Sentiment Analysis of COVID-19 Tweets – Visualization Dashboard

Project Report

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**INTRODUCTION**

**Overview**

It's been a 100+ days since the first COVID-19 case in India and 60+ days into the earliest Lockdown Order by our Government. Social media was abuzz with reactions on Lockdown Extension. The instructions passed by the government and severity of Covid-19 has greatly aﬀected the day to day lives of citizens in the country. Thus, it is important to understand and analyse public sentiments under COVID-19 Lockdown extension.

This solution will perform Twitter Sentiment Analysis and understand the public sentiment towards the announcement of lockdown extension. And develop a visualization dashboard from the obtained results.

This solution, primarily using IBM Cloud, Watson Natural Language Understanding, Watson Language Translator, Watson Language Identify, IBM Cloudant and Node-RED, derives the sentiment analysis of the twitter feeds and provides a visualization dashboard for analysis.

Objectives:

* Extract tweets on #lockdownextension.
* Perform sentiment analysis, store the tweets and their respective sentiment scores in **Cloudant** database.
* Use **Watson Language Identify** and **Watson Language Translator** to identify and translate tweets respectively, which are of languages not accepted by Watson NLU.
* Extract tweet emotions using **Watson Natural Language Understanding**.
* **Node-RED** to build dashboards of the analysis obtained.

**Purpose**

Lockdown Extension has affected the day to day activities of people in our country. Understanding the state of citizens could be of interest to various organizations to carry out tasks and take necessary measures. The proposed solution looks into the factors that affect mental health of people due to social distancing, tackling of fake news, etc., and arrives at a score and a dashboard visualization which can be used for further analysis like taking the key decisions to improve the economy or restart any business.

The IBM Cloud services used in this solution will help build a predictable analytics model and a visualization dashboard using the obtained sentiment and emotion scores of tweets.

**LITERATURE SURVEY**

**Existing Problem**

The existing process has inadequate accuracy and performance in sentiment analysis. Due to the large amount of streaming data and insufficient labelled data, they are unable to deal with complex sentences and analyse. This leads to summarizing the emotions of people only during a specific time interval and not on daily basis. Building visualization dashboards would require complex code, consuming more time in writing the code rather than building the model. Which eventually leads to decrease in the performance of the model.

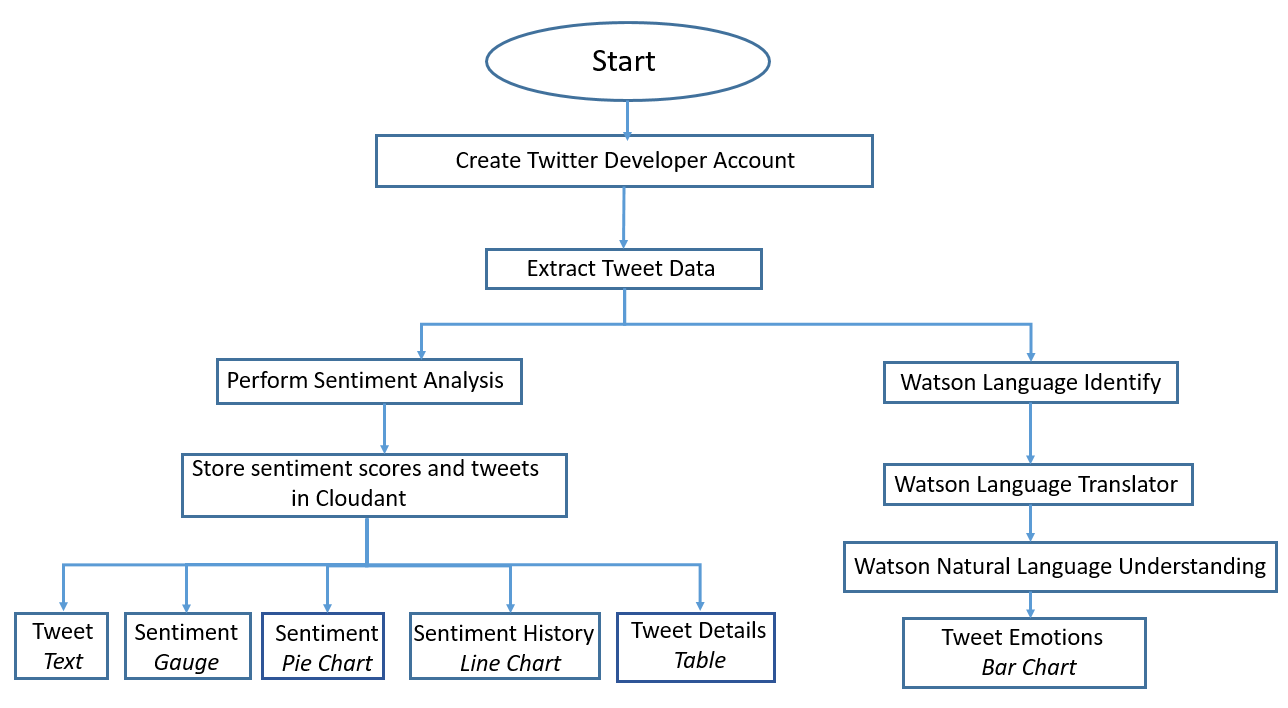
**Proposed Solution**

Using IBM Cloud, Watson services - Watson Natural Language Understanding (Watson NLU), Watson Language Translator, Watson Language Identify, IBM Cloudant and Node-RED would help us reduce the complexity of the solution and leads to easy development. Using Watson Language Identify, will help us detect the language of the tweet and translates using Watson Language Translator, then sends the tweet to the Watson NLU. This will avoid us from the limitation of Watson NLU – which does not accept all languages (only 13 languages). The Watson NLU will give us tweet emotion scores – joy, sadness, disgust, fear, anger instantly. The sentiment node in Node-RED will give us sentiment scores without writing huge codes.

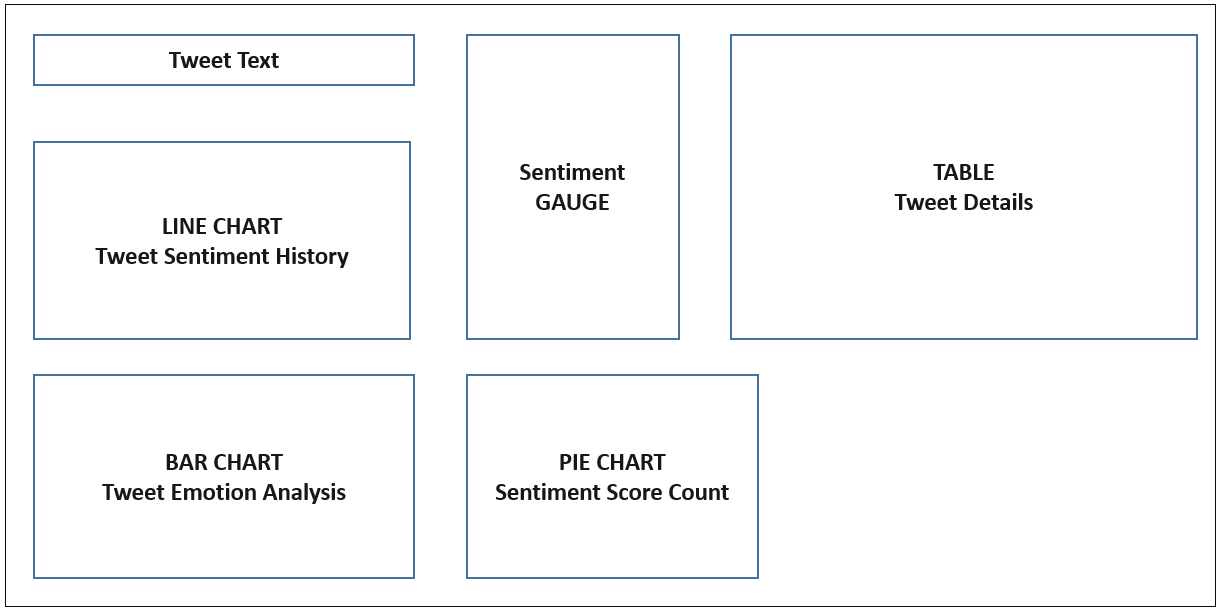
Building dashboards on Node-RED would make our solution much easier without writing complex code and decreasing the performance. The dashboard nodes in Node-RED will give us visualization dashboards by collecting live twitter data and developing dynamic dashboards.

**THEORETICAL ANALYSIS**

**Block Diagram**

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**Hardware/Software Designing**

****

**Experimental Investigations**

Developing this solution included many investigations, tests and research. Understood how the IBM Cloud and Watson services work which helped me build my model out of these services. Ran many tests on Watson NLU to get the tweet emotions, Watson Language Translator to translate and Watson Language Identify to detect the language. Using them in my model and running gave me few observations, Watson NLU supports only 13 languages, sentiment node gives sentiment scores, etc., Here is a list of what I have investigated and tested on:

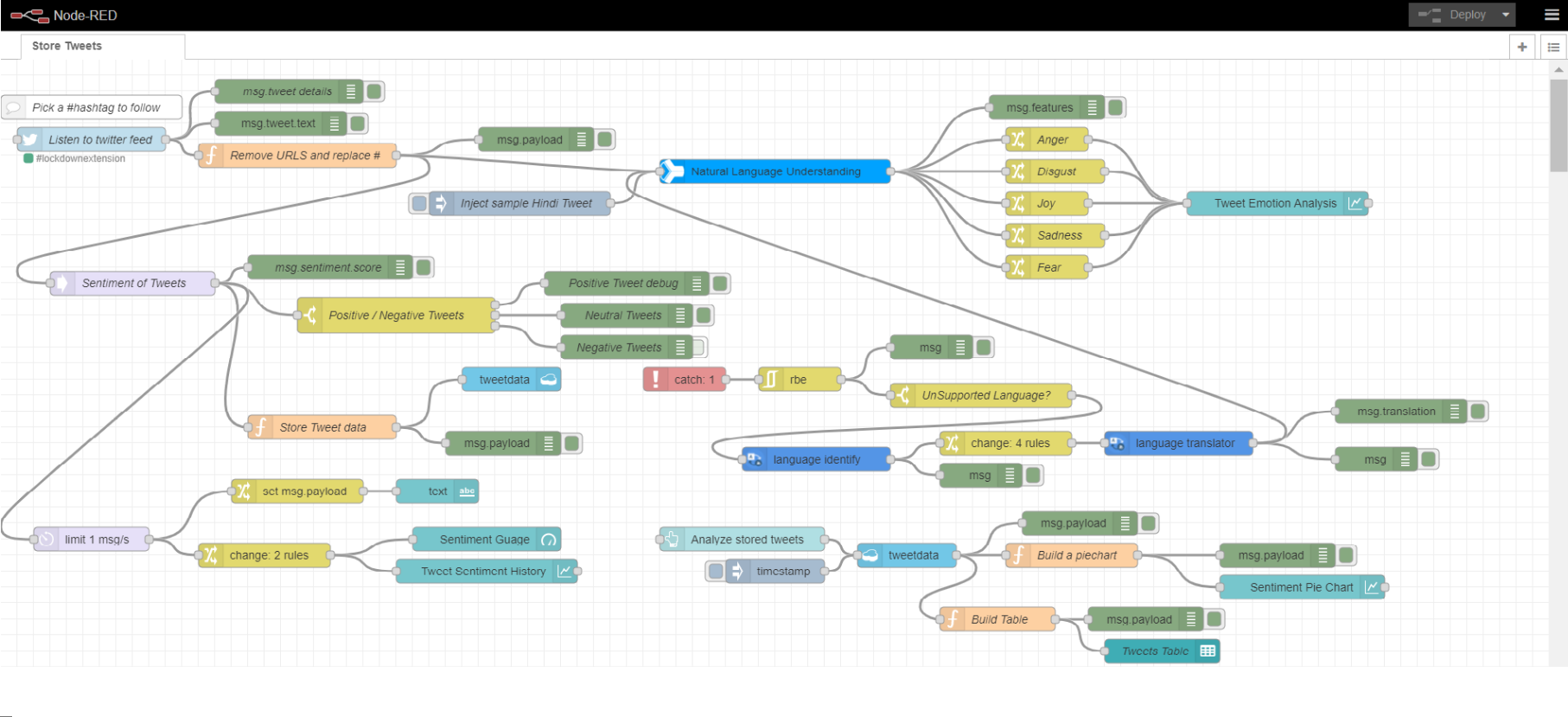
1. IBM Cloud
2. Watson Natural Language Understanding
3. Watson Language Translator
4. Watson Language Identifier
5. IBM Cloudant
6. Node-RED

**Flow Chart**

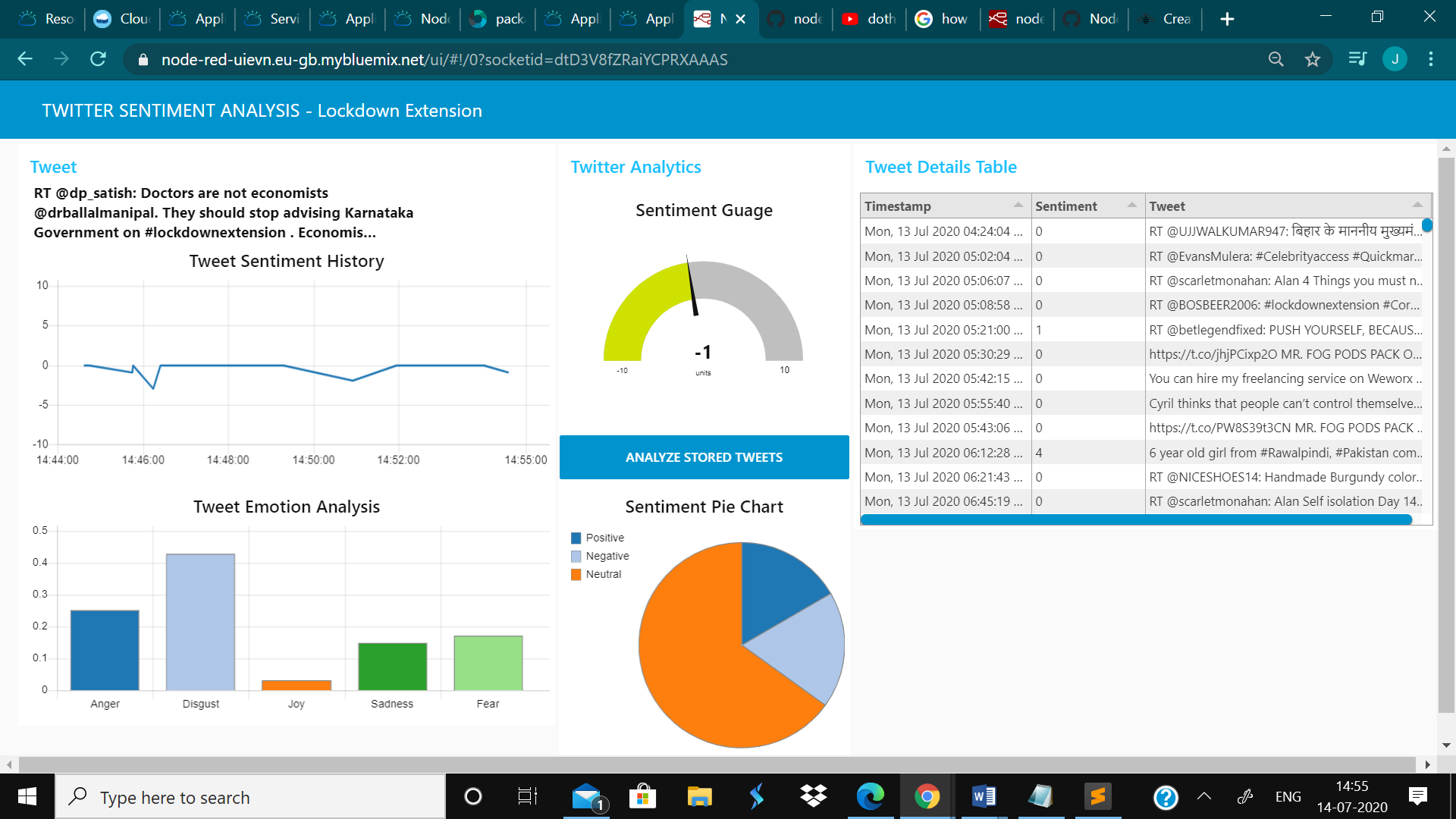


**RESULT**

**Model Flow**



**Dashboard**



**ADVANTAGES**

This solution includes the following advantages –

1. No complex code required.
2. Works with loads of live streaming data without decrease in the performance.
3. Easy to use and develop.
4. Dynamic visualization dashboards using IBM services.

**APPLICATIONS**

Building this model will not only get the public sentiment on lockdown extension but also but also keeps track of your product or service on social media. It will provide valuable insights on any model, brand, service, etc., and get to know public emotions towards it. Build complex models, analysing conversations, views, political views, public reactions, business, product launches, and many.

**CONCLUSION**

This model gave you a clear understanding of Twitter Sentiment Analysis using IBM Cloud, Watson Natural Language Understanding, Watson Language Translator, Watson Language Identify, IBM Cloudant and Node-RED. Live twitter data is collected and visualization dashboards are built using Node-RED which could help us analyse and draw insights on public sentiments and emotions towards lockdown extension.

**FUTURE SCOPE**

This application can be further used to analyse complex text and get sentiments out of it. This will be possible because we use IBM Cloud and Watson services which make our work easier. We can build dynamic dashboards using large amount of data without decreasing the performance of the model. This will help organizations, business companies by giving them analysis of their product or brand on which they will get to know the factors to improve their brand in.

**BIBLIOGRAPHY**

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College: Chaitanya Bharathi Institute of Technology

Project Title: Sentiment Analysis of COVID-19 Tweets – Visualization Dashboard

**References:**

IBM Cloud - <https://cloud.ibm.com/>

Node-RED - <https://nodered.org/docs/getting-started/ibmcloud>

**CODE**

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