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1. INTRODUCTION

1.1 Project Overview

News Tracker is an application that primarily focuses on enhancing and optimizing the way of user interaction with the news stories. It is more user friendly in a way that a user can personalise his/her own interests in this application. The study process began with how other applications developed with respect to personalisation and giving users a curated content. This step allowed the study analysis identify the disadvantages and make it as advantages in this application. The idea of personalisation is that it keeps track of the user's interests and accordingly change the home page for the users to give them a personalised experience based on what they set as their preferences. The application also has an added advantage that any user using this application might not be able to feel discomfort as there are no advertisments which many applications failed to meet up the expectations of a user. The application stands out off the crowd in terms of personalisation, better search and able to view in multiple languages.

1.2 Purpose

News tracker serves the purpose of delivering a better application to the users and enhanced user experience and user interface. The ultimate purpose is giving the user a personaslised application with an ability to better search and this application doesn't function on one language and thus enabling users to use this application worldwide. The users should be displayed with clean, personalised content on the home page with zero advertisements. The need for this project is to deliver news stories without any distractions and getting to see the content only the users like.

2. LITERATURE SURVEY

2.1 Existing Problem

Newspapers were the leading source and first physical source of news for people. Even though the habit of reading newspapers has decreased significantly, the information sector is still alive and well.

Several advancements in the technology sector first enabled smartphones to display latest and updated news on reader's demand. Personalisation of news access should extend beyond 'what' the user sees to 'how' they access it. Popular applications like **Google News**, **BBC** and **DailyHunt** provide personalised and curated content to users. Users select topics to follow and the system generates a news feed for them to read and also provides a summary for each article.

The personalisation news apps can be achieved by making the User Interface adaptable. An adaptable user interface will allow the system to adapt to the way the users read and provide summaries of articles.

Existing System:

Google News:

- Under each headline, the "Full Coverage" button lets users round up coverage from the best news sources on a given topic—something discerning readers value in an era of intense partisanship and concern about biased reporting.

- Ability to subscribe to specific news sources and read them directly from the app.

- Option to purchase premium subscriptions to news outlets.

- Interconnected updates on the latest developments for existing news updates.

2.2 References

- https://news.google.com
- https://www.msn.com/
- http://news.yahoo.com/
- http://twitter.com/

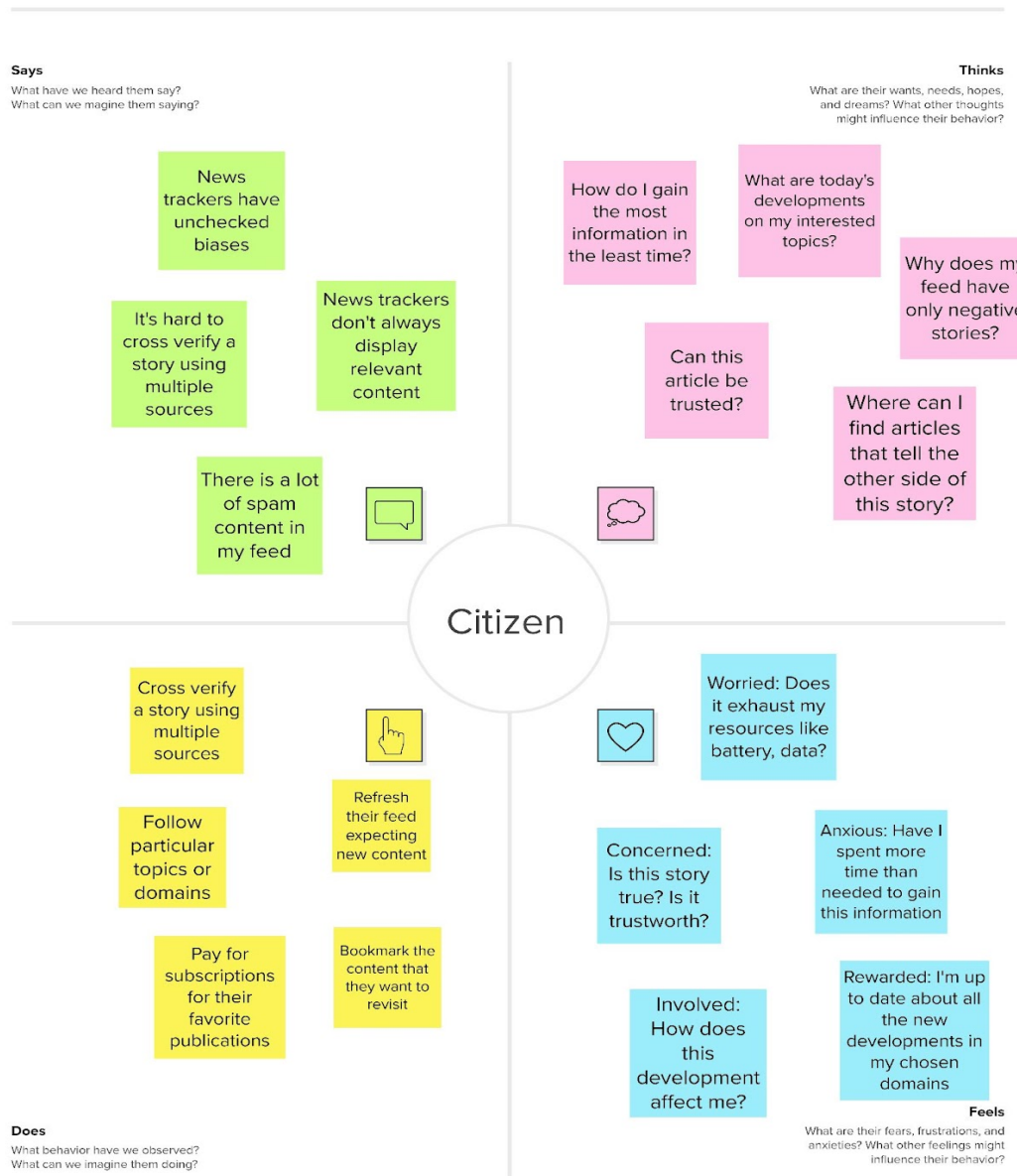## 2.3 Problem Statement Definition

News articles are accessed via smartphones and tablets more now than ever. This has created

a need for providing personalised feed of news articles for users. A recent study by Reuters Institute for the Study of Journalism's Digital News Report said that about 82 percent of Indians read the news online, out of which 73 percent do it on their smartphones.
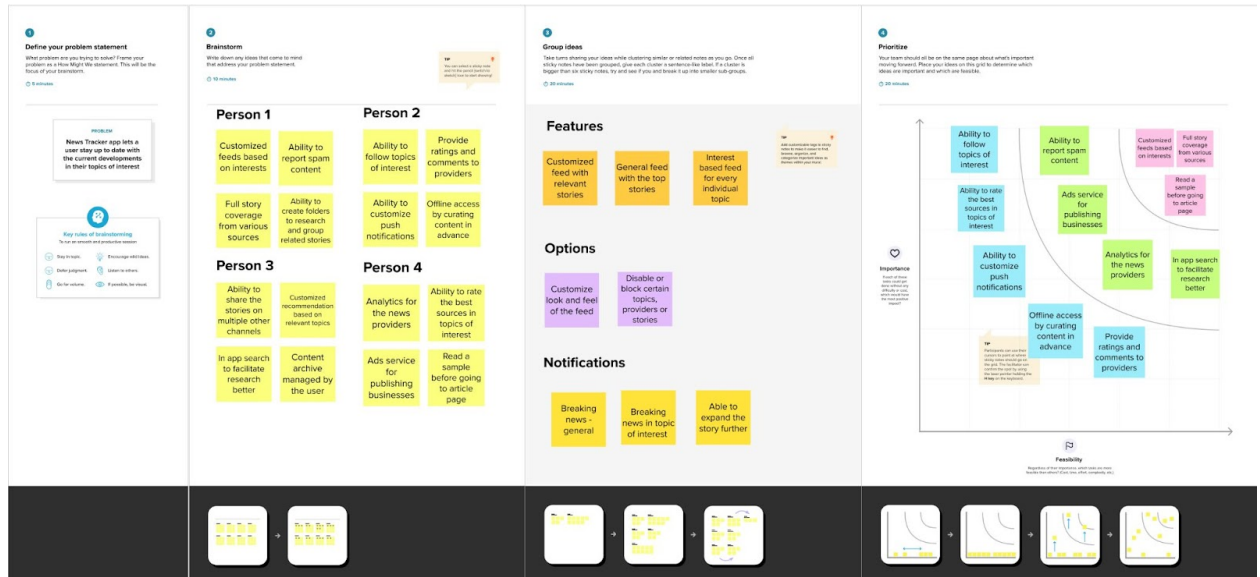
Curated news feed has been widely used as the tool for sourcing a variety of content from different sources on a report and providing a 360-degree review of the story. The demand for news curation has increased over the years and users looks for SMEs to help them find quality and informative content without having to spend much time browsing or scan multiple articles themselves.

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

Says
What have we heard them say?
What can we imagine them saying?

- News trackers have unchecked biases
- It's hard to cross verify a story using multiple sources
- News trackers don't always display relevant content
- There is a lot of spam content in my feed

Thinks
What are their wants, needs, hopes, and dreams? What other thoughts might influence their behavior?

- How do I gain the most information in the least time?
- What are today's developments on my interested topics?
- Why does my feed have only negative stories?
- Can this article be trusted?
- Where can I find articles that tell the other side of this story?

Citizen

Does
What behavior have we observed?
What can we imagine them doing?

- Cross verify a story using multiple sources
- Follow particular topics or domains
- Refresh their feed expecting new content
- Pay for subscriptions for their favorite publications
- Bookmark the content that they want to revisit

Feels
What are their fears, frustrations, and anxieties? What other feelings might influence their behavior?

- Worried: Does it exhaust my resources like battery, data?
- Concerned: Is this story true? Is it trustworth?
- Anxious: Have I spent more time than needed to gain this information
- Involved: How does this development affect me?
- Rewarded: I'm up to date about all the new developments in my chosen domains

3.2 Ideation and Brainstorming

3.3 Proposed Solution:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	With lives getting busier by the day, people find it difficult to keep up with current affairs. In some cases, users find it hard to trust the source of the information they read and hence customer base also goes down gradually. This can be overcome by providing the users curated or personalised content based on their interests and Subject Matter Experts can be brought in to determine if the sources are credible or not.
2.	Idea / Solution description	Several events occur globally. Users find it cumbersome to search for topics or specific articles. This system will allow users to select a few topics or domains and they will be provided a feed with articles and reports from those domains.
3.	Novelty / Uniqueness	The credibility of the sources mentioned in the feed cannot be determined without the verification of content by Journalists, Reporters and Subject Matter Experts. The system's feed will be void of falsified and misleading reports and articles.
4.	Social Impact / Customer Satisfaction	News readers have reduced because of increasing falsified information and misleading titles in reports. Giving them an accurate report of the event will increase customer base, resulting in an increased level of general knowledge amongst the general populous.
5.	Business Model (Revenue Model)	Website Monetisation by allowing Web Banners can increase the revenue generated. Providing a subscription based premium articles and removing advertisements similar to Harvard Business Review.

6.	Scalability of the Solution	The application is designed and constructed using a scalable architecture. Hence, the system will be able to meet any amount of expected traffic, working seamlessly across pages.

3.4 Problem Solution Fit

News Tracker Application — Project Design Phase – I Solution Fit Template — Team ID: PNT2022TMID21106

1. CUSTOMER SEGMENT(S) — CS
Who is your customer?

People who don't have time to read the newspaper

People who like to see more relevant stories

People who can't physically carry newspaper and hence read news in their device

People who want to know instant updates about their domains of interest

6. CUSTOMER — CC
What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.

Network connectivity – provide offline access

Lack of personalization

Inability to escape spam or clickbait content

Inability to group articles together while bookmarking during research

5. AVAILABLE SOLUTIONS — AS
Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking

User can follow favourite topics and people

User can block a genre from showing up in their feed

Availability of a separate general feed and customized feed

2. JOBS-TO-BE-DONE / PROBLEMS — J&P
Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides.

There is a lack of filter for non-trustworthy publishers in the existing solutions

It is hard to cross verify stories across multiple resources

It is hard to track a particular issue

It is hard to filter out spam

9. PROBLEM ROOT CAUSE — RC
What is the real reason that this problem exists? What is the back story behind the need to do this job? i.e. customers have to do it because of the change in regulations.

No customization options for users

No feedback system for users

No filters for spam or clickbait content

No offline access for users

No options to customize notifications

7. BEHAVIOUR — BE
What does your customer do to address the problem and get the job done? i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace)

User manually finds different sources of information to verify a story

User saves the stories privately in a medium of their own during research work

User manually searches stories to track an issue since its beginning

3. TRIGGERS — TR

Wanting to make productive use of breaks
Wanting to keep up with viral trends of the day
When instant update needed about weather, sports, market etc

10. YOUR SOLUTION — SL

Providing options to customize their feed based on their interests

Option to customize the look and feel of the feed

Option to bookmark stories using a folder system

Option to search through the stories

Option to customize what shows up and what doesn't in the notification

8. CHANNELS of BEHAVIOUR — CH
8.1 ONLINE

User gets to see live updates when they have data connectivity

The system also downloads stories for them to read if they go offline

8.2 OFFLINE

The user can browse through the content downloaded when they were online

They can rate the quality of downloads

4. EMOTIONS: BEFORE / AFTER — EM

Before: Frustrated over irrelevant content, slow updates
After: Satisfied

Problem-Solution fit canvas is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 licenseCreated by Daria Nepriakhina / Amaltama.com

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4. REQUIREMENT ANALYSIS

4.1 Functional Requirements:

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR – 1	User Registration	Registration through Form Registration through Gmail
FR – 2	User Confirmation	Confirmation via Email Confirmation via OTP
FR – 3	Find Content based on Topic and Region	Users should be able to find articles or content based on the region they are in or using a search bar for content based and region-based searches
FR – 4	User – friendly Ads	Advertisements are great revenue generators and they should be displayed as web banners.
FR – 5	Real time news updates	An auto refresh feature should be enabled for users to read latest content without a lapse in time
FR – 6	Allowing subscriptions and registrations	Adding subscription feature and registrations can be used to track user's loyalty and the type of content they're interested in

4.2 Non-functional Requirements:

| FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	- Simple and elegant User Interface - The feed and content should be aligned well and application should be responsive to all devices
NFR-2	**Security**	- Strong password requirements should be set - Two-step verification for every login - No sensitive data should be stored
NFR-3	**Reliability**	The content of the feed should be verified by reporters
NFR-4	**Performance**	- Seamless and smooth transition of pages - Low lapse of time in case of lower end devices
NFR-5	**Availability**	- Web application delivered over the internet - Low downtime for production changes and maintenance
NFR-6	**Scalability**	Scalable and simple application that is made available to customers and users

5. PROJECT DESIGN

5.1 Data Flow Diagrams

Data Flow Diagrams:

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.

Example: Flow Diagram

Flow
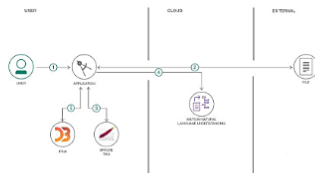
1. User configures credentials for the Watson Natural Language Understanding service and starts the app.
2. User selects data file to process and load.
3. Apache Tika extracts text from the data file.
4. Extracted text is passed to Watson NLU for enrichment.
5. Enriched data is visualized in the UI using the D3.js library.

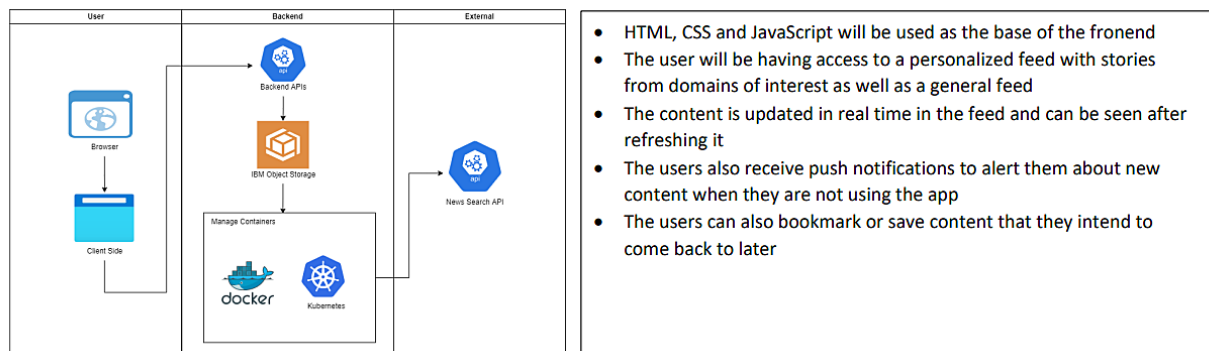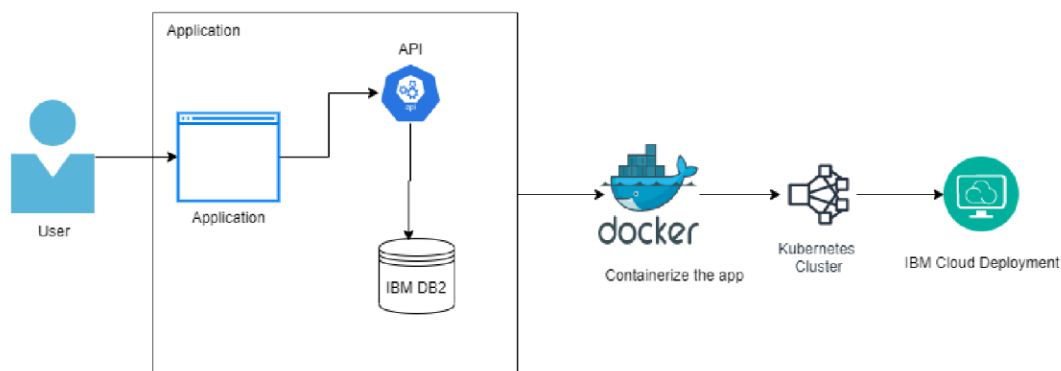Example: DFD Level 0 (Industry Standard)
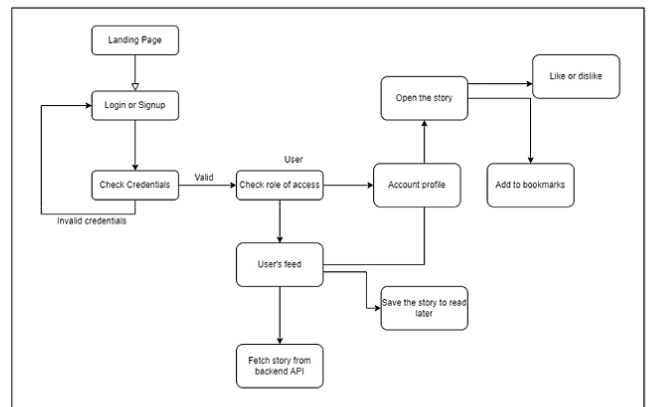
5.2 Solution & Technical Architecture

Solution Architecture: Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to: • Find the best tech solution to solve existing business problems.

- Describe the structure, characteristics, behaviour, and other aspects of the software to project stakeholders.
- Define features, development phases, and solution requirements to the project.
- Provide specifications according to which the solution is defined, managed, and delivered to the customers.

- HTML, CSS and JavaScript will be used as the base of the fronend
- The user will be having access to a personalized feed with stories from domains of interest as well as a general feed
- The content is updated in real time in the feed and can be seen after refreshing it
- The users also receive push notifications to alert them about new content when they are not using the app
- The users can also bookmark or save content that they intend to come back to later

Components and Technologies

S.No	Component	Description	Technology

1.	User Interface	The user should be able to access the application through a web browser in a range of devices like desktops, mobile phones, tablets etc	HTML, CSS, React Js.
2.	Application Logic	Logic for the backend processes in the application	Flask (Python)
3.	Database	Data Type, Configurations etc.	MySQL
4.	Cloud Database	Database Service on Cloud	IBM DB2
5.	File Storage	File storage requirements	IBM Block Storage
6.	External API	To fetch news articles that are updated in real time	News Search API
7.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Cloud Server Configuration :	Docker, Kubernetes.

Application Characteristics

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Flask	Python
2.	Security Implementations	IAM controls provided by the IBM cloud	Encryptions, IAM Controls
3.	Scalable Architecture	3 tier architecture	IBM container registry, IBM DB2 cloud
4.	Availability	Distributed cloud, and automatic load balancing with containerization	Docker, Kubernetes
5.	Performance	High performance as a result of load balancing and containerization	Container registry, Kubernetes

5.3 User Stories

User Type	Functional Requireme nt (Epic)	User Story Numb	User Story / Task	Acceptance criteria	Priori ty	Release

		er				
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	Medium	Sprint-1
		USN-3	As a user, I can register for the application through Google	I can register & access the dashboard with Google Login	Low	Sprint-2
	Login	USN-4	As a user, I can log into the application by entering email & password	I'm redirected to dashboard if entered credentials are valid	High	Sprint-1
	Dashboard	USN-5	The updated feed with latest stories fetched from the API are displayed	I'm able to view latest stories in my feed	High	Sprint-1
Customer (Web user)	Search Bar	USN-6	Users searches for stories or topic in the search bar	I'm able to view relevant stories in my feed	Medium	Sprint-2
		USN-7	Users can apply filters to their searches such as date, publisher etc	I'm able to apply filters to my search results for more accurate results	Low	Sprint-1
Customer Care Executive	Chatbot	USN-8	A functional chatbot can respond to user queries in real time	I'm able to clear my queries with	Medium	Sprint-3

				the help of the chatbot		
Administra tor	Server	USN-9	Administrator verifies and validates the news available in the database	Fakes and invalid news will be rejected and removed from the database	High	Sprint-4
		USN-10	Administrator provides news articles with video and audio content	I am able to view the articles with video and audio content	High	Sprint-3

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Sprint	Functional Requireme nt (Epic)	User Story Numb er	User Story / Task	Story Points	Priority	Team Membe rs

| Sprint | | USN | | | | | |
|--------|--------------|--------|---|---|--------|-------------------|
| Sprint-1 | Registration | USN-1 | As a user, I can register for the application by entering my email, password, and confirming my password. | 3 | High | Monica |
| Sprint-1 | | USN-2 | As a user, I will receive confirmation email once I have registered for the application | 2 | Medium | Ram Haridhra |
| Sprint-2 | | USN-3 | As a user, I can register for the application through Google | 1 | Low | Samyuktha |
| Sprint-1 | Login | USN-4 | As a user, I can log into the application by entering email & password | 3 | High | Sanjana |
| Sprint-1 | Dashboard | USN-5 | The updated feed with latest stories fetched from the API are displayed | 3 | High | Sanjana |
| Sprint-2 | Search Bar | USN-6 | Users searches for stories or topic in the search bar | 2 | Medium | Ram Haridhra |
| Sprint-1 | | USN-7 | Users can apply filters to their searches such as date, publisher etc | 1 | Low | Samyuktha |
| Sprint-3 | Chatbot | USN-8 | A functional chatbot can respond to user queries in real time | 2 | Medium | Monica |
| Sprint-4 | Server | USN-9 | Administrator verifies and validates the news available in the database | 3 | High | Samyuktha |
| Sprint-3 | | USN-10 | Administrator provides news articles with video and audio content | 3 | High | Ram Haridhra |

6.2 Sprint Delivery Schedule

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	12	29 October 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	3	5 November 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	2	12 November 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	3	19 November 2022

6.3 Reports from JIRA
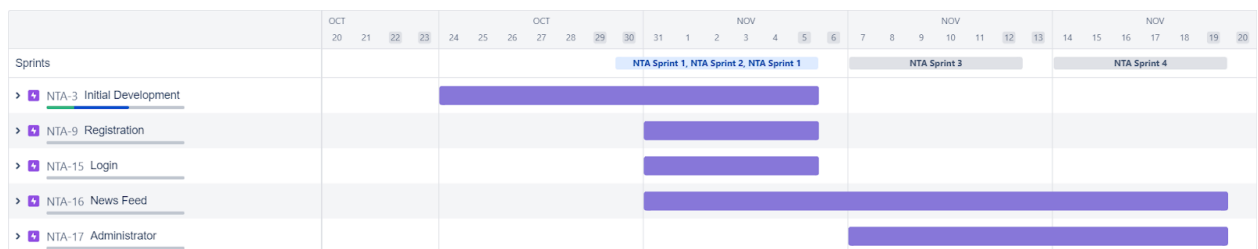
7. CODING & SOLUTIONING

7.1 Feature 1 - Personalisation
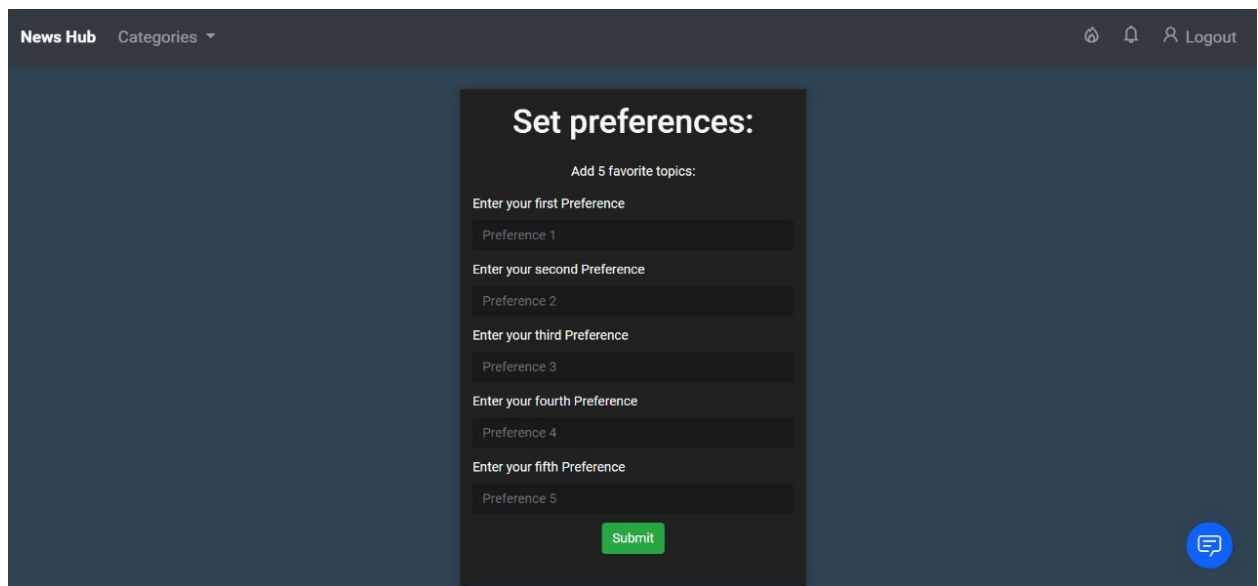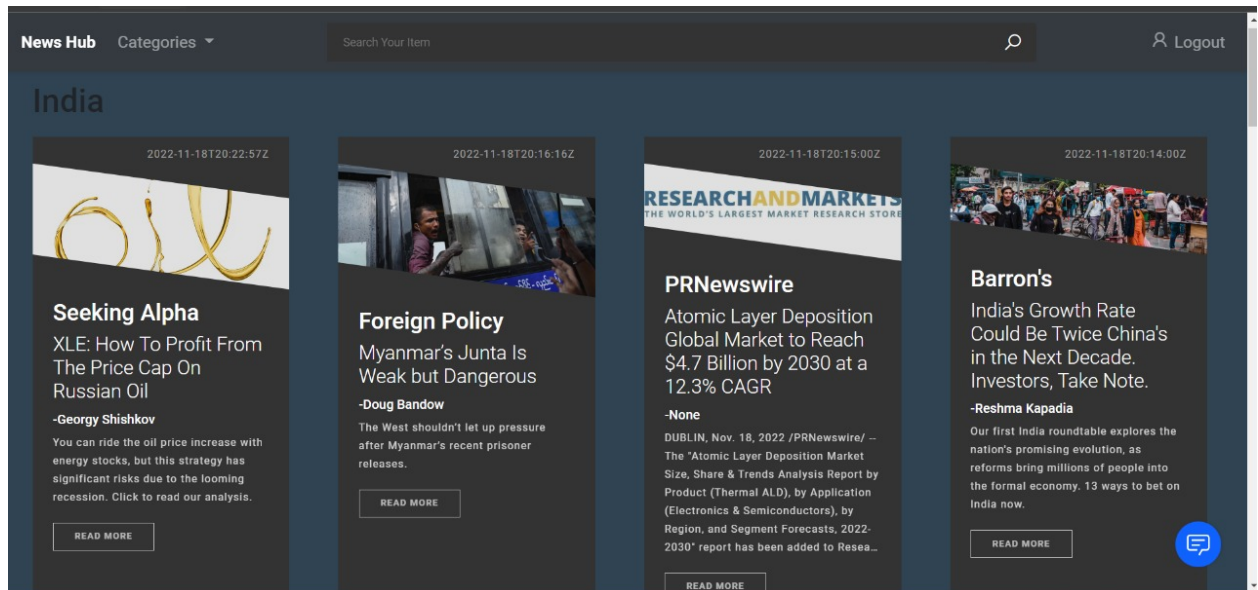
The "set-preferences" allows registered and logged in users (who haven't already set their preferences) to set them up.

This allows the user to read articles based on their preference. The users is made to choose 5 topics of their choice from which the latest articles will be displayed after they login. This gives the user a sense of personalisation and encourages them to visit the application more often.

7.2 Feature 2 - Search
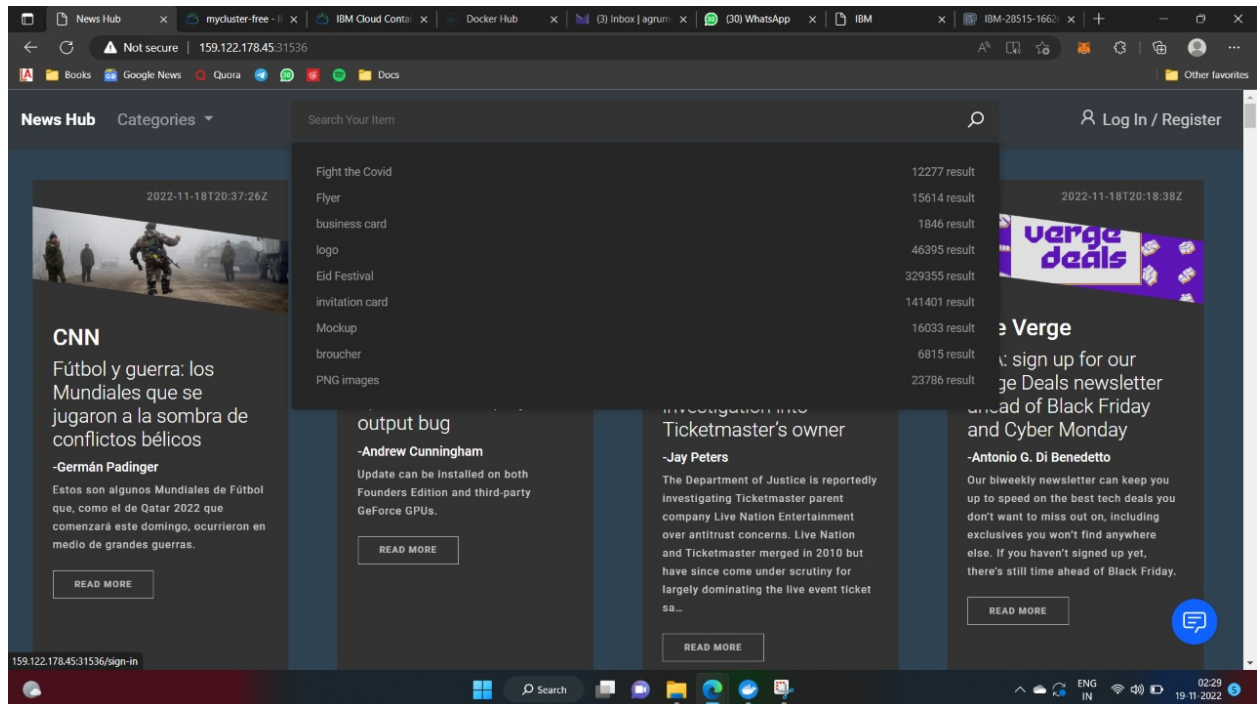
The search bar allows users to search topics, sources and authors of their choice. The newsApi will fetch the articles based on the query and display them as tiles.

3.Database Schema

PREFERENCES

No statistics available.

Name	Data type	Nullable	Length	Scale	
EMAIL	LONG VARCHAR	N	32700	0	👁
PREFERENCE_1	LONG VARCHAR	Y	32700	0	👁
PREFERENCE_2	LONG VARCHAR	Y	32700	0	👁
PREFERENCE_3	LONG VARCHAR	Y	32700	0	👁
PREFERENCE_4	LONG VARCHAR	Y	32700	0	👁
PREFERENCE_5	LONG VARCHAR	Y	32700	0	👁

USERS

No statistics available.

Name	Data type	Nullable	Length	Scale	
EMAIL	LONG VARCHAR	N	32700	0	👁
USERNAME	LONG VARCHAR	N	32700	0	👁
USERPASSWORD	LONG VARCHAR	N	32700	0	👁

The Users table is used for storing and retrieving user data when they register and login respectively. Users on registering their emails and usernames will be able to track their data throughout the application

The Preferences table is used for setting the user's topics of choice for the landing page. Every user is asked to set 5 topics on their first login and these preferences are set for the user throughout till the user's data is removed.

8. TESTING

8.1 Test Cases

The Test cases for the News Tracker application are as follows
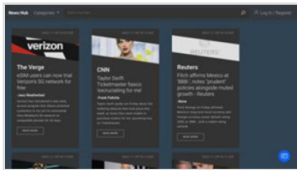
- Verify If user can Sign up to the account

- Verify If already signed up user cannot log into the account

- Verify if user is able to see Login/Register when clicked on it

- Verify if user is able to filter articles based on categories

- Verify if user is able to see detailed information when clicked on read more

8.2 User Acceptance Testing

Test_Case ID	Feature Type	Component	Test Scenario	Steps to Execute	Test Data	Expected Result	Actual Result	Status
SignUpPage_TC1	Functional	Home Page	Verify If user can Sign up to the account	1. Enter URL 2. In Navigation bar, click on Login/Register 3. Enter Credentials like Email, Username	Mail: testing123@gmail.com Username: Ram_Haridhra Password: password	Logged in messge should be displayed	Working as Expected	Pass
SignUpPage_TC2	Functional	Home Page	Verify If already signed up user cannot log into the account	1. Enter URL 2. In Navigation bar, click on Login/Register 3. Enter Credentials like Email, Username	Mail: testing123@gmail.com Username: Ram_Haridhra Password: password	User already exists, please log in	Working as Expected	Pass
SignInPage_TC3	UI	Home Page	Verify if user is able to see Login/Register when clicked on it	1. Enter URL 2. In Navigation bar, click on Login/Register 3. Verify SignIn/SignUp Displayed	http://127.0.0.1:5000/	SignIn/SignUp Page should be displayed	Working as Expected	Pass
SignUpPage_TC4	UI	Home Page	Verify if user is able to see Login/Register when clicked on it	1. Enter URL 2. In Navigation bar, click on Login/Register 3. Verify SignIn/SignUp Displayed	http://127.0.0.1:5000/	SignIn/SignUp Page should be displayed	Working as Expected	Pass
CategoriesPage_TC5	Functional	Categories	Verify if user is able to filter articles based on categories	1. Enter URL 2. In Navigation bar, click on Categories 3. Verify if filter is applied	http://127.0.0.1:5000/	Articles based on categories should be displayed	Working as Expected	Pass
ArticlesPage_TC6	Functional	Articles Page	Verify if user is able to see detailed information when clicked on read more	1. Enter URL 2. Go to Articles Page, click on Read more 3. Verify if detailed information is shown	http://127.0.0.1:5000/	Detailed Article should be displayed when clicked on read more	Working as Expected	Pass

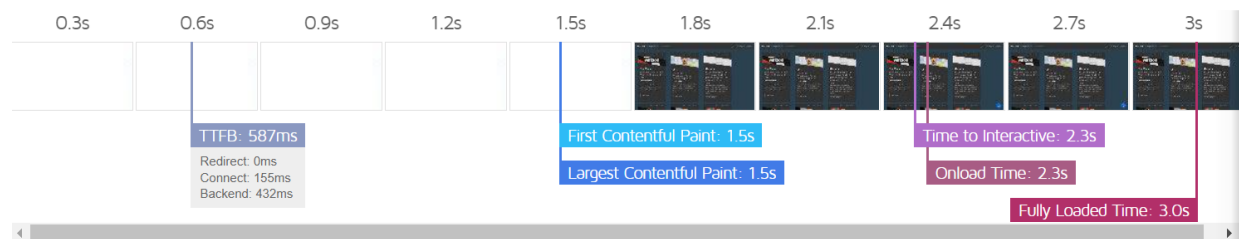# 9. RESULTS

9.1 Performance Metrics

Performance Metrics

The following metrics are generated using Lighthouse Performance data.

Metric details `OFF`

First Contentful Paint ?	Longer than recommended
	1.5s

Time to Interactive ?	Good - Nothing to do here
	2.3s

Speed Index ?	OK, but consider improvement
	1.6s

Total Blocking Time ?	Good - Nothing to do here
	92ms

Largest Contentful Paint ?	OK, but consider improvement
	1.5s

Cumulative Layout Shift ?	Good - Nothing to do here
	0

Speed Visualization ?

0.3s	0.6s	0.9s	1.2s	1.5s	1.8s	2.1s	2.4s	2.7s	3s

TTFB: 587ms

Redirect: 0ms
Connect: 155ms
Backend: 432ms

First Contentful Paint: 1.5s

Largest Contentful Paint: 1.5s

Time to Interactive: 2.3s

Onload Time: 2.3s

Fully Loaded Time: 3.0s

10. ADVANTAGES & DISADVANTAGES

Advantages

- The user's are able to keep track of their favourite sources, categories or authors with a few clicks

- The search bar allows the user to query results based on a large number of options and combinations

- Chatbot integration for assistance in account creation and preference setting

- Multiple categories and endless articles fetched using newsapi

Disadvantages

- Since the news articles are fetch from an external API, the validity of the data cannot be guaranteed

- Users have to give accurate keywords to search for results

11. CONCLUSION

With the help of the internet and external application programming interfaces, it is possible to keep the users informed of the current affairs. With a vast database of articles and references, users are even encouraged to read more.

As news is increasingly accessed on smartphones and tablets, the need for personalising news app interactions is apparent. Users' demands and requirements for personalisation increases day by day. The application's personalisation feature will attract users to spend more time browsing through articles.

And finally, the search bar, will help readers located certain articles based on multiple filters like date, source, language and author to give the users a better user experience.

12. FUTURE SCOPE

- Provide filter options for user's to track articles

- Modification and deletion of preferences

- Location based rendering of articles

- Allowing users to report falsified and misleading information

13. APPENDIX

GitHub Link: https://github.com/IBM-EPBL/IBM-Project-28515-1660113129