Project Report

Web Based Dashboard For COVID-19 Twitter Sentiment Analysis

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Acronyms:

AI: artificial intelligence

IBM: International Business Machines Corporation

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General Introduction

With the rapid development of technology, Artificial Intelligence is everywhere! Now with the easy use of this technology, AI is altering the world.
AI systems have the ability to learn. they can capture and understand a flow of information in real time. Also, AI systems can make a decision based on signals.
The technological revolution is here and it is transforming the world. The progress in Artificial Intelligence technologies is what driven this revolution. AI can be used in almost any field or area to help understand the environment of this field and eventually alter it to the best.

The year 2020 was defined by COVID-19 which was arguably the worst pandemic the world has had in 100 years.
The coronavirus affected everything, it changed everything around us. people around the world learned what it feels like to be stuck at home to rely on technology to go out under certain conditions. This led to the eventual spread of a curtain sense of fear and anxiety around the world.

The aim of this project is to collect data related to the public's reaction and sentiment about this global pandemic and analyse this data. the output of this project is a dashboard that will allow us to view the sentiment analysis of the people to COVID-19.

In this report we will go in further into details about this project and understand it better, from how it was made and the technology used to the visual output and the advantages and disadvantages of it.

1- Introduction

1.1 Overview

The aim of this project is to create a web based dashboard to analyze a twitter feed to help understand people's sentiment about the global pandemic.
The project uses node-red along with IBM services to create the dashboard needed to visualize the effect of COVID-19 on individuals around the world.
using the twitter node in node-red we were able to select the keywords "COVID-19", "Coronavirus" and "COVID". every tweet selected is analyzed depending on the sentiment with the help of IBM tone analyzer. the tweet is then displayed on the dashboard along with 3 visual representation of the tweet analysis:
1- An icon is placed on a world map on the exact location of the tweet, the icon color is grey if the tweet is indifferent meaning the sentiment score is equal to zero, green if the tweet is positive and red if the tweet is negative.

2- The sentiment score is displayed on a gauge that will have the values -10 , 0 and 10.

3- With the help of Watson face recognition, if the tweet has an image it will be displayed on the dashboard along with the result table of the visual recognition.

1.2 Purpose

The purpose of this project is to visualize the sentiment of every tweet related to the pandemic. This will help analyze people's feelings towards the lockdown and the COVID-19 pandemic. the dashboard will help us understand people's reaction to the global pandemic and possibly predict riots.

2- Literature survey

1.1 Existing problem

Analyzing a twitter feed isn't exactly a very common need, few softwares and solutions exist on the market and here is a couple of them:

1. **IntenCheck:**

Description of the existing:

This software is a cloud-based platform that provides a sentiment analysis to analyze texts from any source of data.

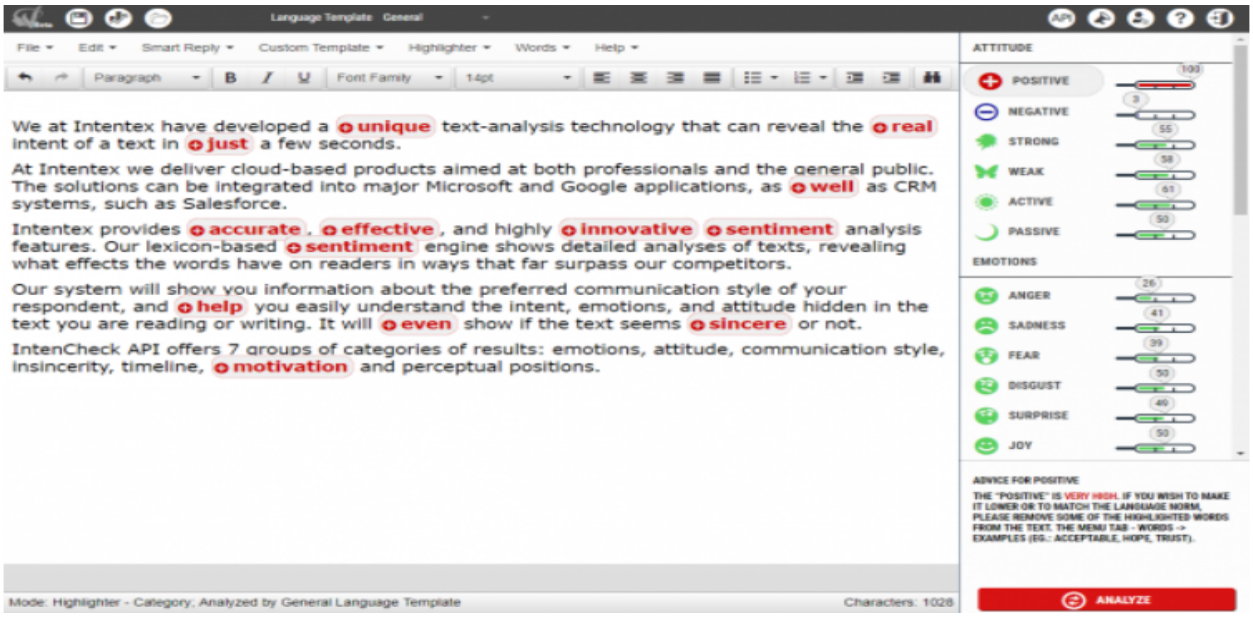

figure 1: IntenCheck example

Critical analysis of the existing:

-This software is free under a limitation of 30 requests a month and the paid version is 19$/month.

-this software cannot read a social media feed, instead you have to upload the text for it to analyze.

-this software will only give you the sentiment score of the words in the texts, it does not provide

any visual charts.

2. **Social Searcher**

Description of the existing:

This tool allows you to analyze the sentiment of a social media feed using specific keywords.

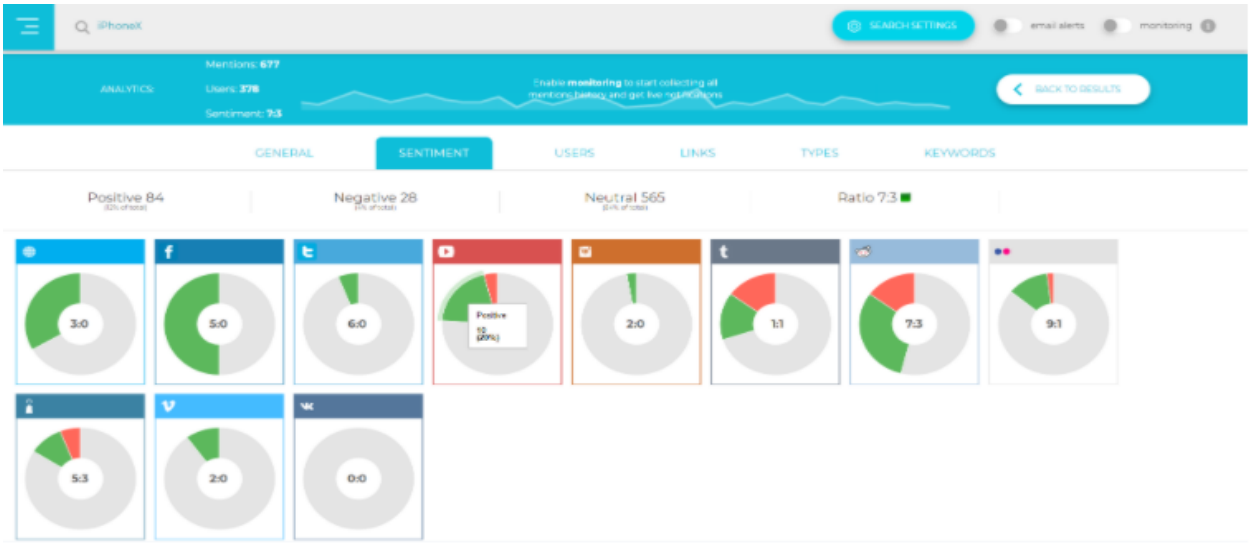

figure2: Social Searcher example

Critical analysis of the existing:

-This tool is free under the limitation of 100 real-time searches per day and the paid version (unlimited version) starts at 4.18$/month.

-the visual analysis of the feed is limited to a sentiment score and the total sum of positive reaction, negative reaction or neutral reaction.

1.2 Proposed solution

The solution suggested by this project is to provide a well organized and clear dashboard that allows the user to understand the feeling and reaction behind every tweet related to the keywords COVID-19 and Coronavirus.

The dashboard created by this project provides a world map that will help the user see the reaction of the people to COVID-19 **world wide.**

The dashboard created by this project provides a gauge that will help the user know the sentiment score of the tweet.

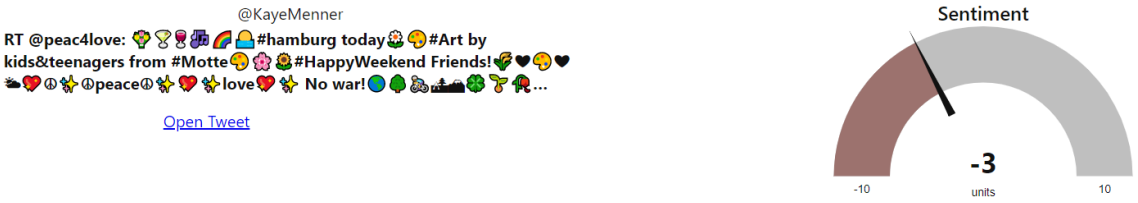

figure 3: Screenshot dashboard: tweet+gauge

The dashboard created by this project provides visual recognition results that will help the user understand the meaning behind the images in the tweet (if the tweet has an image).

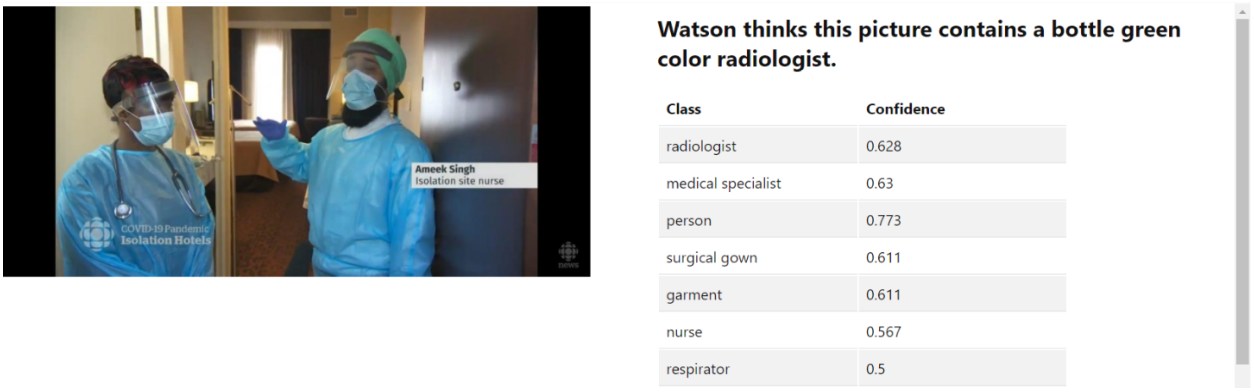

figure 4: Screenshot dashboard: image+visual recognition result

3- Theoretical analysis

3.1 Block diagram

This project was developed using node-red flow editor.

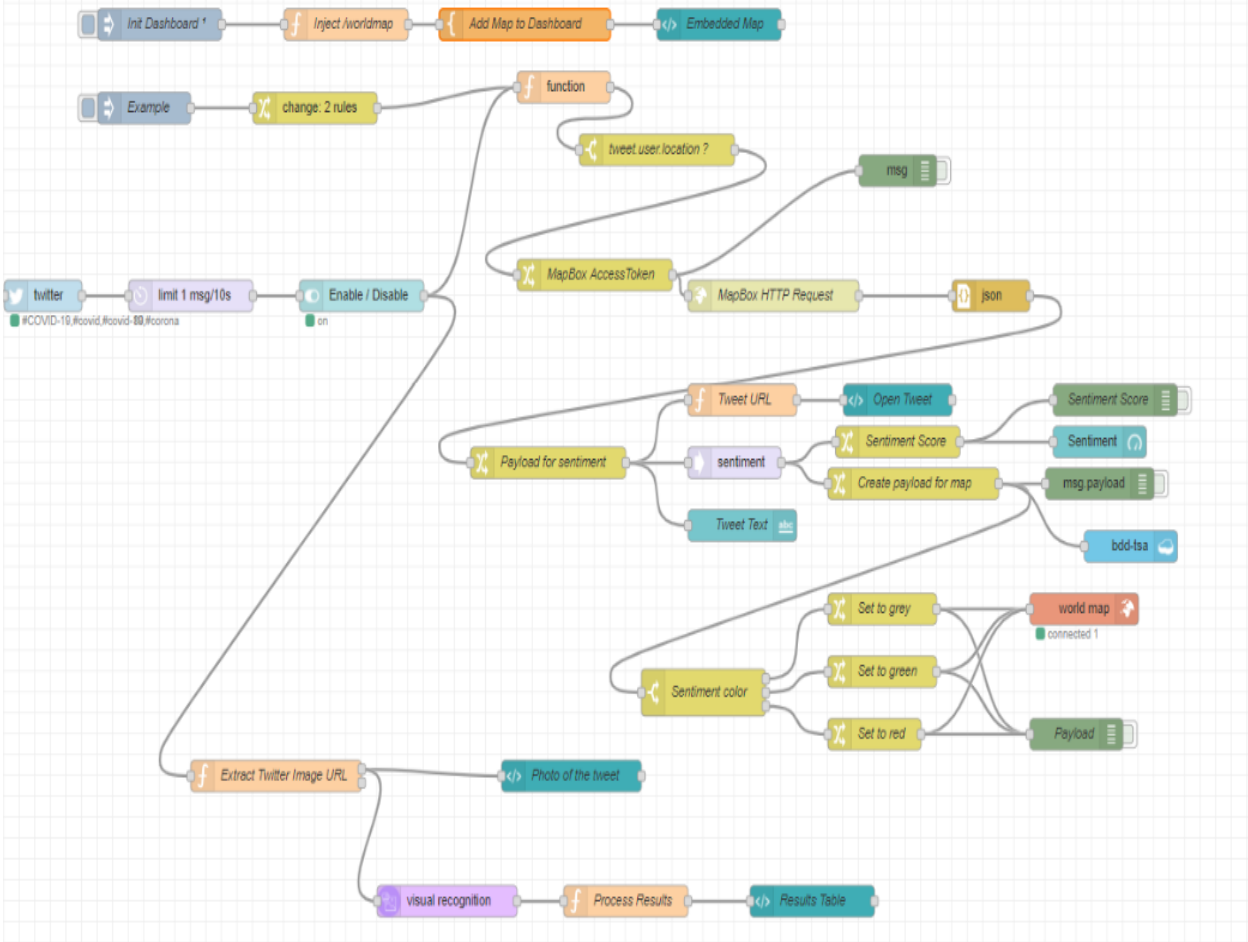

figure 5 : Node-red flow of this project

To simplify how this project works, here is the block diagram for the project:

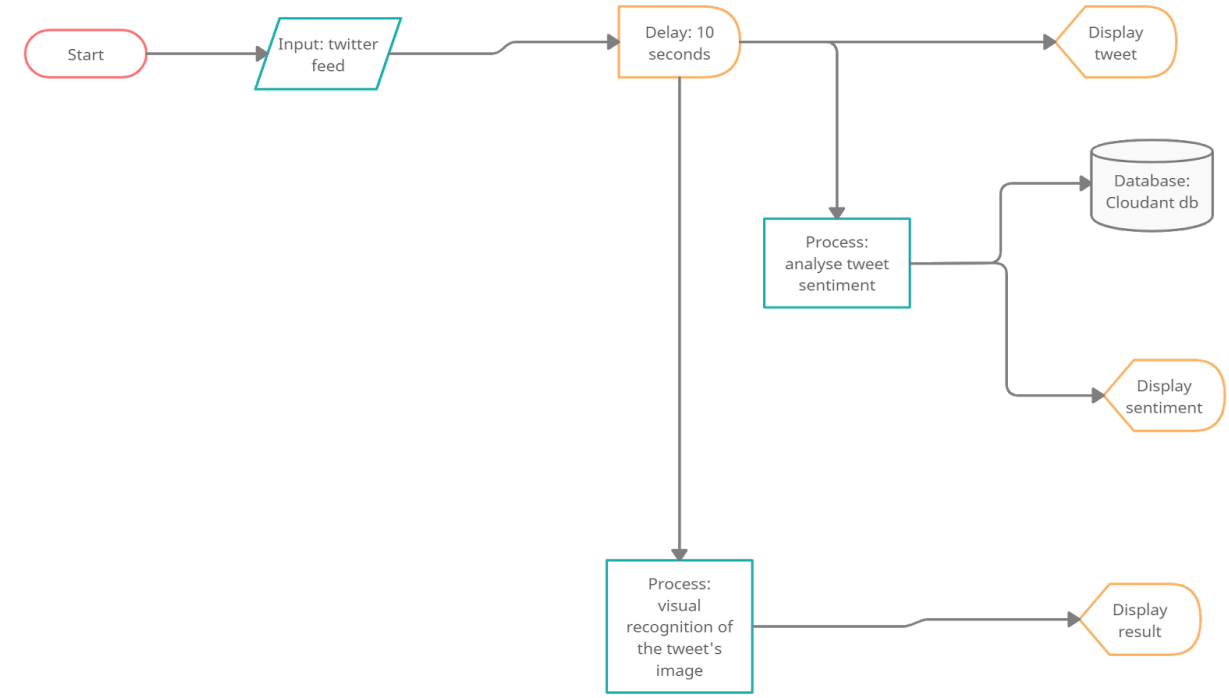

figure 6: Block diagram

1.2 Software designing

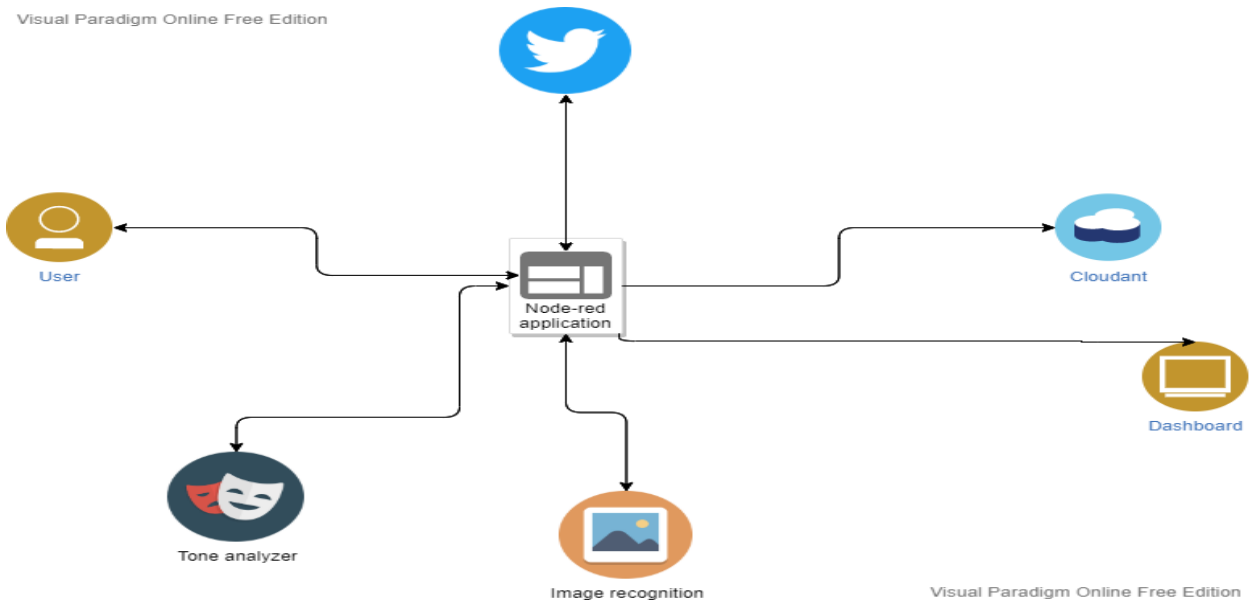

figure 7: Project description

This project used a number of services, softwares and APIs to help create the web-based dashboard.

The project is a node-red application, Node-RED is a flow-based development tool for visual programming developed by IBM. The project was done with the help of the web browser-based flow editor.

The twitter feed was obtained using a twitter node in node-red application, this twitter node will only work if you provide it with twitter credentials from a twitter developer account. the twitter node needs to be installed so it may eventually be used.

The sentiment analysis was done using IBM Watson tone analyzer, this service provided by IBM is easily created and very easily used making it the perfect solution to use on this project to provide an accurate sentiment analysis.

The display of the tweet location on the world map was done using mapBox credentials which i obtained by creating a mapBox account.

The visual recognition result of the tweet's image was achieved with the help of IBM Watson visual recognition which is, like the tone analyzer, easily implemented and used on the project.

This project used Cloudant database which is a non-relational, distributed database service. This service helped store the tweets as well as the sentiment score collected by the application for further use.

4- Experimental investigation

The output of this project is a dashboard, a well organized and clear dashboard that can help the user visualize the analysis of a real-time contentious twitter feed ragerding COVID-19. through the making of this project a lot of services and APIs were used and studied along with some replacement solutions.

5- Flowchart:

To simplify how the project works we used this flowchart.

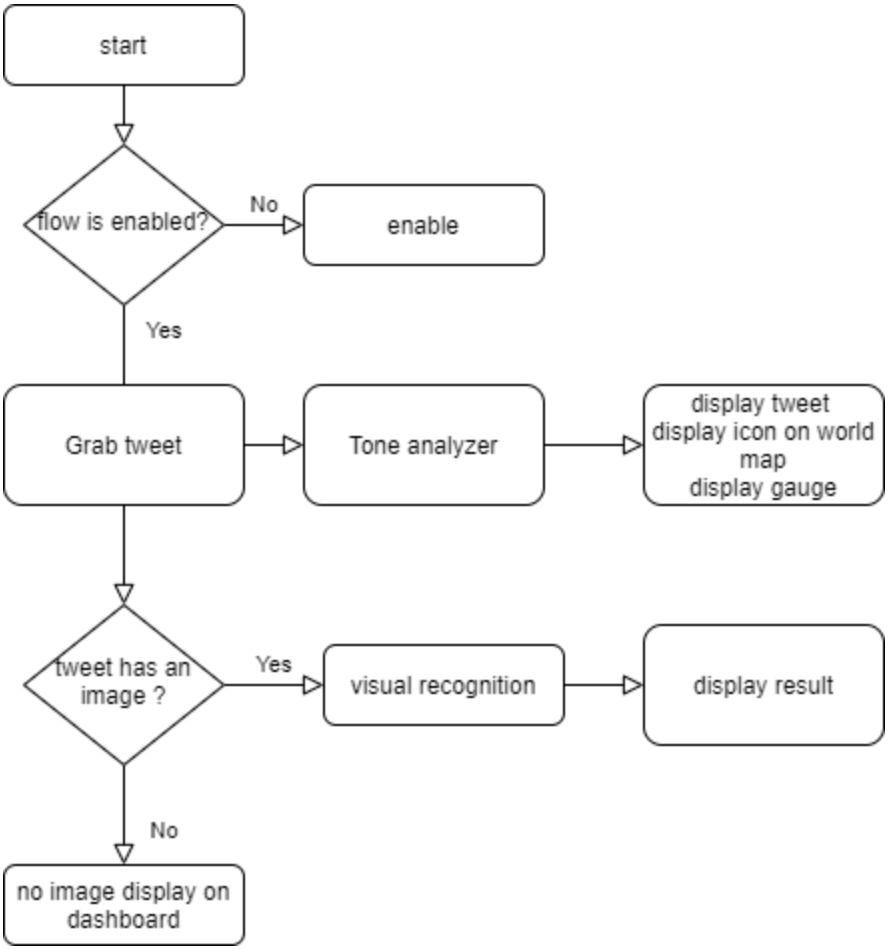

figure 8: Flow chart

6- Result

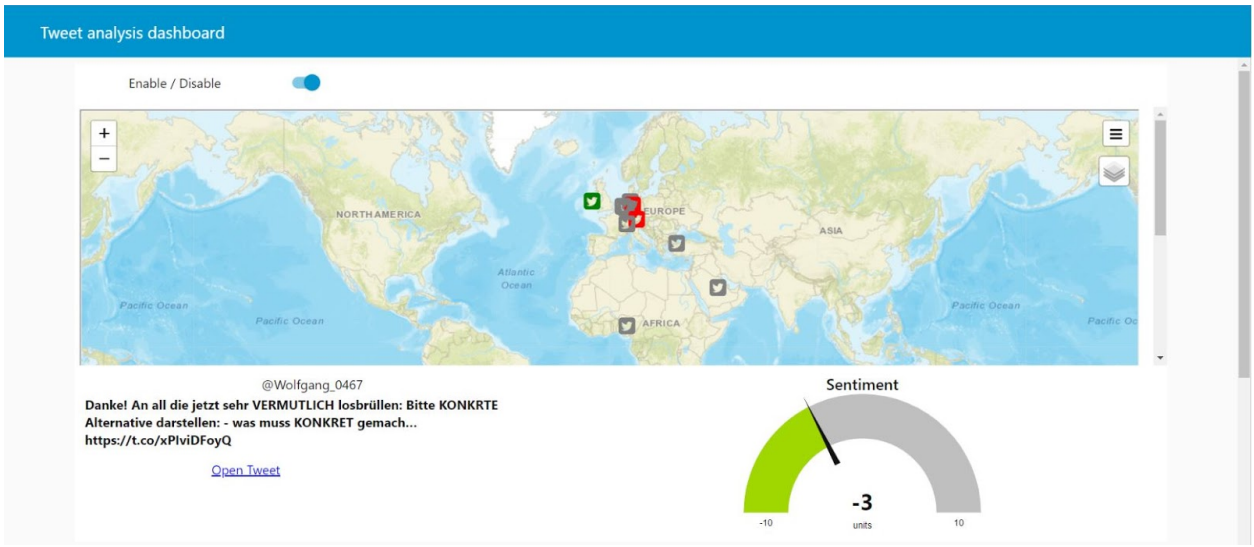

figure 9: Screenshot of the dashboard 1

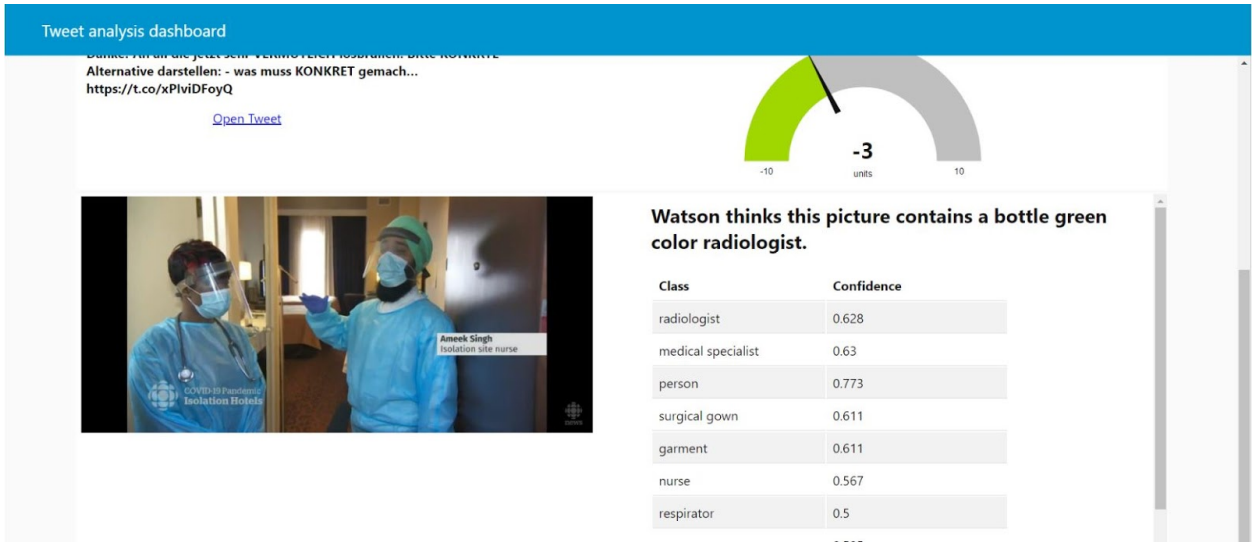

figure 10: Screenshot of the dashboard 2

The dashboard contains 2 parts:

1. a part which contains an enable disable button + a world map
2. The tweet text + open tweet link + a gauge for the sentiment score
3. the tweet image + visual recognition result table

7- Advantages and disadvantages

this project provides a Web based Dashboard for COVID-19 Twitter Sentiment Analysis

Advantages:

Complete dashboard:

The dashboard contains a complete analysis of the tweet: a world map to place icons according to the tweet's sentiment and location, a gauge for the sentiment score, the tweet text and a visual recognition result of the tweet’s image.

Multiple uses:

This dashboard can be used for other analysis by just changing the keywords used in extracting the twitter feed.

Disadvantages:

Poor design

The dashboard could use a better layout and a more appropriate design.

8- Applications

This project can be applied to several uses and areas. as we mentioned earlier, the project displays an analysis of the twitter feed related to COVID-19, as in the reaction of the public to the pandamic. therefore the project can be used by the goverment to understand people's reaction to the lockdown and eventually predict riots, which will help in better decision making by the goverment as well as considering a better approche to its people.

9- Conclusion

COVID-19 altered our life, from the way we interact with people to how we study and practice our jobs. Due to this sudden change, the global pandemic had a very big effect on our feelings and psychological state. It is very important to analyse how people feel about the pandemic and what better way to do that than to use technology. AI is the best way to collect and understand a curtain flow of data which is what was done in this project. With the help of IBM services such as Tone analyzer and visual recognition and applications such as Node-red application, we were able to visualize the effect of this pandemic by analysing the sentiment of a twitter feed that contains the keywords “COVID-19”, “covid” and “Coronavirus”. this project provided us with a dashboard that will help the user understand how people feel about COVID.

10- Future scope

For future enhancement the project could use a better presentation of the dashboard meaning a better layout. Also it would be useful to put the flow into a list so the user can still see past tweets for a specific period of time since the current dashboard changes data (tweet text, tweet score and visual recognition result) every 10 seconds.