

## 1. INTRODUCTION

### 1.1 Overview

The web is home to massive amounts of data, with more being created every day. Organizations can harness this constant stream of information to gain understanding, plan strategies, and find opportunities. Enriched news data can help your application make dynamic connections across current events faster. In this project, we worked with the basics and build our own news mining web application using Node-RED / Python Web App and the IBM Watson Discovery Service. The user interacts with the created app UI to request relevant news content.

### 1.2 Purpose

The main purpose of the application is to provide a simple platform for the news readers to simply search the type for the news they want to read. There is a lot of content available on internet about any topic. A large amount of time is wasted in searching most of the relevant news in a large database. Using our news search application, it will check all the news in the database matching the news which the user has searched for. Our news search application will provide top relevant news along with their sentiment. Total sentiment count is also provided so that one can decide about the sentiment of the news.

## 2. LITERATURE SURVEY

### 2.1.1 Existing problem

The issue in today's time is that the internet is filled with all kinds of news, be it a genuine news, fake news or an irrelevant news related to user's search. The user has to search his/her specific type of news from different categories of news and then produce a search. This is a long and tiring process which involves a lot of user's time. In this long process the user has to make many clicks, follow many links and open many web pages, all at the same time.

### 2.1.2 Survey

**1. NOVA: A Knowledge Base for the Node-RED IoT Ecosystem-** Arne Bröring<sup>1</sup>, Victor Charpenay<sup>2</sup>, Darko Anicic<sup>1</sup>, and Sebastien Püech<sup>1</sup>

They presented the NOVA approach, and showcased e.g. the automated license clearing that can be extended similarly to [1], by checking composite license characteristics for compatibility with the planned usage of a node. Second, they addressed the issue of missing links from flows to contained nodes. In fact, the name of listed nodes can be ambiguous. Using SPARQL, they showed a two-fold querying process that addresses this issue and solves ambiguity for many nodes [2]. The possibilities for future use and research on the created knowledge base are broad. Automated quality checks or indexes can be developed based on

different input parameters from the NOVA model [3]. This indicates to the users if a component can be utilized or not. Discovery could be improved too. This can be achieved by semantically annotating nodes and flows with categories, or transforming their keywords into links to well-defined terms [4]. This way, links to a more general knowledge base, such as wikidata [5], could be built up.

## **2. IBM Watson: How Cognitive Computing Can Be Applied to Big Data Challenges in Life Sciences Research-** Ying Chen, Elenee Argentinis and Griff Weber

Cognitive computing solutions patterned [6] after several key aspects of human thought are emerging in many industries [7]. Their ability to ingest varieties of data and to understand [8], evaluate, and learn from the data has the potential to unlock novel insights. These solutions may enhance areas such as Life Sciences [9], which are in dire need of accelerated innovation [10]. Early pilot projects suggest that cognitive computing infuses novelty and adds speed to the research process. Further study is needed to validate its utility in different therapeutic areas and research domains [11]. Cognitive computing may also add value in the identification and coding of adverse event reports from the text of case reports and published articles [12]. Current pilot projects are beginning to yield insight into whether Watson has the potential to improve both the accuracy and speed of adverse-event detection [13] and coding. As with discovery, multiple test cases across event types, drug types, and diseases will be needed to evaluate and improve Watson's abilities in drug safety [14]. In both cases, IBM will learn from each engagement and improve Watson's ability to both, extracting known relationships and hypothesizing novel relationships [15] through predictive text analytics.

## **3. Getting Users' Attention in Web Apps in Likable, Minimally Annoying Ways-** Dan Tasse, Anupriya Ankolekar, Joshua Hailpern

A series of recommendations for application designers, based on data from a 1505-person study where participants played a game while a user interface element tried to get their attention was presented [16]. Based on their survey answers, reaction times, and recall, UI elements were identified with glowing shadows [17] as the most likeable and effective way to get user attention. Icons with badges were shown as a good alternative for less-critical information. It was also found that users prefer dynamic visual elements [18] that blend in with the surrounding content instead of pop-ups. Using these recommendations, designers can create user interfaces that are likely to be more useful, usable and appealing [19] to users. Data-driven studies to improve user interfaces were considered as a promising avenue for research [20] and encourage future work in this area.

### 2.1.3 References

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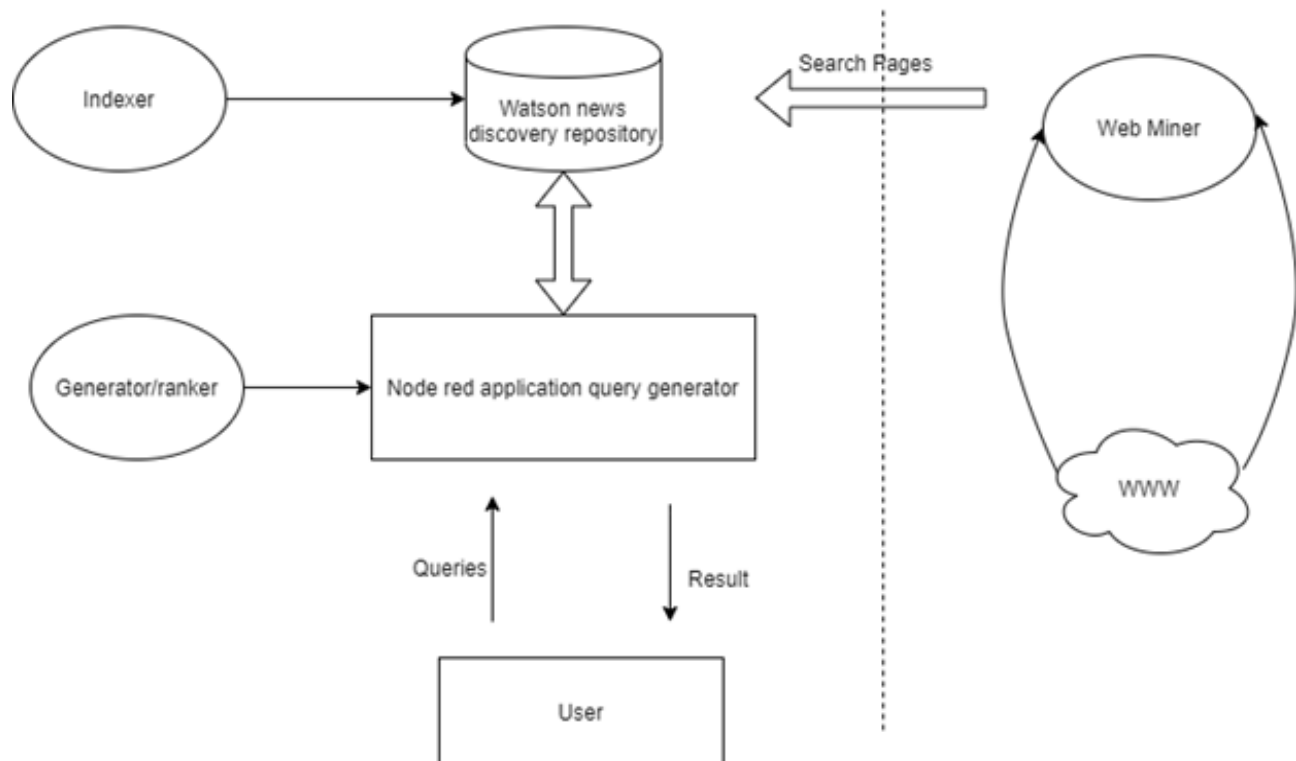
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16. Piotr D. Adamczyk and Brian P. Bailey. If Not Now, When: The Effects of Interruption at Different Moments Within Task Execution. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, (2004), 271–278.
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## 2.2 Proposed Solution

In this project to reduce this time-consuming process the user just has to type in his/her news which he wants to be fetched. Our application will analyze this search and return the latest relevant news. The application also categorizes the news based on the sentiment. All of this is done using artificial intelligence. The news is fetched from the pre-enriched documents in IBM Watson Services by using Discovery as an API. The sentiment analysis is also done on the whole news which gives the total count of positive, negative and neutral news.

## 3. THEORETICAL ANALYSIS

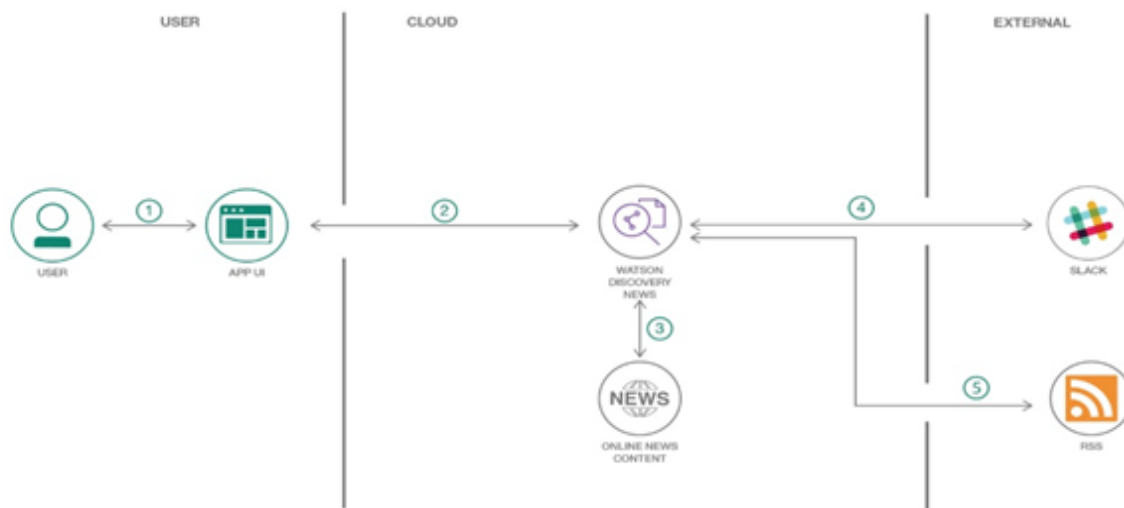
### 3.1 Block Diagram



- User interacts with user interface by giving news as a query. This interface is created using node red application.
- Appropriate query is generated and query is passed towards Watson news discovery repository.

- Watson news discovery repository has a pre-build news mining feature. It extracts the appropriate news based on the user query and JSON file is given as a response to the Node-RED application.
- Then the query is processed as per the requirements and the appropriate result is displayed on the User Interface.

## Flow



### 3.2 Hardware/Software designing

Software used for creating AI powered news search application-

**Watson Discovery:** It is an award-winning enterprise and AI search cognitive technology that breaks open data silos and retrieves specific answers to your questions while analyzing trends and relationships buried in enterprise data. It may also be regarded as content analytics engine to identify patterns and actionable insights.

**Node.js:** Node.js is an open-source, cross-platform, JavaScript runtime environment that executes JavaScript code outside of a web browser. Can also be defined as an asynchronous even driven designed to build scalable applications.

**React:** React is a JavaScript library for building user interfaces. It is maintained by Facebook and

a community of individual developers and companies. React can be used as a base in the development of single-page or mobile applications.

**Slack:** Slack is a proprietary business communication platform developed by Slack Technologies. It delivers services with chat bot integration too.

In order to develop an app UI for news mining there are certain requirements which need to be fulfilled-

- 1) Knowledge regarding IBM Cloud and use of IBM Watson Discovery Service to collect the news article.
- 2) Development of Web application using Node-RED.
- 3) Processing user query and giving appropriate response.
- 4) Accessing the Watson Discovery Service through the Discovery API.
- 5) Using a Slack interface to query the data
- 6) Pushing news alerts out to web notification
- 7) Deploying the application on IBM Cloud

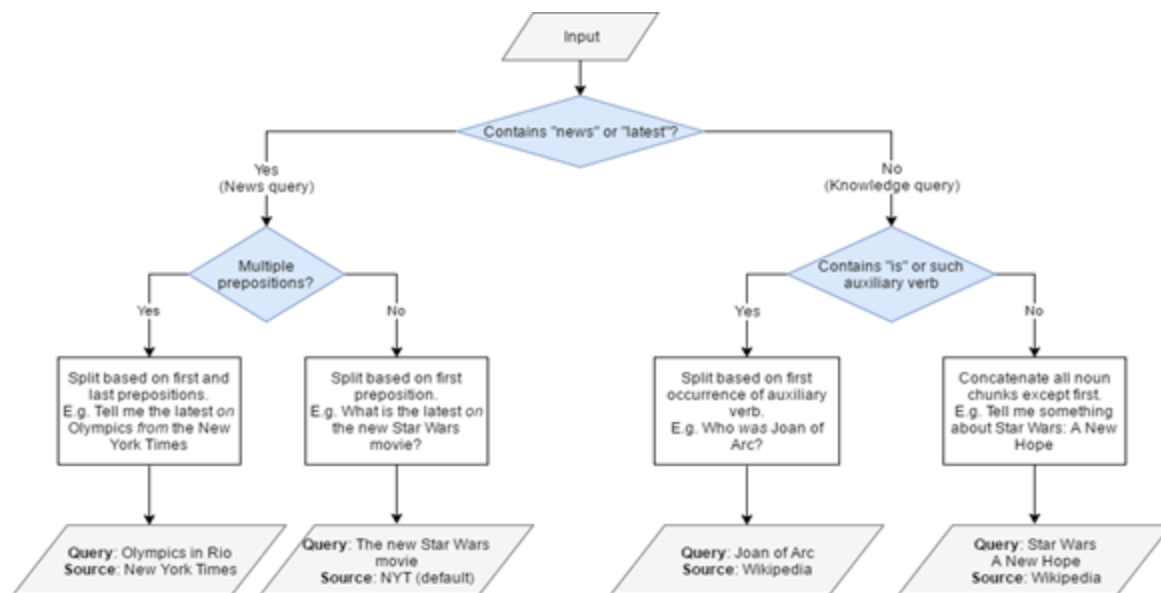
## 4. EXPERIMENTAL INVESTIGATIONS

I started this project to simply develop a web application for users to easily search their preferred news. I began by looking into numerous news pages and examined their user-interface deeply how they represented the news on the screen, the placement of all the important buttons and bars, the font-size of various headings and sub-headings. I tried looking for some open source codes for the news search pages for reference so as to know the work that is put in through the codes. In the end I was unable to find an accurate page which could be used as a reference to complete the project so I decided to work on it from scratch. I made use of a simple click and search UI. I kept the user-interface minimalistic yet attractive so that the user does not find it hard in getting the results, after all this was actually our proposed solution for existing problems of news search applications.

For the back-end development I referred to countless Machine Learning models. Again, it required a large amount of pre-stored data to train the algorithm which was a hassle since there were not many websites which would permit me to access their news search history. Henceforth, I went with IBM Watson Services using Discovery as an API. This not only had a bank of news search entities but was also capable of performing sentiment analysis (by writing appropriate J-Queries) on the searched text which enabled the user to get a deep insight of his/her search

result.

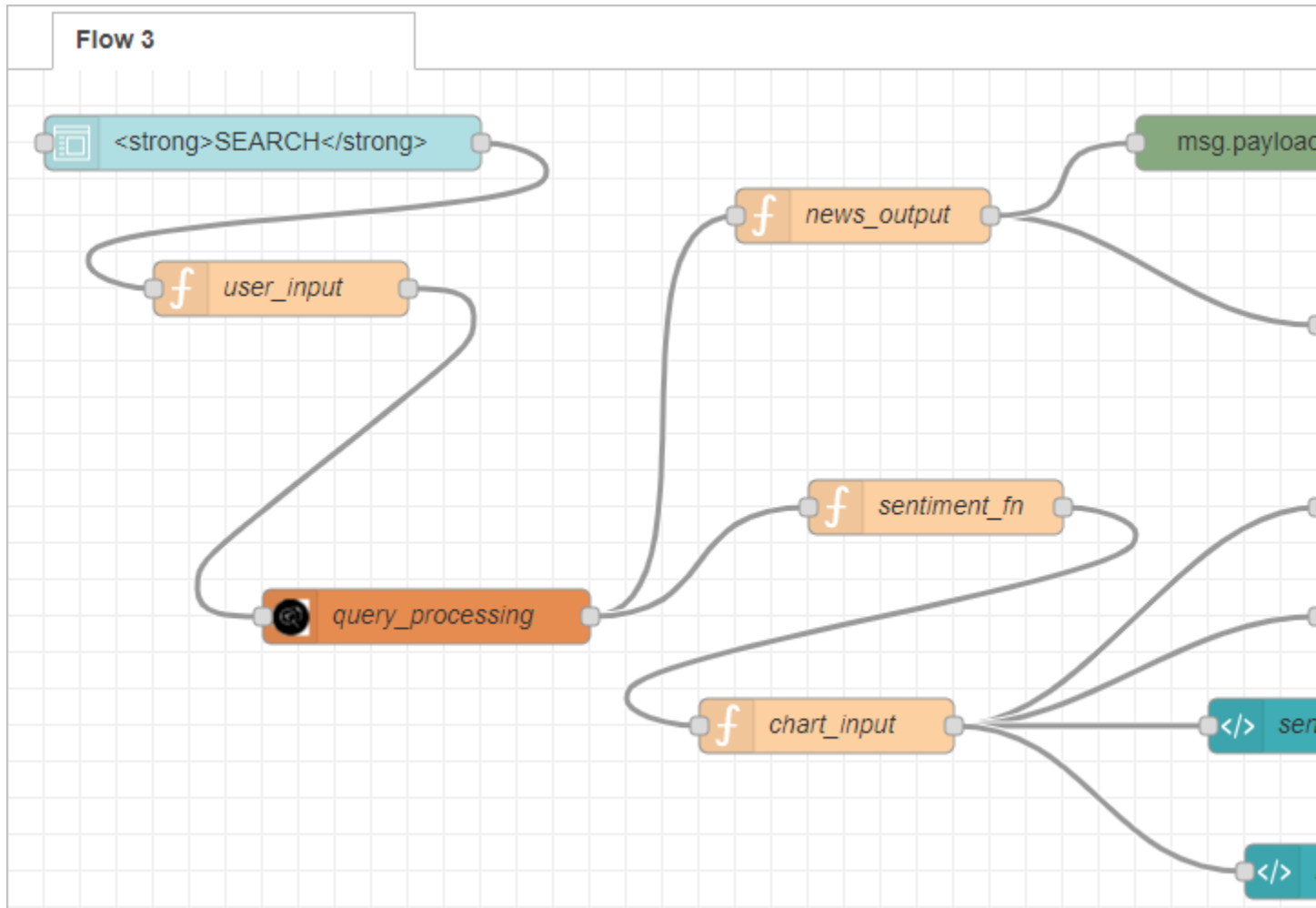
## 5. FLOWCHART



## 6. RESULT

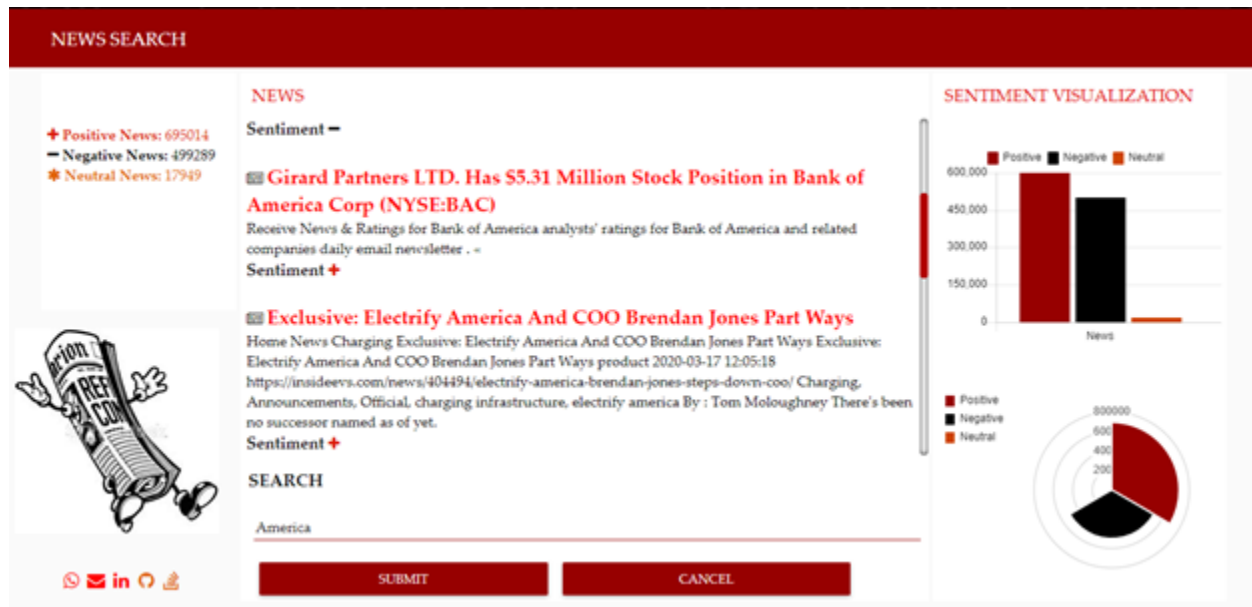
### 1. Node-Red flow graph



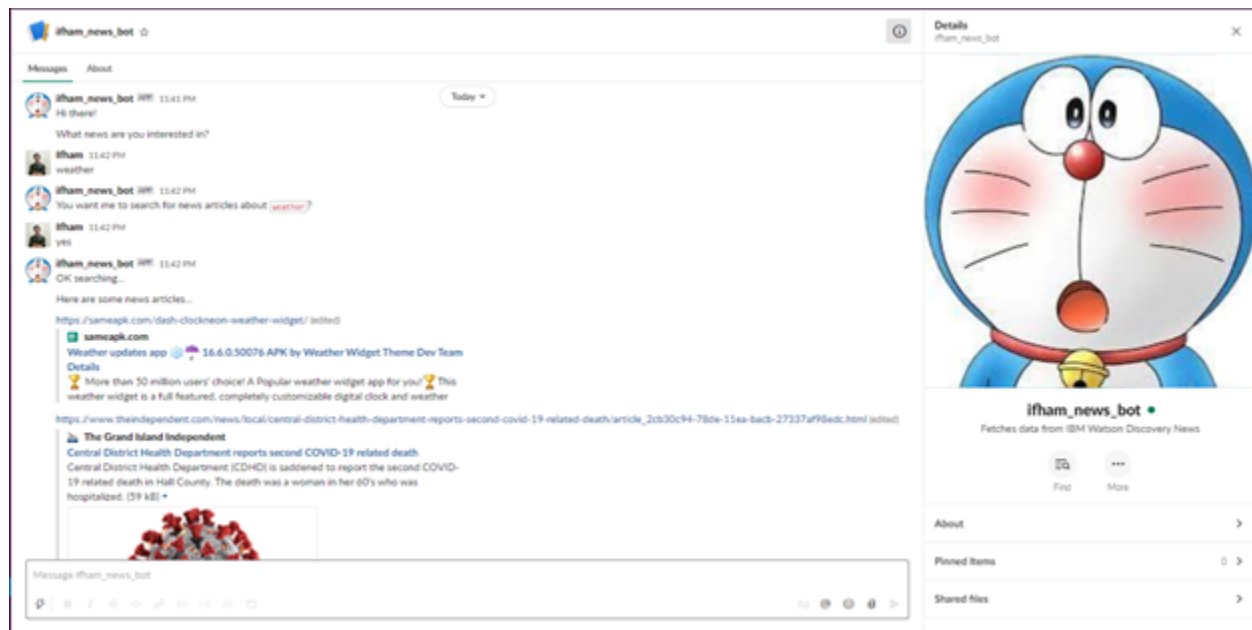


## 2. User Interface of web application

URL <https://ifhams-news-search-app.eu-gb.mybluemix.net/ui/#!/0?socketid=xpWuKuufOJB3quaiAABa>



### 3. Slack-Bot integration with IBM Watson Discovery



## 7. ADVANTAGES & DISADVANTAGES

### Advantages:

1. It has a simple yet attractive User interface which is very easy to understand.
2. Sentiment analysis of news is also done.
3. Unconventional simple click and search interface which makes it scalable as well.
4. Integration with slack bot makes it functional on a mobile phone as well.
5. Less response time is shown by the application.
6. Sentiment visualization using various charts and dashboard features.

**Disadvantages:**

1. Not programmable to show more than 10 news at once.
2. No area left for collaborating any advertisements which makes it non-commercial.
3. The interface can be more worked upon to enhance the user-friendly nature of the application.

**8. APPLICATIONS**

1. Best used for searching the most relevant and latest news.
2. Users who want sentiment analysis as well as visualization can make use of this application.
3. For users wanting to access the features via mobile phone can make use of the slack-bot integrated with IBM Watson Discovery Service.
4. During this Covid-19 outbreak, where news is mostly crowded with news and updates on Covid-19, users can make use of this application for updates on other topics.
5. Recommended for all the users wanting a search result of their searched query without much news of any other topic.

**9. CONCLUSION**

This was the first time when I was working with a cloud platform for deployment of an application. I have learned a lot in this past one month by making use of IBM Cloud Platform, using IBM Watson Services using Discovery API. The pre-enriched documents in the IBM Watson enabled me to make the basis of my news application so that it could return the latest news and updates. Furthermore, my experience with node-red was amazing. It helped me to access the Watson Services by making use of Discovery node with API credentials of Discovery in it. Node-red enabled me to design an interactive user interface which help in getting queries and data from the user. Furthermore, various function nodes assisted me to access the

data supplied by Watson Services. I made use of various Dashboard nodes and features to visualize the data output which made my interface even more attractive. Overall, this experience was unparalleled and I wish to work on more such projects involving these emerging technologies and platforms.

## **10. FUTURE SCOPE**

I intend to work more on the interface to make it more interactive. The application can be released to few of the users who can test this application and give constructive feedback as well as overall review of my work. The future prospects also include making this application a commercial one once it receives positive reviews from a majority of the users using it. Adding functionalities such as- web notifications and sharing of link of a particular news will prove to be a success for the overall efforts which I have put in the past one month. Dashboard allowing the changing of themes as per the user's convenience is an aim to be achieved. There are certainly many features which are unexplored in the Node-red environment which I want to use. These include, searching for news through user's speech which will certainly make it different from other news search applications and enhance our functionality.

## **11. BIBLIOGRAPHY**

I took help from various sources-

- <https://nodered.org>
- <http://noderedguide.com>
- <https://opensource.com>
- <https://youtube.com>
- <https://cloud.ibm.com>
- <https://github.com>
- <https://developer.ibm.com>
- <https://api.slack.com/support>

## **APPENDIX**

*JSON Flow Code*

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{{x['title']}}\n    </span>\n    </a>\n    <br> \n    <span style=\"color:black\">\n
{{x['content']}}\n    </span>\n    <br>\n    \n    <span style=\"font-weight:bold;font-size:18px\">\n
Sentiment\n    </span>\n    <span ng-if=\"x.sentiment=='positive'\">\n    <span
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<span ng-if=\"x.sentiment=='negative'\">\n    <span style=\"color: black\">\n    <i class=\"fa
fa-minus\"></i>\n    </span>\n    </span>\n    \n    <span ng-if=\"x.sentiment=='neutral'\">\n    <span
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