-based application design.
	HTML	5	Used to build individual components.
	CSS	4	Better styling.
	Bootstrap	4.5	Provides built-in designs and development
	JavaScript	ES6	Validation support
Query Language	SQL	Language support	Performing queries from database
Database Application	H2 - RDBMS	1.4	To store the application data and ability for having either in-memory or remote accessible database through url.
Repository	JPA	2.0	Access data from database and perform CRUD operations on the data
Web Services	Rest APIs		To post Http requests and receive http responses for transferring data.
Testing	Postman	5.5	To test API end-point.
Version Control	SVN Repository		To manage the code and documents during the entire project without any conflicts

5. Requirements Evaluation Plan

The end result of the application relies on Quality Assurance. To ensure it satisfies the desired outcome, project must meet the requirements successfully.

- **Functional Requirements**: Functional requirements which are the basic functionalities of the system can be tested and made sure by performing validations and unit testing.

- **Non-Functional Requirements:** Non-Functional requirements are ensured by Spring Security which authenticates the system and performance management by using light-weight components on the frontend and so on.

6. Background Research and Reading List

Potential background analysis for making the application unique and successful has been carried out.

1. NEWSDATA.IO providing news data for specific categories and locations has proved well organized so-far but still looking some refined options with Kaggle (kaggle-docs, n.d.)
2. Gone through Personalization concepts and various categories of personalization. Apart from this, conducted research on Machine learning approaches performing Collaborative filtering to effectively achieve personalization (Aysun Bozanta, 2018).
3. Performed some technical compatibility checking of amcharts (preferred) vs plotly to achieve visualization filter (amcharts-docs, n.d.).

7. Risk Management

- The main complexity of the application resides in news gathering from a news dataset. The risk measured being low as database tables can be merged as required for the system.
- Another major challenge is designing the database schema and data ingestion. This is more important part of the system to fulfill the personalization exactly as we needed. This can be resolved using the SQL queries efficiently.
- Achieving both contextual and behavioral forms of personalization is bit complicated to have but would make the system more holistic.
- And yet another challenge is to get the user-based recommendation system which is based on Mahout Machine learning Recommendation methods. This can be resolved by feeding some sample data instead of actual system's user data to achieve at a prototype level.

8. Time Plan

Week	Module	Tasks
1 - 2	Project Overview	1. Work on analysis of project and give brief project description. 2. Provide preliminary report. 3. Analyze right dataset for the news feed. 4. Setup skeleton of frontend and backend
3	Design Database	1. Design DB schema 2. Find right data and feed into database. Create tables and data with category and location field.
4	Design menus	3. Create layout for initial pages(frontend) 4. Create more appealing UI for menus.
5	User Session	1. Create user signup and login (frontend) 2. Design user database schema 3. Create session using authentication – spring security / JWT tokens (backend)
6	Contextual Personalization	1. Personalize feed based on user's location and selected preferences into personal feed. (Complete both backend and frontend)
7-8	Behavioral Personalization	1. Create option to like and add to favorites for each feed. 2. Collect previous history of likes for each user and list of favorite categories to add to personal feed. (Complete both frontend and backend). 3. Submit Interim report
9	Visualization	Project Globe to fetch location-based news report. This is sort of personalized visualization filter. (Achieve both frontend and backend)
10	User Profile view and User Charts	1. Build User profile in frontend and fetch user data from database. 2. Additionally, construct chart data to project individual category data.

11	User update Profile and Recommendation system	1. Users should be able to update their profile anytime on the system and updated immediately on the database. 2. Make Mahout recommendation system and trial using sample data to achieve in prototype version.
12	Categorized feeds and saved feeds	1. Users should be able to view various category data in a separate tab. 2. Also, users saved/favorite feed to be made available.
13	Testing and Documentation	1. Perform unit testing and integration testing to ensure overall application works as expected. 2. Prepare necessary documentation for the project submission.

9. References

1. Aysun Bozanta, B. K. (2018). Developing a Contextually Personalized Hybrid Recommender System. *Mobile Information Systems*, 13.

2. kaggle-docs. (n.d.). *KaggleDocs*. Retrieved from https://www.kaggle.com/.

3. amcharts-docs. (n.d.). *Amcharts*. Retrieved from https://www.amcharts.com/.