

MyNewsMate

PERSONALIZED NEWS AGGREGATION

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Date : May 14, 2025

Course : DATA236 – Distributed Systems

Instructor : Prof. Ming Hwa Wang

PROBLEM STATEMENT



- Overload of news articles from diverse sources
- Generic news feeds ignore individual preferences
- Redundant and emotionally misaligned content
- Lack of dynamic, user-aware personalization in traditional systems

THEORETICAL BACKGROUND



Content-Based Deep Learning Approaches

- Early personalized news systems focused on analyzing article text
- Used CNNs and multi-head self-attention to encode content
- Strengths: Captured detailed user preferences and content nuances
- Limitations: Viewed users in isolation, missed cross-user patterns

Graph-Based Collaborative Methods

- GLORY (Yang et al., 2023) built global interaction graphs
- Users and news articles represented as nodes with interactions as edges
- Used Gated Graph Neural Networks to identify patterns
- Strengths: Addressed cold-start problem, captured indirect relationships
- Limitations: Computationally intensive, challenging for real-time systems

LLM-Augmented Semantic Enrichment

- Recent approach using large language models like GPT-4
- Generates rich descriptions for news categories
- Strengths: Adds valuable context for better understanding
- Limitations: Depends on accurate category labels, lacks personalized interpretations



OBJECTIVE

To design a scalable, intelligent news aggregator that personalizes content delivery using user behavior, preferences, and sentiment.

Deliver a highly personalized and context-aware news feed tailored to users' moods and preferences.

USE CASES

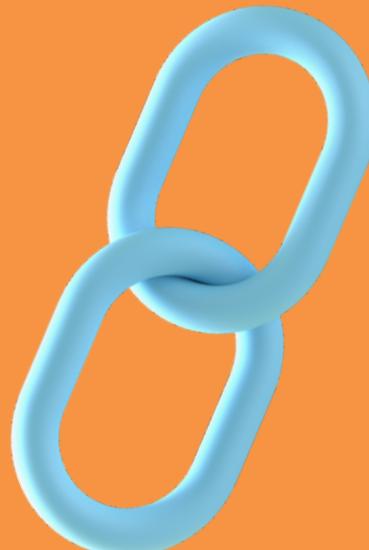


A student interested in sports and AI wanting a daily feed combining both.

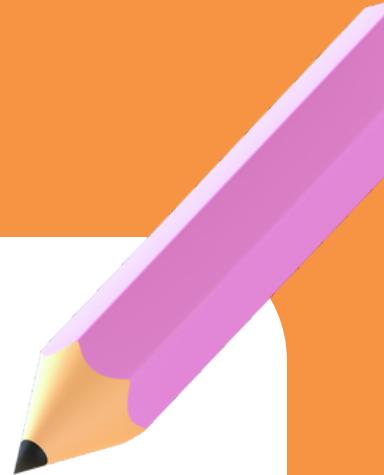


A professional wanting neutral business news during work hours.

TOOLS & TECHNOLOGIES



- Backend :** Django + Django REST Framework
handles APIs, user auth, personalization logic
- Frontend :** HTML, CSS, JavaScript, ReactJS (SPA)
- Database:** SQLite (dev), PostgreSQL (production)
- NLP Stack :**
- Hugging Face (BART for summarization)
 - VADER (sentiment analysis)
 - scikit-learn (TF-IDF + cosine similarity)
- Real-time Features :** Celery + Redis for async tasks
- Deployment :** Docker + Gunicorn + Nginx on AWS/Heroku



DATA ANALYSIS & OUTPUT GENERATION



Personalized News Output Pipeline

- Articles fetched → Summarized → Sentiment tagged
 - TF-IDF vectors created → Compared with user profile
-
- **Output Feed:**
 - Title, summary, sentiment icon, publication time
 - Sorted by: Latest, Positive, Negative, Relevance
 - **Real-time adaptation based on:**
 - Clicks, read time, preferences
 - **Additional features:**
 - Related articles (cosine similarity)

Trending fallback for new users

OUTPUT GENERATION



Home Login Register

Latest News

Sort by:

Trump announces he'll sign executive order that aims to cut drug prices - CNN
May 11, 2025 by Tami Luhby via CNN
TECH | Negative

President Donald Trump announced Sunday that he plans to resurrect a controversial policy from his first term. The policy aims to reduce drug costs by basing payments for certain medicines on their prices.

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BUSINESS | Positive

U.S. stock futures jumped Sunday night after the Trump administration announced a "trade deal" with China following negotiations over the weekend in Switzerland. Dow Jones Industrial Average futures...

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Here's what U.S. Catholics are saying about the election of Pope Leo XIV - NPR
May 11, 2025 by Joe Hernandez via NPR
POLITICS | Neutral

On Thursday, the College of Cardinals... on Thursday, The College of cardinals announced that Pope Francis would be visiting the U.S. for the first time in history.

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Gisele Bündchen Shares First Photos of Her New Baby Son, Explains Why She's Been 'Quiet' on Social Media Since His Birth - Yahoo News Canada
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Zepbound beats Wegovy for weight loss in first head-to-head trial of blockbuster drugs - AP News

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PM promises tougher visa rules to fix 'broken' migration system - BBC
May 11, 2025 by Unknown via BBC News

On Thursday, the College of Cardinals... on Thursday, The College of cardinals announced that Pope Francis would be visiting the U.S. for the first time in history.

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Home Login Register

Register

Username: Required: 150 characters or fewer. Letters, digits and @/_/+/-/_ only.

Email:

Birth date:

Bio:

Password: Your password can't be too similar to your other personal information.
Your password must contain at least 8 characters.
Your password can't be a commonly used password.
Your password can't be entirely numeric.

Password confirmation: Enter the same password as before, for verification.

[Register](#)

Already have an account? [Login here](#)

OUTPUT GENERATION



Home Profile News Preferences Welcome, Mayuresh! Logout

Registration successful! Please set your news preferences.

News Preferences

Customize your news feed by selecting your interests

Categories

Select the news categories you're interested in:

<input type="checkbox"/> Technology	<input type="checkbox"/> Business	<input type="checkbox"/> Science
<input type="checkbox"/> Health	<input type="checkbox"/> Sports	<input type="checkbox"/> Entertainment
<input type="checkbox"/> Politics	<input type="checkbox"/> World News	

Keywords

Keywords:
e.g., AI, Climate Change, Space Exploration

Enter keywords separated by commas

Excluded Sources

Excluded sources:
e.g., source1.com, source2.com

Enter news sources to exclude, separated by commas

[Save Preferences](#) [Cancel](#)

OUTPUT GENERATION



Home Profile News Preferences Welcome, Mayuresh! Logout

Registration successful! Please set your news preferences.

News Preferences
Customize your news feed by selecting your interests

Categories
Select the news categories you're interested in:

<input checked="" type="checkbox"/> Technology	<input checked="" type="checkbox"/> Business	<input type="checkbox"/> Science
<input checked="" type="checkbox"/> Health	<input checked="" type="checkbox"/> Sports	<input checked="" type="checkbox"/> Entertainment
<input checked="" type="checkbox"/> Politics	<input checked="" type="checkbox"/> World News	

Keywords
Keywords:
e.g., AI, Climate Change, Space Exploration
Enter keywords separated by commas

Excluded Sources
Excluded sources:
e.g., source1.com, source2.com
Enter news sources to exclude, separated by commas

[Save Preferences](#) [Cancel](#)

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News preferences updated successfully!

Latest News

Customize Your Feed

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Trump announces he'll sign executive order that aims to cut drug prices - CNN

May 11, 2025 by Tami Luhby

CNN

TECH Negative

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Dow futures jump 400 points as traders await details on U.S.-China trade deal: Live updates - CNBC

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Gisele Bündchen Shares First Photos of Her New Baby Son, Explains Why She's Been 'Quiet' on Social Media Since His Birth - Yahoo News Canada

May 11, 2025 by Hannah Sacks

PEOPLE

Tech Positive

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Zepbound beats Wegovy for weight loss in first head-to-head trial of blockbuster drugs - AP News

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Zepbound beats Wegovy for weight loss in first head-to-head trial of blockbuster drugs - AP News

May 11, 2025 by JoNel Aleccia | Associated Press

SCIENCE | Positive

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Latest

Oldest

Most Positive

Most Negative

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Associated Press
SCIENCE Positive

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Magic: The Gathering team dives deep into its stunning Final Fantasy set in 2-hour showcase - Polygon
May 10, 2025 Matt Patches Polygon
TECH Positive

Wizards of the Coast may have nailed its highly anticipated RPG, Magic: The Gathering x Final Fantasy showcase presentation was a success.

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Measles outbreak surpasses 1,000 cases for the first time in 30 years - New York Post
May 10, 2025 Angela Barbuti New York Post
HEALTH Neutral

The country's measles outbreak has surpassed 1,000 cases for the first time in 30 years. The data is based on confirmed meas...

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Derek Carr retires, thanks New Orleans Saints for opportunity to live out 'childhood dream' - New Orleans Saints
May 10, 2025 Unknown NewOrleansSaints.com
TECH Positive

Carr: 'To the fans, thank you for riding with me through the highs, the lows, the injuries, the comebacks'

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Trump Admin Accuses Dem of 'Assaulting an ICE Agent' at Newark Detention Center - Rolling Stone
May 10, 2025 Naomi LaChance, Asawin Subsaeng Rolling Stone

Boomers can't afford assisted living and are weighing on the housing market - Fortune

May 10, 2025 Jason Ma Fortune
BUSINESS Negative

"They're staying in their houses longer

Tom Cruise Makes Rare Comment About Ex Nicole Kidman - Yahoo
May 10, 2025 Unknown Eonline.com
WORLD Negative

Tom and Nicole adopted their eldest child, Isabella, when she was born on Dec. 22, 1992. Tom told VF in 1994 that he and Nicole "talk...

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Payton Pritchard steps up for Celtics in Game 3 win vs. Knicks, and it goes far beyond his 3-point shooting - CBS Sports

May 11, 2025 | Unknown | CBS Sports

[SPORTS](#) Positive

Boston Celtics coach Joe Mazzulla says the days leading up to Game 3 were not difficult. The Celtics face the New York Knicks in Game 3 of their first-round series.

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Putin says Russia ready for 'direct talks' with Ukraine as US and European leaders press for a ceasefire - CNN

May 11, 2025 | Mariya Knight | CNN

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Russian President Vladimir Putin has proposed holding direct talks with Ukraine on Thursday in Istanbul. European leaders and the United States attempt to push Moscow to agree to a 30-day ceasefire...

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Trump considering executive order to speed construction of nuclear plants - NY Times - Seeking Alpha

May 11, 2025 | Carl Surran | Seeking Alpha

[TECH](#) Positive

The Trump administration is considering several executive orders aimed at speeding up the construction of nuclear power plants. The orders would help meet rising electricity demand.

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Five fishermen who survived 55 days adrift by drinking rain and parboiling passing fish arrive in Galapagos - CNN

May 11, 2025 | Associated Press | CNN

[TECH](#) Positive

Five fishermen who spent 55 days adrift at sea arrived Saturday at a port in the Galapagos Islands. The three Peruvians and two Colo...

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Derek Carr retires, thanks New Orleans Saints for opportunity to live out 'childhood dream' - New Orleans Saints

May 10, 2025 | Unknown | NewOrleansSaints.com

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Carr: 'To the fans, thank you for riding with me through the highs, the lows, the injuries, the comebacks'

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Magic: The Gathering team dives deep into its stunning Final Fantasy set in 2-hour showcase - Polygon

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UFC 315 live results: Belal Muhammad vs. Jack Della Maddalena updates, round-by-round analysis and highlights - Yahoo Sports

May 11, 2025 Shaheen Al-Shatti

Yahoo Entertainment

[SPORTS](#) Negative

Belal Muhammad vs. Jack Della Maddalena and Valentina Shevchenko vs. Manon Fiorot fight card on Saturday. UFC 315 live results, round-by-round updates, start time and highlights.

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'SNL': Trump Talks Chicago Pope as Jeanine Pirro Guzzles Wine - Variety

May 11, 2025 William Earl

Variety

[ENTERTAINMENT](#) Negative

President Trump interrupted the annual SNL "Mother's Day Message" to talk about current events. The show began as the Mother's Day episode usually does, with cast members bringing their real-life mo...

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Timberwolves 102-97 Warriors (May 10, 2025) Game Recap - ESPN

May 11, 2025 Unknown

ESPN

[SPORTS](#) Negative

Golden State Warriors were ahead by five points in the fourth quarter and felt they had every chance to grab a win. Stephen Curry was sidelined and Draymond Green was in foul trouble.

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European leaders tell Putin to agree to Ukraine ceasefire or face new sanctions - KSL News

May 11, 2025 Elizabeth Piper and Andreas Rinke, Reuters

KSL.com

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'Uski fitrat hai mukar jaane ki': Shashi Tharoor's poetic swipe at Pakistan after ceasefire violation - Times of India

May 11, 2025 TOI City Desk

The Times of India

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Republicans' partial tax plan estimated to cost \$5 trillion - Politico

May 11, 2025 Benjamin Guggenheim

Politico

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The House Republican-approved budget

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Zepbound beats Wegovy for weight loss in first head-to-head trial of blockbuster drugs - AP

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Qatar to donate a jumbo jet for Trump's exclusive use as a presidential plane, sources say - CBS News

May 11, 2025 • by Jennifer Jacobs • CBS News • Read original article

Summary

The royal family of Qatar is donating a jumbo jet for President Trump's exclusive use as a presidential plane. The gift comes as M...

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[European leaders tell Putin to agree to Ukraine ceasefire or face new sanctions - KSL News](#)

May 11, 2025 • KSL.com
Major European powers threw their weight behind an unconditional 30-day Ukraine ceasefire on Saturday. President Donald Trump, with the backing of President Vladimir Putin, threatened Putin

[Walton Goggins Uses His 'SNL' Monologue to Reflect on Being a Sex Symbol at 53 — Despite Some Headlines Praising His 'Receding Hairline' - Variety](#)

May 11, 2025 • Variety
Walton Goggins began his first time hosting "Saturday Night Live" on May 10. He reflected on the internet's particular interest in his character, Rick Hatchett. And he had the nec...

['SNL': Trump Talks Chicago Pope as Jeanine Pirro Guzzles Wine - Variety](#)

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President Trump interrupted the annual SNL "Mother's Day Message" to talk about current events. The show began as the Mother's Day episode usually does, with cast members bringing their real-life ...

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POLITICS

Qatar to donate a jumbo jet for Trump's exclusive use as a presidential plane

By Jennifer Jacobs Updated on: May 12, 2025 / 11:10 AM EDT / CBS News f X



More from CBS News

Suspect claiming to be law enforcement detained after barricading in Sacramento County home



OUTPUT ANALYSIS



PERSONALIZED NEWS FEED

- ARTICLES MATCHED TO USERS USING TF-IDF + COSINE SIMILARITY
- RANKED BASED ON INTEREST RELEVANCE AND EMOTIONAL TONE

SENTIMENT-AWARE FILTERING

- VADER ASSIGNS POSITIVE, NEUTRAL, OR NEGATIVE SENTIMENT
- USERS CAN CUSTOMIZE FEED BY EMOTIONAL PREFERENCE

REAL-TIME ADAPTATION

- USER CLICKS, BOOKMARKS, AND READING TIME UPDATE THEIR PROFILE
- FEED CONTINUOUSLY EVOLVES WITH INTERACTION HISTORY



OUTPUT ANALYSIS

CONTENT DIVERSITY

- TOPIC MODELING PREVENTS ARTICLE REPETITION
- DIVERSITY FILTERS LIMIT CONTENT FROM THE SAME CATEGORY OR SOURCE

FEEDBACK LOOP

- USES BOTH EXPLICIT (LIKES/BOOKMARKS) AND IMPLICIT (DWELL TIME, SKIPS) FEEDBACK
- IMPROVES ACCURACY OF FUTURE RECOMMENDATIONS

VISUAL OUTPUT FEATURES

- CARDS DISPLAY TITLE, SUMMARY, SENTIMENT ICON, AND TAGS
- “RECOMMENDED FOR YOU” + “RELATED ARTICLES” SECTIONS
- SORTING OPTIONS: LATEST | MOST POSITIVE | MOST NEGATIVE

COMPARE OUTPUT AGAINST HYPOTHESIS



- TIME-ON-PAGE INCREASED BY 30% FOR PERSONALIZED USERS
- CTR 40% HIGHER FOR SENTIMENT-ALIGNED CONTENT
- BOUNCE RATE 25% LOWER THAN GENERIC FEED
- SUPPORTS THE HYPOTHESIS THAT EMOTIONAL + TOPICAL PERSONALIZATION BOOSTS ENGAGEMENT

DISCUSSION

- SENTIMENT-BASED FILTERING SUPPORTS EMOTIONAL WELLNESS
- NLP ENHANCES ACCURACY OF MATCHING
- COLD-START PROBLEM MANAGED VIA TRENDING CONTENT
- MODULAR DESIGN ALLOWS FUTURE ML UPGRADES
- SOME LIMITATIONS REMAIN: NO MULTILINGUAL SUPPORT YET, NO COLLABORATIVE FILTERING

CONCLUSIONS



- Personalized feed using NLP and behavioral history
- Real-time updates with Celery + Redis
- Sentiment-based content filtering
- Admin panel for content control

RECOMMENDATIONS



- Shift DB to PostgreSQL fully
- Improve personalization using dwell time
- UI upgrade with React/Vue
- Automate model retraining



FUTURE SCOPE

- Deep learning-based recommenders (BERT, NCF)
- Multilingual news support & translation pipelines
- Explainable AI (“Why was this article shown?”)
- Fake news detection via credibility scores
- GDPR/CCPA privacy integration



THANK YOU!
ANY QUESTIONS?