



Kavikulguru Institute of Technology and Science

Project Preliminary Investigation Report

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Title of the Project:

Personalized News Recommender System

Area of Project Work:

Artificial intelligence (AI), NLP

Problem Statement:

The objective of this project is to develop an intelligent news recommendation system that can effectively identify and recommend relevant news articles to users without relying on explicit user feedback or labelled data. The system will use unsupervised machine learning techniques to cluster news articles based on their content and similarities and generate personalized recommendations for each user.

Prior Art (Patent Search) :

Sr. No.	Patent Application No.	Title of Patent	Existing Solutions (Abstract of Patent)
1.	US 9.489,112 B2	RECOMMENDED NEWS EDITION ON A MAP USING GEO ENTITIES	Described embodiments enable the presentation to a user of news articles or other content that is of likely interest to a user and that is geographically relevant to the user's location or region of interest. A news delivery system includes an ingest module that assigns topics and locations to available content, a profile engine that determines profile topics and geographic locations that a particular user finds relevant, and a news delivery module that selects content for the user based on the operation of the ingest module and the profile engine. In one embodiment, the profile engine performs decay processing to remove stale topics and locations from a user's profile. In related aspects, the profile engine maintains multiple profiles for the user. 14 Claims, 10 Drawing Sheet
2.	202311019306	MOVIE RECOMMENDATION SYSTEM AND METHOD USING MACHINE LEARNING	A method using Machine Learning Present invention discloses a system and method for recommending movie to user consisting of content based recommendation system to collect user's data either by ratings or by collecting from the activities they do and Ratings and genres by several users from the movies they watch, from the things they do and draws the similarity between the user's habits, reviews and genres they prefer most. Further, R programming is implemented to construct my Recommendation system with their features by using Recommender lab, ggplot2, data table, reshape2 packages, this project is taken forward thus building a movie recommendation system using collaborative filtering based on Items.

3.	US 9,542,649 B2	CONTENT BASED RECOMMENDATION SYSTEM	In one A media control system enables a device-agnostic and Source-agnostic entertainment experience through use of an internet-enabled user device. The user device includes a client application for navigating through media or entertainment content, controlling media devices according to a type of media content selected by the user, and sharing media experiences via social networks. The user device includes Smartphones, tablet computers, and other internet-enabled processor-based devices. The media control system lever ages the internet access of the user device to enable search and discovery of all available media content. A recommendation engine coupled to the client application learns media preferences from user behavior, generates from numerous disparate media Sources recommended media choices corresponding to the media preferences, and presents the recommended media choices on the user device. 22 Claims, 11 Drawing Sheets
4.	US 7,908,183 B2	RECOMMENDATION SYSTEM	A computer-implemented service analyzes purchase histories and/or other types of behavioral data of users on an aggregated basis to detect and quantify associations between particular items represented in an electronic catalog. The detected associations are stored in a mapping structure that maps items to related items, and is used to recommend items to users of the electronic catalog. The items may include products and/or categories of products. 27 Claims, 7 Drawing Sheet.

Literature Review :

Sr. No.	Title of Paper	Details of Publication with Date and Year	Literature Identified for Project
1.	Personalized News Recommendation Based on Click Behavior	2020	It would involve examining existing research on personalized news recommendations and how they utilize users' click behavior. Limitations might include issues with privacy, over-reliance on past behavior, and potential biases in the recommendation algorithm.
2.	News Recommendation Based on User Topic and Entity Preference in Historical Behavior	2020	It would involve exploring existing studies on news recommendation systems that leverage user preferences for topics and entities from their historical behavior. Limitations could encompass challenges in accurately capturing evolving user interests, potential information filter bubbles, and difficulties in handling sparse user data for effective recommendations.
3.	Wide and Deep Learning for Recommender Systems	2019	It would involve surveying existing research on the application of wide and deep learning techniques in recommender systems. Limitations may include the need for substantial computational resources, potential model complexity, and challenges in incorporating contextual information effectively for diverse recommendation scenarios.

4.	Research Progress of News Recommendation Methods	2018	It would involve surveying the current state of research on various news recommendation techniques. Limitations may encompass issues like the cold start problem, data sparsity, algorithm scalability, and challenges in incorporating user context and evolving preferences. Additionally, the review should consider the dynamic nature of news content and the need for real-time adaptation in recommendation systems.
5.	Neural News Recommendation with Attentive Multi-View Learning	2017	It involves examining existing research on neural network-based news recommendation systems that leverage multi-view learning with attention mechanisms. Limitations may include the complexity of model architecture, potential challenges in training and parameter tuning, and difficulties in handling large-scale datasets. Moreover, interpretability of attention weights and potential overfitting due to multiple views could be areas of concern.

Current Limitations

Privacy Concerns: Balancing personalization with user data privacy remains a challenge. Collecting user data can raise ethical and legal issues.

Lack of Context: Understanding real-time events and contextual factors for news recommendations is challenging.

Proposed Solution

To tackle privacy concerns in a personalized news recommender system, by considering the likes and dislikes of particular individual

To overcome the lack of context in a personalized news recommender system, an "Event-aware Recommendation" mechanism can be employed.

Objectives and Scope of Work

Objectives:

1. To Personalization: Tailoring news content to individual user preferences, ensuring a more engaging and relevant news consumption experience.
2. To User Engagement: Increasing user interaction and time spent on the platform by delivering captivating and interesting news articles.
3. To Content Diversity: Balancing personalized recommendations with a diverse range of news topics to prevent filter bubbles and broaden users' perspectives.

Scope of Work:

Data Collection and Preprocessing:

Gather news articles from diverse sources.

Collect user interaction data (clicks, likes, shares, etc.).

Clean, preprocess, and store data for analysis.

User Profiling and Preference Modeling:

Develop user profiles based on demographics, behavior, and preferences.

Utilize machine learning techniques to model user preferences over time.

Feasibility Assessment:

I. Expected Outcomes of the Project

1. Increased User Engagement: Users are more likely to engage with news content that aligns with their interests, leading to higher click-through rates and longer session durations.

2.Enhanced User Satisfaction: Tailored recommendations can lead to higher user satisfaction as they receive content that is relevant and interesting to them.

3.Improved Content Discovery: Users may discover news articles from diverse sources that they might not have encountered otherwise, leading to a broader understanding of current events

II. Innovation Potential

AI Advancements: Incorporate advanced AI techniques, such as deep learning and reinforcement learning, to continuously improve recommendation accuracy and adapt to changing user preferences.

Natural Language Processing (NLP): Utilize NLP techniques to understand user behavior, sentiment, and context, enabling more refined and contextually relevant recommendations.

III. Task Involved

Data Collection and Processing:

Gather news articles from diverse sources and topics.

Collect user interaction data, including clicks, likes, and shares.

Preprocess and clean the data, handling duplicates and inconsistencies

Feature Extraction:

Extract relevant features from news articles, such as keywords, categories, and sentiment.

Create user profiles based on their historical interactions and preferences

IV. Expertise Required

1. Inhouse Expertise

Html, CSS, Bootstrap, MySQL database

2. External Expertise

Python, Flask Framework, JavaScript, jQuery

V. Facilities Required

1. In-House Facilities:

Data Storage and Management: Robust databases to store user profiles, news articles, and their attributes.

Data Preprocessing: Tools and pipelines for cleaning, transforming, and aggregating news data.

2. External Facilities:

Internet , Storage

Milestones and Time Plan

	Task	JULY 2023	AUG 2023	SEP 2023	OCT 2023	NOV 2023	DEC 2023	JAN 2024	FEB 2024	MAR 2024	APR 2024
Design	Conceptual Design		✓								
	Detailed design		✓								
	Design Modifications			✓							
	Final Design			✓							
Develop	Procurement (If any)				✓						
	Prototyping					✓					
	Modifications						✓				
Deliver	Testing and Validation							✓			
	Final Modifications							✓			
	IPR / patent draft								✓		
	Thesis and Poster									✓	

Project Guide

Mrs. Ankita Nathe

Signature of HOD

Dr. Vilas P. Mahatme