Impact Analysis of COVID-19 on Employment Trends

Abdul Jabbar (✉ jabbartabani27@gmail.com)

FAST - National University of Computer and Emerging Sciences <https://orcid.org/0000-0001-9381-7738>

Muhammad Shahzad

FAST - National University of Computer and Emerging Sciences

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Abstract

Along with the spread of the COVID-19 virus, other crises have evinced in the form of employment trends around the globe. As it has affected the economies of the biggest countries, it has also affected the common person's daily life. There is a need to identify and understand the informational crisis and the sentiments of the general public towards the employment trends during the COVID-19. As the unemployment which can directly cost the mental health of the person, so it is really important to understand the relationship of the COVID-19 pandemic with the employment trends. As due to this virus, we have seen the social distancing and the self-isolation as well, so the work from home culture has also been seen in the employment trends during the specific period. In this research, we need to identify the sentiments of people on changing employment trends to analyze the impact of it on their daily life and mental health. As to how this pandemic has changed the trends from people losing jobs at a certain time when the it was at the peak to so many job opportunities after some months when it had the low density. In this research, we will be building a data set of COVID-19 tweets collected from twitter API and other dataset collected the dataset COVID-19 cases from WHO, furthermore we have calculated the employment related sentiments using VADER algorithm, also plot the COVID-19 cases timeline as well and did the trends analysis to see the sentiments of the users towards the employment trends during the COVID-19. Finally, after finding some major trends, these results are plotted on the visualizations graph using PowerBI tool.

1 Introduction

The COVID-19 spread has changed the daily activities of humans all around the globe. This pandemic has created some new and very strong relative measures which have affected the world's economy including the organization's rules and regulations as well. The COVID-19 pandemic and the lockdown situations in various countries have affected 114 million people to lost the job around the world [11]. Due to the massive spread in the regions, many organizations have fired the employees due to the two major reasons, one is the lockdown situation in that particular area and the other one is that not having the work in this critical situation. Many organizations have cared for their employees and issues the order of work from the home policy. Many of the workers of that organization are able to transform the workspace from the physical office to the home office. Some of the employers also forced the employees to come to the office in those critical conditions, so that due to the forcing behavior, the employees have switched the jobs to the other organizations. Due to unemployment, in many countries the unemployed people have received the unemployment insurance funds to feed the family.

2 Literature Review

Detailed study has been done on the past studies available to understand the COVID 19 and its relationship with the employment trends.

As employment is a very crucial part of every human being and it's necessary to have to earn in this era. The COVID-19 pandemic has negatively affected the overall global economies of the countries. The first research is associating the unemployment due to the COVID 19 to the panic attack due to the anxiety, stress and depression to the person. They have used the Recurrent Neural Network deep learning method in a single platform to analyze the multiple layers of neural networks. they have used the data from the Kaggle dataset, which is unemployment and mental illness [1].

The Second research paper is prediction of unemployment with the various machine learning algorithms and mainly are time series problems. They have used the time series prediction model with the FARIMA model and GARCH model, and three of the machine learning algorithms, support vector regression, forwarded neural network and the multivariate adaptive regression. They have compared the results of the different techniques and models they have used in this research paper. The FARIMA model with GARCH gives the best results and machine learning models which are used, has not given the best results [2].

Due to the COVID-19 pandemic, the world health organization suggested people to do self-isolation and stay at home as much as possible, so due to this reason many organizations have started working remotely. so, this research is analyzing the sentiments of the employees for working from home. They have analyzed the sentiments of the employees while doing work from the home, the results have shown that the positive sentiments are more than the negative sentiments and the trust word has been used by many employees [3].

After the COVID-19 has been spread, and the government policy to remain away from each other and do the physical distancing, then the new trend of the work from home has been observed for every big company, So, they have used two methodologies, one is offline sentiment analysis model and other is the online sentiment analysis pipeline. They have used Apache Kafka, decision tree, SVM, logistic regression and the k nearest neighbor algorithm. They have trained and tested the model on the tweets of twitter. [4].

In Pakistan, due to the lockdown various businesses have been affected as well the economy is affected too. The main reason of downfall of the economy is the micro, medium and the small industries of the Pakistan country. This research has analyzed the various organization data and analyzed the economic situation of these companies. The results showed that this pandemic has severely affected these organizations and the employees of those organizations [5].

This paper is analyzing and visualizing the tweets related to the influence of the COVID in the world with the biggest spread around the globe. They have used the naïve bayes, SVM, Decision tree, max entropy, random forest and the boosting machine learning algorithm. they have collected the data from the twitter API, and clean and filter that data according to the situation [6].

Another paper which is analyzing the tweets and sentiments of the twitter users who have tweeted during the COVID with the hashtag COVID 19 pandemics. For the text classification, they have used the natural language processing techniques, they have also analyzed from which device the tweets were done, also

the sentiments of the public which are some fears based. They have used 70,000 tweets of the users over a year. Naive bayes, linear regression model, logistic regression models and K nearest neighbors are being used to evaluate the model [7].

COVID-19 pandemic is the biggest reason for unemployment, due to which the depression of the unemployed person was raised to the highest level. they have used the hybrid machine learning algorithms such as the multi-layered perceptron-imperialist competitive algorithm (MLP-ICA) and the adaptive network-based fuzzy inference system (ANFIS) to predict the future of the pandemic time series in the Hungary country. [8].

Social distancing during the COVID 19 pandemic has changed the usual things as per routines. So, it changes the employment rules and regulations as well due to the lockdown situation in India, they have been predicting till how much time the lockdown will be imposed in their country. They have collected the data from the online website of the COVID situation in the India country, which was having the rate on which the cases are increasing, the recovery rate and death rates of the COVID 19. The linear Regression technique has been used to analyze the spread of the COVID-19 and the imposed lockdown in India. [9].

The last research estimating the employment due to the COVID 19 and what will be the situation in the upcoming days of the other layers of the COVID 19. They have used the Unemployment inflow and outflow rate, inflow rate projects and outflow rate projection possibilities with regression techniques. They estimate that after a specific time period the employment rate will drop to a specific percentage [10].

3 Methodology

The section will discuss methodology of this research and design in detail. Each step has been described with detailed explanations. Also, the proposed work has the architecture diagram as well in the figure 1 as well. This section explains from the starting how the data is collected and then what happened with it so that the results have been created and which tools are used to create the visualizations.

3.1 Data Collection

This is the first dataset which will be use in this research that is Covid-19 tweet ID's dataset was taken from the GitHub, and based on that IDs particular tweets were fetched from the tweeter API. These tweets contain the public opinion and information related to the pandemic and its related activities. This dataset consists of the Date and Time, location where the tweet was posted which will be use more precisely in this thesis. The dataset included in this study is from the March 2020 till March 2021. The data is in the json format and some of attributes are following:

1. Creation Time: It's the time when the tweet has been done from the user's account and its in the UTC time zone.
2. Text: It's the text of the tweet which has been done by user
3. Id: It's the unique identified for the tweet, which uniquely identify it from other tweets.

4. Hashtags: It's the tag which are associated with each of the tweet to identify the topic of the tweets.
5. URL for tweet: it's the link for the tweet to open in any browser.
6. Followers count of user: It shows the total follower of the user who have posted the tweet.
7. Friends count: It shows the total friends of the user who have posted the tweet.
8. Tweet's count: It shows the total tweets of the user have posted from his personal account.
9. Language: It's the language of the tweet which was posted by the user from his account.
10. retweet count: it's the count of the tweet shared by his friends and followers from their account.
11. Location: It's the location from where the tweet has been done.

3.2 Data Processing

Firstly, the COVID-19 tweets IDs have been collected from the GitHub repository. Then, based on the tweet IDs, relevant Tweets have been fetched from the twitter API. These twitter tweets are fetched in the JSON format with the above specified columns. After fetching all the COVID-19 tweets from the twitter API, then the filtration process has been done on the fetched data. The tweets which were having language other than the English were removed from the dataset. The English language filtered tweets were again gone through the filtration process of only employment related tweets using some specific keywords.

Once the only relevant tweets were left in the dataset, then the tokenization process has been done on the gathered data and the stop words has been removed too like the "is", "the", "are" from the tokens which are generated. The reason for removing these stop words because they are not going to contribute in our research, that is why it has been removed so that the sentiments calculation can easily be done on the smaller pieces of the text of tweets. As the data is only about the employment trends tweets, so the final results will be produce just related to the employment and its trend in the whole globe. As the JSON file size which was too huge, then the relevant left tweets have been converted into the CSV format to store and then to further process on it in the next step.

3.3 Sentiment Calculation

Once the data is ready and tokenized for the sentiment calculation, then it has been used to identify and categorize the opinions of the users which are expressed in the tweets of the pandemic. Each token has been evaluated based on the sentiment value provided to it based on the opinion it has and the emotions it contains. The VADER algorithm is used to calculate the text sentiment analysis based on the tweet's opinions, it works using the polarity based and the sentiment lexicons. Once the tokens are ready, then VADER algorithm is applied to these tokens, then it added the polarity to each of them. Polarity is the measurement for the positive and the negative of the sentence or the word specifically.

These tokenized tweets will be analyzed to see the public opinions and experience related to the employment trends happened during the pandemic period using the Vader algorithm. In this stage, the number of occurrences of the negative and positive words in the tweets will be analyzed to determine the sentiment score of the data. As when the sentences are provided to the Vader algorithm, it provides the

rating between -1 to 1 to each sentence, because it analyzes the input based on the words it used like what type of emotions are used, which emojis are used when the tweet was done. Then the tweet has done with the positive attitude then its sentiment value will be greater than 0 and less than 1, else if the tweet has been done with the negative attitude, then the sentiment value will be less than -1 but greater than the 0.

Furthermore, once the sentiment has been created for each of the tweet, then it has been classified into the aggregation, because there are thousands of the tweets done by the users daily and we can't display each tweet value, so the final results are summarized into the daily average of the sentiment value. The average of the sentiment has been taken by using days, month and the year.

3.4 Covid Cases Data

This is the second dataset of this research. This COVID-19 cases data has been collected from the World Health Organization and then it is cleaned according to the requirements of our research purpose. This data has been acquired to plot the COVID-19 cases data around the globe with respect to the employment trends visualization data. Furthermore, when these both trends have been visualizing in the results section, it will be helpful to see the growth of the COVID cases weather the increase in the employment trends have been seen or not. It will support the employment sentiment visualization results to identify more reasons for the changing the employment trends.

The data is in the csv format and some of attributes are following:

1. Continent: It defines the region of that record
2. Location: It defines the country where the COVID cases belongs to and the COVID-19 cases are identified.
3. Date: It defines the date when this record was created.
4. Total cases: It's the current total COVID-19 cases in that particular country till above date.
5. New cases: It's the new COVID-19 cases in that particular country on above date.
6. Total deaths: It's the current total deaths due to COVID-19 virus in that particular country till above date.
7. New deaths: It's the new deaths count due to COVID-19 virus in that particular country on above date.
8. Positive rate: It's the new COVID-19 cases positive rate in that particular country on above date.
9. Population: It's the current population of that above mentioned country of the region.
10. people fully vaccinated: It's the current fully vaccinated people count of that above mentioned country of the region.

Furthermore, the above stated attributes will be use to add the reason to the results. The COVID-19 cases data for the whole world will be use with majority of the results sets, but for local country results, specific country related data will be filtered based on the location and continent in the data. Once they are plotted

into the visualization, they will make more sense to analyze the impact of the COVID-19 cases with respect to the employment sentiments in the world.

3.5 Timelining

After the sentiment calculation, all the sentiments of the people towards the employment trends during pandemic will be arranged time wise according to some specific interval. The timelining process of the data will be applied to both of the datasets. Process data will be visualized using different plots for each specific time period. These plots consist of the covid effects on employment location wise, each month wise, different layers wise with respect to the covid data. Different employment trends with respect to the COVID-19 cases have been organized, and then overall covid impact on the employment throughout the world will be analyzed based on different time intervals.

The aggregate results for the timeline have been created using the SQL queries in the SQL Server database where the other sentiments have been imported to map it on the Power BI tool in the next chapter. These data have been aggregated for each day as there were thousands of the tweets which was impossible to display in the results. Once the daily sentiment was ready, then it is ready to import into the next step.

3.6 Data Trends

As the visualization is the best way to identify the trends in the data, so in this part the results taken from the above timelining as the aggregated data. Once the data has been aggregated and ready for the results to plot, it has been imported from the SQL server to the PowerBI tool. Both datasets that are COVID-19 data and the employment related data have been imported as tables and the relation has been created among both sources in the tool.

The employment trends for the COVID-19 pandemic will be visualized using different plots against each layer of COVID-19 among different countries of the world, and the results will be analyzed using different aspects of the data. The arrangements of the timelining data will be used to identify the various trends in the data. These trends will be analyzed with respect to the employment conditions during COVID-19. First, the data trends for the employment from tweets will be analyzed for the whole world with the COVID-19 cases for the whole year.

Furthermore, the trends will be generated for different continents of the world and some major countries in it. The work from home sentiments will also be generated with respect to the COVID-19 cases using the tweets data. Another major result of this research is related to the work from home, these results will show the sentiments of the public tweets related to the work from home during the pandemic. Lastly, the local trends will be generated for Pakistan to visualize the Covid-19 cases data and employment trends.

4 Results

The first stage of the results and analysis is to fetch the COVID-19 tweets IDs from the GitHub, then based on that IDs the respective tweets have been fetched. Once the COVID-19 tweets from the twitter have been fetched then it is filtered using the above keywords, then the filtered tweets have been used as the employment related tokens, then the remaining data has been used to create the sentiments using the VADER algorithm. generate the results of the employment trends. These employment trends consist of various regions of the world.

Some results consist of the overall status of the employment trends with respect to the COVID-19 total cases throughout the world. These COVID-19 cases have been taken from the United Nations website and then it has been imported into the SQL databases for adding them into the visualizations.

Some of the results consist of the various regions in the world and within that region various significant countries have been selected to display in the results section with the COVID-19 cases. These regions consist of the Africa which countries are Ghana, Kenya, Nigeria, South Africa and the Tanzania. Europe region countries list are France, Norway, Spain, Sweden, United Kingdom. Asia region countries consist of the China, India, Indonesia, Japan and the Pakistan. America region countries consist of the Australia, Brazil, Canada, New Zealand and the United States of America. Besides this the local Pakistan country comparison is also created with the employment trends and the COVID-19 cases as well. Now we will explain all the results below and see the trends which are generated from two data sources.

4.1 Global Worldwide Employment Sentiments With COVID-19 Cases

When we generate the sentiments of the employment related tweets, then we got thousands of sentiments which are having all the tweets for one year. Then we aggregate those sentiments into average daily sentiments and we got around 365 entries of the sentiments for each day because we have to map it into the visualizations results. Once we got the daily sentiments, we have taken that data and imported in the Power BI tool. Furthermore, the covid cases data also have been imported in SQL first and then imported into the power bi tool and the results have been plotted in the below diagram.

As we can see in the following Figure 2 in the May, June and July 2020 the purple line the people Sentiments of the employment was too low and same time the COVID-19 cases started to rise. This was because on that time people were too much had fear for the new virus and the whole world was stop and people use to stay at home all day. Gradually, everything comes to normal and people have created habit to live with it and we can see that in Sep, Oct & Nov the cases were too high but the sentiments towards the employment were rising towards positive.

Furthermore, we can see that during the month of the march 2021 both sentiments of the people towards the job and the covid 19 cases are on same places, which indicates that the massive hiring after the covid period has been done. Between that we can see that the employment trends of whole world have been increasing after July 2020 and it was never declined after that, which means that when the COVID arrived

in the whole world during May, June and July 2020, many people were fired because many of people assumed that we will never continue the same lifestyle again and this way many companies were closed and millions of the people have lost the job during that period from the whole world. But after sometime people are used to it of this pandemic then everything comes to normal and world starts to open then the sentiments of the people are also getting positive day by day.

4.2 Employment Sentiments for Asia

As the Asia continent consist of the various countries, but we have selected only top five countries to see the impact of employment trends in those countries. Those countries consist of the China, India, Indonesia, Japan and Pakistan. The average sentiments for the twelve months from March 2020 till April 2021 are following:

As we can see five major countries of Asia employment related sentiments in the above Figure 3. Starting from the Pakistan country, we can see in March 2020 the sentiments of the people of Pakistan is very low as its almost -1, but after that it increases gradually till the starting of the 2021 and it went again in the negative for some time, which means that the residents of the Pakistan country were too much feared in the beginning period of the COVID-19 and then they make a habit of living with it. Also, the similar behavior for the China is been observed, we also know that the China is the first country were COVID-19 was hit, so from march 2020 the condition was not even good in China, we can see the negative sentiments in May 2020 in China as well. But after that it never goes in negative because after that virus has been went away from the Chine because of the good governance and management in the whole country.

Another country which starts with the negative country is India, as we can see that it starts with the less negative sentiments but we can also see that it never settled at any point, the sentiments were going in positive for some time, but it goes in negative as well for some time. As India also experience the worst COVID-19 period in the end of the 2020 & early 2021 period, they lost various people during that COVID-19 layer.

Another big country is Japan, we can see that Japan is only country which have the negative sentiments towards employment in the beginning which is March 2020 but after that it never goes to negative sentiment, only it goes to zero which is the neutral sentiment towards the employment.

The last country in Asia is Indonesia, we can observe that it is the only country among Asian countries which hits the max positive value in April 2021, as it was having the lowest COVID-19 during that period as compare to the other countries in Asia. So, overall, the Asian countries were having the positive sentiments most of the time for these twelve months of the COVID-19 period.

4.3 Employment Sentiments for America & Oceania

As both the America and Oceania continent consist of the various biggest countries of the world, but we have selected only top five countries from both regions to see the impact of employment trends in those

countries. Those countries consist of the United States of America, Australia, Canada, Brazil and New Zealand. The average sentiments for the twelve months from March 2020 till April 2021 are following:

As we can see five major countries of America's and Oceania's employment related sentiments in the above Figure 3. Starting from the America country, we can see in March 2020 the sentiments of the people of America were positive and till the end of this analysis, it never goes into negative despite the fact that we heard various people were lost the jobs in the United States of America as well, but here we took the average for whole month, so majority of the people's sentiments are above the neutral line.

Another country in Oceania's continent is the New Zealand, we can see that the sentiments of the people of this country is very abnormal, as it starts with the negative in March 2020 and it went again positive in April and May but after that it went to negative again. It continues to fluctuate like this till the end of the March 2021. Let's see Canada now, which also never goes into the negative sentiment as well, we can see that it starts with the high positive sentiments and it also fluctuate but never goes into the negative part because of the good governance in the Canadian country. Another Oceania's country Austria, which sentiment starts with the negative, as there were high COVID-19 cases in early second quarter of 2020, but gradually they manage with it, also in third quarter they manage the cases and learned how to survive with the virus and the pandemic, that why we can see that in the third quarter of 2020 they sentiments of the employment is increased and it never goes into the negative part after that till March 2021.

Another major country of America continent is the Brazil, we can see that the sentiments of the people of this country are very dynamic, as it starts with the negative in March 2020 and it went again positive in April and May but after that it went to negative again. It continues to fluctuate like this till the end of the March 2021. So, overall, the American and Oceania countries were having the positive sentiments most of the time for these twelve months of the COVID-19 period in analysis period.

4.4 Employment Sentiments for Europe

As the Europe continent consist of the many biggest countries of the world, but we have selected only top five countries to see the impact of employment trends in those countries. Those countries consist of the United Kingdom, Sweden, France, Spain and Norway. The average sentiments for the twelve months from March 2020 till April 2021 are following:

As we can see five major countries of Europe employment related sentiments in the above Figure 5. Starting from the United Kingdom country, it never goes into the negative employment sentiment because it was one of the very well managed and organized countries during the COVID-19 period. As it starts with positive sentiments but it goes below the mark where it started. And it also ends with the positivity which means that the public of the United Kingdom were happy with the employment related things in the country. Another major country of Europe continent is the Sweden, we can see that the sentiments of the people of this country are too much dynamic, as it starts with the very positive in March 2020 and it went to negative in June but after that it went to positive again. As we can observe it continues to fluctuate like

this till the end the of the March 2021 because of the employment conditions were very bad during the COVID pandemic period in Sweden.

Let's observe another major country of Europe which Spain, it starts with the negative sentiments as well but it recovers very well and it never goes into the negative sentiments after March 2021 as the COVID-19 cases were in Spain were decreasing day by day and the employment related things are getting normalized in Spain. Another important and big country of the Europe is Norway, which is the only country in Europe out of six which never goes into the negative sentiment as well, we can see that it starts with the high positive sentiments and it also fluctuate but never goes into the negative part because of the good governance in the Norway country and in the last we can also see that it reaches to the maximum point of the positive sentiments which indicates that the things were quite stable related to the employment in Norway.

The last country in the Europe region is France, we can observe that it only goes into negative only one time during whole year analysis in June 2020, as it was having the high COVID-19 cases during that period as compare to the other countries in Europe. So, overall, the European countries were having the positive sentiments most of the time for these twelve months of the COVID-19 period.

4.5 Employment Sentiments for Africa

As the African continent consist of the many biggest countries of the world, but we have selected only top five countries to see the impact of employment trends in those countries during those periods. Those countries consist of the South Africa, Tanzania, Ghana, Kenya and Nigeria. The average sentiments for the twelve months from March 2020 till April 2021 are following:

As we can see five major countries of Africa's employment related sentiments in the above Figure 6. Starting from the Ghana country, we can observe that it started too much in negative sentiments for employment in march 2020 but gradually it increases as Government improved the situation so that public have learn how to live with this pandemic, then we can see that it never goes into negative again. Another major country of Africa continent is the Nigeria, we can see that the sentiments of the people of this country are changing very rapidly, as it starts with the positive in April 2020 and it went again negative in July and August but after that it went to positive again. It continues to fluctuate like this till the end the of the March 2021 and end with positive employment sentiment.

Now let's observe another country of Africa i.e., Kenya, which have also dynamic sentiments as it also fluctuates too much but it was in positive from start but in later first quarter of 2021 it went into negative sentiments. Same case is with the South Africa, as it was having the majority of the cases of COVID-19 among all the five countries. It also fluctuates too much like the Nigeria as it also ended with the positive sentiments in the first quarter of the 2021. The last country of the Africa region is the Tanzania, which also fluctuates too much as it like Nigeria and it also ends up with the positive employment sentiment as well. So, overall, the African countries were having the negative and positive both sentiments most of the time for these twelve months of the COVID-19 period.

4.6 Employment Sentiments for Pakistan with COVID-19 Cases

The local sentiment of the employment for one of the Asian's country Pakistan has been created for the twelve months from March 2020 till April 2021 are following:

As we can Pakistan's employment related sentiments with the COVID-19 cases as well in the above Figure 7. It started with the March 2020 we can see the average sentiment of the public opinion towards the employment was very low when the COVID-19 first wave just started because the people were too much have fear and everything started to close in Pakistan too like rest of the world. As we can see that when the COVID-19 cases were on peak in June 2020, the sentiments towards the employment in Pakistan were also near too negative, but as days passed people try to live with this pandemic.

As we can see that the Covid cases are declined due to the strict government policies to shut down each and every town in the whole country also the sentiments of the people towards the employment are also near to zero which is neutral, but when in Nov 2020 the cases again starts to increase and Government again impose the smart lockdown so that the employment related sentiments of the public are also going towards the negative part, hence we can also observe that when in first quarter of the 2021, the Covid cases again rise and we can see that the sentiments of the people were also went to negative again because people were not satisfied with the Government policies. So, overall, the Pakistan country was having the negative and positive both sentiments most of the time with respect to the Covid cases for these twelve months of the COVID-19 period.

4.7 Worldwide Work from Home Sentiments with COVID-19 Cases

The work from home sentiments has been generated from the public COVID-19 tweets by filtering them based on work from home keywords in the text of the tweets. Once the tweets have been filtered then they are imported in power BI tool to generate the results for the visualizations. These work from home sentiments have been created from the April 2020 till March 2021, for almost 1 year data. This result set also contains the COVID-19 cases data, to visualize the trend of the work from home with the COVID-19 cases spread all over the world. The work from home sentiments with the COVID-19 cases can be visualized in the below figure 08.

As we can see from starting of this result in April 2020, there was very few COVID-19 cases were identified throughout the world, where as the work from home employment culture was also started from that time. As we can see, there is some tweaks can be seen in the month of July when the sentiments of the work from home was decreases, but the COVID-19 cases were not increasing drastically, it can be because some employers totally end up the work station and some employers call their employees again to office rather than the work from home continuation.

Furthermore, we can observe that the sentiment towards the work from home is increased in the month of the September 2020, as the cases of COVID was increasing rapidly as well in the whole world, on that time the whole world was locked down and most of the countries seen the curfew situation in some of their cities, so this way many of the employees were locked in the home and they were working from their home and using various communication platforms to connect with the team. Therefore, After December 2020 we can see that the work from home sentiment is started to decrease from the maximum point in the result also when the COVID-19 cases were on peak too, that was the time when everything in the world started to open gradually and lots of the employees started to work from office by having the proper following COVID SOPs. That's why we can see that in February 2021, the work from home sentiment went into the negative for the first time in the last whole year, that was the time when all the employees were returning to the office with taking the vaccines doses and the COVID-19 SOPs. So, overall, the results for work from home having the positive sentiments most of the time with respect to the COVID-19 cases for these twelve months during the COVID-19 period.

5 Conclusion

In this chapter we will going to conclude the findings we did in the last chapter of the results, also we will be discussing the contributions of this research thesis. We will conclude what has been achieve in this research and what will be the future work for this topic.

As this research work was done to analyze the impact of the COVID-19 on the employment throughout the world. Therefore, there are lots of conclusion can be made from the above results with respect to the overall world employment sentiments and the regions wise as well. During the study we have analyzed various regions of the world and the top countries of that particular regions and we have conclude that there was a positive impact of the COVID-19 cases on the employment earlier in the first or second layer when the whole world was shut down, but when things starts to open and the people of different countries learned how to live with this pandemic then we can see that in various countries the sentiment towards the employment of the people were went to positive. We can also advise the employers from this research that if this type of pandemic came again in the future, then the firing the employees is not the solution, because this way the unemployment will going to increase in that particular country and overall world, the solution is to provide the employees the flexibility to work from various remote positions as well, like to work from the home or from any place where they feel comfortable. For the future work, we can further enhance the current produce data on various trends, like to predict the future forecast about the employment related activities for any further COVID layer or for the same or higher intensity pandemics. We can also use this data with the public personal data to create relationships among them and identify the reasons for the negative sentiments towards the employment or find the various elements for the employment lost. From the results which are extracted from the tweets of the public, we can identify the direct impact of the COVID-19 pandemic on the employment and many people have lost the job during that pandemic.

Declarations

Conflict of Interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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Figures

Figure 1

Architecture Diagram

Figure 2

World Wide Employment Sentiments

Figure 3

Asia Employment Sentiments

Figure 4

America’s & Oceania’s Employment Sentiments

Figure 5

Europe’s Employment Sentiments

Figure 6

Africa’s Employment Sentiments

Figure 7

Pakistan’s Employment Sentiments

Figure 8

World Wide Work from Home Sentiments