

An Analysis of Online News Distribution Solutions

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Abstract—The proliferation of information due to the Internet has allowed for a wide swath of news organizations to publish stories rapidly. Consumers of news are left with many news sources to choose from that provide articles that they may not be interested in. News distribution in the age of online media is still fairly similar to that of a newspaper or magazine. Each publication only provides stories which they themselves create. This does not offer much in terms of variety for the user. Younger news readers are also more likely to only want to visit one or two sites when looking for news which limits the amount of content they are exposed to. In order to combat this, news aggregation should be used to provide readers with the most popular and most interesting news articles from a variety of sources. Three different approaches to aggregate news distributing are explored within this paper.

I. INTRODUCTION

There are about 1,387 daily newspapers in the US as of the year 2009 [4]. Along with those there are about 62 large news channels such as CNN, MSNBC and FOX as well as some smaller online only news outlets, which are responsible for providing the news in the form of video. Hence an average American is inundated with variety of news resources. According to pew research about 51 percent of Americans read a physical daily newspaper. This number is constantly declining as many consumers switch to the digital news sources.[5]

Although digital news is becoming the new norm, the presentation and distribution of news has remained roughly the same. News is segmented by individual sites much like how certain kinds of news content could only be found in a particular newspaper or magazine. This segmentation of the news market makes it harder for consumers to view all of the news they want in a limited amount of time. The average news viewership time for online media is already pretty low. [1] In order to capitalize on this short time frame, news should be aggregated in order to present as many stories to a user in the shortest amount of time.

Many apps and websites already allow for users to view aggregated news, but there is not much information as to which styles of aggregate news distribution users prefer. In order to determine which distribution scheme most matches the needs of the new millennial news market, three distinct distribution platforms were investigated. Using inspiration from literature and popular applications, three solutions were created which were a Website, and Email Newsletter as well as a Twitter page.

II. LITERATURE REVIEW

A. Online News Readership Data

Pew Research has investigated the behavior of users that consume online news. Some information included in the report discusses top online news sources as well as viewership statistics.

One interesting tracked statistic happens to be how much time users spend on average during browsing sessions for top online news sources. According to the report, between 30 percent and 40 percent of users only spend five minutes or less at a particular news website. The user base that spends six to ten minutes on a news website is half that of the aforementioned group. This group contains about 10 to 15 percent of the overall userbase [1].

With this information, it is apparent that users generally only view the most popular news article upon each browsing session. Users generally have short attention spans or are too busy to view a lot of news from one website in one sitting. News aggregation would help this as it allows the top stories from many sites to be stored and easily viewed in one place.

B. The Millennial News Market

Research has been conducted in the news viewership trends of adults aged from 18 to 34. Contrary to popular belief, this group, Millennials, do consume news. The overall viewership trends are vastly different than that of the more traditional news model, however.

The Media Insight Project has found that 69 percent of Millennials consume news at least once a day. 82 percent of Millennials get most of their news from multiple online sources [3]. These statistics of young news readers somewhat matches the results from the initial questionnaire that we distributed.

The Media Insight Project also discusses how Facebook and Twitter are often gateways to learning about news. 88 Percent of Millennials claim that they get news from Facebook. 33 Percent claim to receive news from Twitter [3]. Social media is not usually thought of as a news distribution platform, but perhaps this aspect of social media should be explored in more detail.

C. Popular News Aggregate Apps

1) *Inshorts*: Inshorts is a news application that selects the news from multiple national and international news sources and presents it in a concise 60 words or less format. The application also allows for user to select certain categories

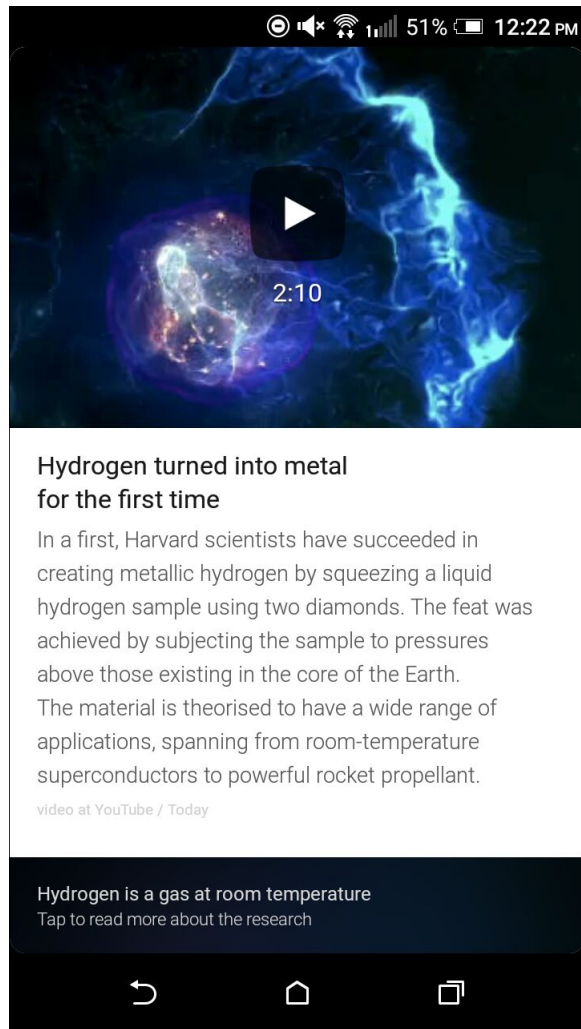


Fig. 1. User Interface for Inshorts



Fig. 2. User Interface of NPR One

of news such as Sports, Business and International Relations as well as other topics. The interface shows the summarized article along with the link to the original detailed article. The application also has a feature of suggesting trending news topics to the user. The user can also manually set the list of news categories according to his or her preference.

2) *NPR One*: This is an application provided by the National Public Radio where users can access to news, podcasts and stories in the form of audio. Users can also get regular news updates from their local radio news station. This type of news delivery system is specifically targeted for users who are constantly on the move and do not necessarily have the time to read the news.

3) *Flipboard*: Flipboard is a news magazine application that provides summarized news in a form that mirrors a physical flipbook. The application aggregates news from popular publications like The New York Times and PEOPLE Magazine. The application also allows users to connect to LinkedIn, Instagram, Twitter and Facebook in order to share interesting stories with others.

III. SOLUTIONS

In order to explore the feasibility of news aggregation, we created a few solutions that will allow for users to easily receive news. The back end for each of the solutions is a Python web framework called Flask. This web framework is paired with a MySQL database allows for user preferences and email address to be stored. Having Python as the main server side language allows us to use many convenient APIs. This was especially helpful when determining how to construct the email and social media based solutions. The same API (<https://newsapi.org/>) was used for the backbone for all solutions.

In order to host the website we used the service pythonanywhere. The website can be found at the link wolfpack-post.pythonanywhere.com. The Wolfpack Post Twitter page can be found at twitter.com/WolfpackPost.

A. Project Features

1) *Website*: The first explored solution was a website where users could A website will be implemented in order to provide

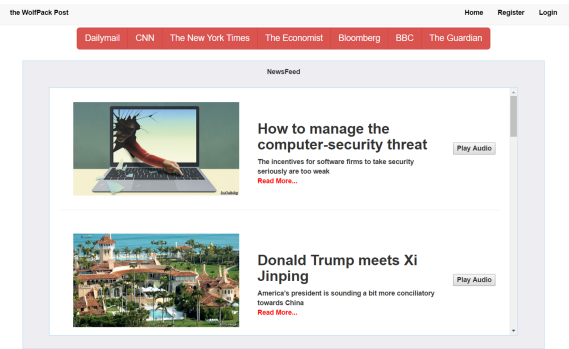


Fig. 3. Screenshot from Website

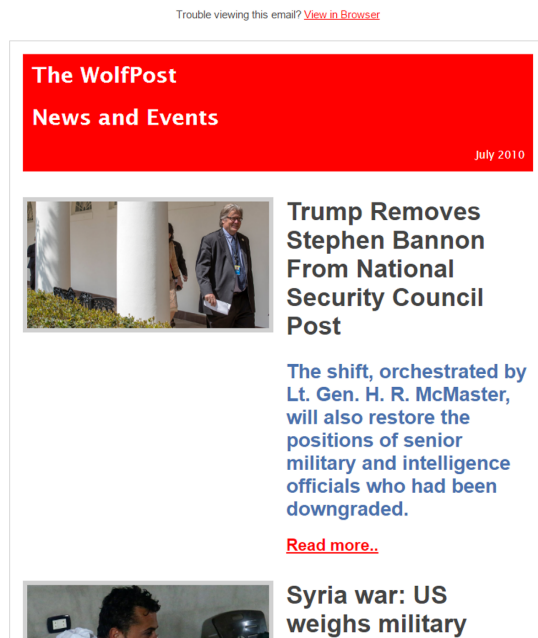


Fig. 4. Screenshot from Email

users with the most popular news articles from major news sources. Only the most popular articles from each represented website are shown within the newsfeed. This allows the users to only view the most important news that they need to know. If users are interested in a title or article description, the user can then click on the read more hyperlink to view the full article that the information is pulled from. Using this site, users can also sign up for the Email service mentioned below.

2) *Email*: Through our website, users may opt into receiving Email messages containing news headlines as well as short summaries of the original articles. Users will receive an update of the top news from the previous day. If the user sees a particular headline that piques their interest and want to read more, they can click the provided link to view the entire article.

3) *Twitter Page*: Based on the information presented in the literature review, we decided to investigate the usability of social media for news distribution. Twitter has the ability to use REST API in order to publish content automatically.



Fig. 5. Screenshot of a Twitter post

Facebook has the same ability, but publishing content to a Facebook page takes a lot more effort and initially needs human input from the admin from the page. This makes Twitter the only real choice for automatic news publishing.

This solution targets users who frequently use social media. We have created the WolfPack Post Twitter page via which user can receive the latest news updates to their newsfeed. The Twitter page is updated approximately every thirty minutes assuming popular stories are available. A server side script controls the automatic posting of news updates to the Twitter page. One downside to this option is that it will not allow users to have freedom of choosing their news topics.

Problems also arose from posting to Twitter using automatic posting. Requests to post were blocked after a while as Twitter thought the account was compromised by a bot. Twitter prompted us to change the password for the account. We have not run into this problem since then.

IV. EVALUATION OF SOLUTIONS

To evaluate three different solutions, we conducted randomized trials on a group of 23 individuals aged from 22 -28 years of age. Participants in the study group were all college educated and culturally diverse. The participants within the study group were presented with the three different solutions i.e Website, Email Newsletter and Twitter page and were allowed to interact with the implementations. During this session, questions were asked to the participants in the study group to evaluate our three different implementations.

A. Website

1. How usable do you find this website?

The usability is evaluated on the scale of 0-5 with 0 being least useful and 5 being very useful. About 91 percent of our user gave ratings of 4 or more.

2. Do you find the formatting of the news acceptable?

Users were asked to evaluate the presentation of news in the UI. The majority of the users were satisfied with the news formatting but few users found the formatting of the website to be lacking.

3. What could be improved in terms of the layout or navigation of the website?

How usable to you find this website? (23 responses)

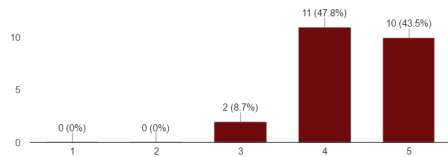


Fig. 6. Website usability question result

Do you find the formatting of the news acceptable? (we know it looks kinda bad, but is the general flow of info ok?) (23 responses)

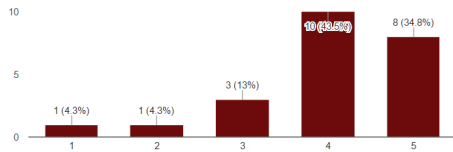


Fig. 7. Website formatting question result

Would you use the Wolfpack Post website to get lots of info on current events? (23 responses)

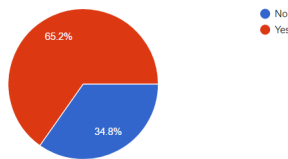


Fig. 8. Results about users who plan on using the website

How frequently should we send out emails? (24 responses)

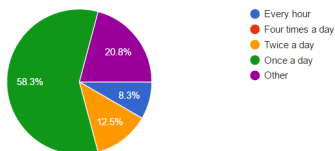


Fig. 9. Results regarding the frequency of email

Do you find the formatting of the email acceptable? (again, we aren't pro web designers so keep that in mind!) (24 responses)

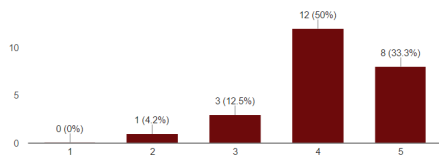


Fig. 10. Email formatting question result

We asked user for their suggestion about how the UI can be improved and got some very positive feedback from the user. A user suggested the UI to be mobile friendly while other users wanted a better newsfeed in terms of the number of articles displayed etc. Some users wanted personalized features such as selecting/de-selecting news source and news categories.

4. Would you use the Wolfpack Post website to get lots of info on current events?

65 percent of users said they would like to use WolfPack Post as a source of information for the current events. Some users already claim that they use other platforms such as News Republic and other news sources to get the latest current affairs.

5. Why or why not? (referring to above question)

Some users liked the idea of viewing news from different sources in one single webpage. Few users liked having a summarized newsfeed to get the daily updates rather than spend much time on reading the long article.

6. Any other comments/suggestions?

We asked users for their suggestion on which different features they would like to have onto the website. Most of the user want a personalized newsfeed where they can select their own newspaper sources in addition to the selection of different news categories.

B. Email

1. Do you find the formatting of the email acceptable?

About 80 percent of the users were satisfied with the formatting of email template.

2. What could be improved in terms of the layout of the email?

A high number of users were content with the formatting of the news. Some users complained about the email template being poorly designed and expected a better color theme for the email template. Much like the website, a few users pointed out empty spaces in the design.

3. Would you (or do you already) subscribe to news through email? Why or why not?

Few users stated their inbox are already filled with lot of irrelevant mails and would not want email as the primary source of getting information. Some users prefer email because they check their inbox every day and thus would allow them to view the summarized news easily.

4. How frequently should we send out emails?

Most users liked the idea of receiving a news summary once a day. The second most popular option was a custom setting that would allow users to set up how frequently they were to receive email updates.

5. Any other comments/suggestions?

Some users wanted the functionality of selecting the frequency of receiving emails. Some users reiterated that they wanted a better color theme for the email template.

C. Twitter

1. Would you (or do you already) follow a news channel such as Wolfpack Post on Twitter? Why or why not?

How often do you think the Twitter page should post about new stories?
(24 responses)

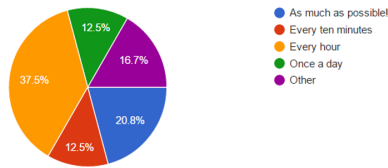


Fig. 11. User Survey Question about Twitter Timing

Rank the news distribution solutions based on how useful they would be to you day-to-day:

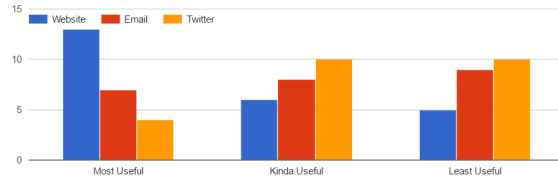


Fig. 12. Overall Usefulness of each Solution

9 out of the 24 respondents said that they would use the service to receive news. Most of the other respondents claim that they do not use Twitter.

2. Do you find the presentation of the article descriptions to your liking?

A high percentage of respondents find the Twitter descriptions adequate. Much work went into combating Twitters character limit when displaying long article summaries.

3. How could the presentation of the article descriptions improve?

A few users responded and wanted better splitting of the large news articles. Some respondents wanted videos or pictures as a part of tweet.

4. Should other social media channels be investigated for news distribution (ex Facebook, Instagram)?

Users suggested to use Facebook and Reddit as another possible platform for news distribution. Most users seem to be more comfortable with Facebook than Twitter.

5. How often do you think the Twitter page should post about new stories?

The majority of users think that the Twitter page should be updated every hour. The second most popular option is that the page should be updated as frequently as possible.

6. Any other comments/suggestions?

The users who actively used social media and Twitter enjoyed this approach. Otherwise, users seemed pretty mixed about its application to their everyday life.

D. Overall

1. Rank the news distribution solutions based on how useful they would be to you day-to-day:

The Website was by far the most useful solution to the majority of users.

Do you feel that the news descriptions accurately describe the article they refer to?
(24 responses)

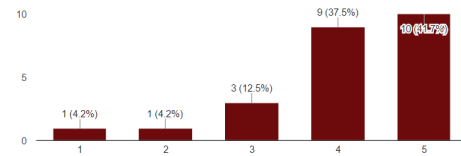


Fig. 13. News Description Accuracy

2. Please describe your thought process for the above question:

Most users felt like the website was the most accessible in day to day situations. Many users said that they already receive too many emails or do not use Twitter.

3. Do you feel that the news descriptions accurately describe the article they refer to?

79.1 percent of users felt that the descriptions presented within each of the solutions were acceptable.

4. What could be done in order to improve the article descriptions?

One user suggested the use of natural language processing for better article descriptions and having articles displayed in multiple languages. Most of them felt the article descriptions were generally appropriate.

5. Any other news distribution systems we should look at?

Reddit, Inshorts, News Republic and Flipbook all came up as suggestions for apps we may examine to view the positives from their varied approaches.

6. Any other comments/suggestions?

Little feedback was presented with this question. Only seven users chose to respond.

E. Google Analytics

We integrated Google analytics on the Wolfpack Post website to analyze user behaviour on our website. We have had a total of 24 unique users on our website with average sessions lasting about 9 minutes. We have had users from United States, Brazil, Spain and India with total pageviews of about 150. Although this data is quite preliminary and does not give us much insight about user behaviour on our website. Once we generate enough traffic on our website we could analyze the data to get more insight on user behaviour and use it to attract more users.

V. ANALYSIS OF USER EVALUATIONS

Overall, users seemed pleased with the concept of news aggregation. Most found the idea of having all the news you want in one convenient place to be beneficial. The overall delivery platforms were more mixed in terms of the individuals perceived level of day to day usability.

The email solution had certain problems with respect to the audience that we used for the survey. Collage students may

have a negative view of daily newsletters as they are usually inundated with spam mail daily. Since the survey was only distributed to college students this may explain the overall mixed to the email solution when compared to Twitter and the website.

The social media solution also had problems with some of our audience. Many people did not understand how to user Twitter thus making the the presentation of the news difficult to understand. Even though research suggests that social media may be the next big space for news distribution, perhaps Twitter is not the right platform for this at the moment. Based on the feedback users seemed more familiar with navigating and reading text from Facebook. This option should be explored more thoroughly in the future.

The website seemed to be the most approachable solution for the majority of users. Users felt that they overall had an easy time navigating the website and understanding how they were to view information. In terms of cosmetics, users did complain about the layout of the website template. Although users did have some complaints about the layout, overall it did not appear to negatively impact their viewing experience that much.

Analyzing feedback from participants in the study allowed us to explore different design principles in the human computer interaction domain and how these principles can be used, to design a better UI. Many participants in the study suggested a better color theme which helps in better readability of the text presented. One user complained that 'read more' hyperlink which redirects user to original source should be made bigger and thus making it easier to click. Some users desired mobile support for the website which essentially says system needs to be cross-platformed.

VI. BEST SOLUTION

The Website provided the flexibility where users can login and read news when they want. The problem with newsletter was that, after some time the news letter updates can be irritating. We think that the newsletter would be a better option for people who enjoy receiving emails.

The problem faced by the Twitter solution was that many people do not use Twitter, which was evident from the user evaluations. Also, the character limit in Tweets, created a formatting issue which reduced the readability of the text. Active followers of Twitter do find this solution useful since it aggregates news from various websites and provides news in a platform they are already browsing.

From the analysis, it was clear that the the Web Application is the most marketable solution of the three approaches. The website allows users to view news at any moment they want, which is also true for the Twitter solution as well. However, the website seemed more approachable to most users. The website provides users with a simple, easy-to-use and interface. The website is also the most platform independent solution in that it does not demand another app or any kind of login to use. The website can be viewed on any device with a browser.

VII. CONCLUSION

In order to determine the best solution for news aggregation three different implementations were created. Two more traditional solutions included the creation of a website and automatic distribution of news via an email newsletter. The final, more millennial oriented solution was to distribute news via a Twitter page.

In order to judge the effectiveness of each of the techniques, focus groups were held. Since our target audience is younger news viewers, only millennial were used for the evaluation. Through our analysis of the user responses, we have determined that the majority users most enjoy interacting with the website over the other two solutions. The website provided the most user friendly approach to viewing news with the convenience of being able to check for news updates on your own time.

VIII. FUTURE WORK

With the website being the favorite approach for the audience, more thought could be put into presenting the user with a better, more clear interface. Respondents of the survey were particularly critical about the layout and the spacing of the information within the newsfeed. More testing and surveys could be implemented in order to determine what kind of layout users feel best presents the information.

Users should also be able to select preferences for what news they want to view. This would be able to be changed within a user dashboard. User would be able to choose to add either news sources to their profile or select topic that they find interesting.

In addition to user defined preferences, data analytics could also be used to present each individual user with content that they would find interesting. For example, someone who actively clicks on news links related to foreign affairs would in turn be served more articles dealing with that topic.

In order to cater to populations all over the globe, we could also add support for multiple languages and thus allowing the system more usable to a more diverse readership.

REFERENCES

- [1] K. Olmstead, A. Mitchell, T. Rosenstiel *Navigating news online: Where people go, how they get there and what lures them away* Washington, DC: Pew Resarch Center's Project for Excellence in Journalism
- [2] Y. Chen, N. J. Conroy and V. L. Rubin *Misleading online content: Recognizing clickbait as false news* ACM MDD, 2015
- [3] *How Millennials Get News: Inside the habits of Americas first digital generation* American Press Institute, Associated Press-NORC Center for Public Affairs Research
- [4] Statista. *Number of daily newspapers in the United States from 1985 to 2014*. Published Online. Johannes-Brahms-Platz 1, 20355 Hamburg, Germany, 2014
- [5] Pew Research Center. *Number of Americans Who Read Print Newspapers Continues Decline*. Published Online. 1615 L Street, NW, Suite 800 Washington, DC 20036, 2012.
- [6] Richard H Hall and Patrick Hanna. *The impact of web page text-background colour combinations on readability, retention, aesthetics and behavioural intention*. Behaviour and Information Technology, Published Online, 2004.

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