Artificial Intelligence (AI) technology for Monitoring COVID-19 diagnosis to prevention and control

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Abstract

"COVID-19" is one of the most important issues facing our daily lives. Thousands of former infected people find it difficult to regain their health before infection with Corona, Today, they suffer from fatigue, pain, and constant apnea. This is one of the threats to our world today. This negatively affects many of the political and economic repercussions. Artificial Intelligence (AI) technology can build a smart platform to automatically monitor and predict the spread of this virus. AI provides up-to-date information useful in predicting potential sites of infection and preventing this disease, this is by utilizing data mining and real-time processing. The use of the Bayesian network model is a useful approach to monitoring and diagnosing (COVID-19) in different age groups. This paper presents Bayesian network techniques for (COVID-19) testing to identify the most affected age groups (COVID-19) from the database. The results show that an AI approach that includes data analysis, mining, and processing is a powerful technology. The decision-maker can quickly detect and prevent the disease, identify the age groups most affected by the disease, prevent infection and fight this epidemic.

Keywords: *COVID-19, Artificial Intelligence (AI) technology, Document Clustering*, *Bayesian Network*

1. Introduction

Most infected with the emerging coronavirus, (COVID-19), have mild to moderate respiratory illness and recover without the need for special treatment. However, some will become seriously ill and need medical attention. Older adults and those with underlying medical conditions such as cardiovascular disease, diabetes, chronic respiratory disease, or cancer are more likely to develop serious illnesses. Anyone can get sick with the COVID-19 virus and become seriously ill or die at any age.

Artificial Intelligence (AI) technology is used in Data mining for disease detection, screening, analysis, prediction, and tracking of current and potential future patients. Artificial Intelligence (AI) is applied to track confirmed, recovered, and death case data. Collected the latest information regarding (AI) for COVID-19, then analyzed the same to identify its possible application for this disease [1,2].

Artificial Intelligence (AI) technology is an upcoming and useful tool to identify early infections due to coronavirus and also helps in monitoring the condition of the infected patients. It can significantly improve treatment consistency and decision-making by developing useful algorithms. AI is helpful not only in the treatment of COVID-19 infected patients but also for their proper health monitoring. It can track the crisis of COVID-19 at different scales such as medical, molecular, and epidemiological applications. It is also

helpful to facilitate the research on this virus using analyzing the available data. AI can help in developing proper treatment regimens, prevention strategies, drug and vaccine development [3,4].

Mining patient data in bases of pilin is a relatively new approach to detecting viral spread. Data mining is defined as "the semi-automatic discovery of statistically significant patterns, associations, changes, anomalies, rules, structures, and events in data".

Disease prevention with the help of using data mining strategy as real-time data analysis, AI can provide up-to-date information as an alarm indicator that is useful in the prevention of this disease. It can be used to predict potential sites of infection, virus flow, and the need for family and healthcare professionals during this crisis. Artificial intelligence is useful for the prevention of viruses and diseases in the present and the future, with the help of past guided data on the prevailing data at different times. Defines the features, causes, and causes of the spread of infection. In the future, this will become a very important technology for fighting epidemics. It can provide a preventative measure and fight many other future diseases. AI will play a vital role in providing more predictive and improving preventive healthcare [5,6].

We need pathogen testing to identify early infection due to the coronavirus, it is important for vaccine companies that want to ensure the best vaccine is produced before it is distributed. The results are used to discover the risks and side effects that can come as a result of taking vaccinations and correcting them before it is too late. Discover the appropriate vaccine for each age group, test new technology, and report problems as a result of the mutation and evolution of the virus.

This paper mainly discusses the issue of early detection of the emerging coronavirus in different age groups, early infection testing, detection of patients in different databases, disease vulnerability assessments, and security of electronic health information systems. The paper is divided into the following sections: The first section is the complete introduction: a general review of the early detection of the emerging coronavirus in different age groups, and an overview of the use of artificial intelligence in electronic health sites. The second section describes relevant work and the current discussions. Section 3 presents the various findings of this study. Finally, Section 4 concludes this paper with a summary and conclusions.

2. Related work

In this global health crisis, the medical industry is looking for an Artificial intelligence strategy using new technologies to monitor and control the spread of the COVID 19 (Coronavirus) pandemic. Artificial intelligence is one of the technologies that can track the spread of this virus, and identify high-risk patients. It is useful in being able to control this infection in real-time. It is also possible to Predict mortality risk through appropriate analysis of past data for The patients. AI can help us fight this virus by tracing the population from examination, medical assistance, notification, and suggestions about Infection control [7]. This technology has the potential to Optimize treatment planning and reporting outcomes as shown in table 1.

Table 1: General procedure of AI-based applications that help general physicians to identify the COVID-19 symptoms Key

II) Monitoring treatment production	AI can build an intelligent platform for automatic monitoring And predict the spread of this virus. A neural network can also They are being developed to extract the visible and invisible features of this disease, and this IT would assist in the proper monitoring and treatment of the injured Individuals [6e8]. It can provide daily services Patient updates and also provide solutions to follow in the COVID-19 pandemic [8,9].
iii) Contact tracing of infected individuals	AI can help analyze the level of infection by identifying these virus Groups and "hotspots" and you can connect successfully Figure 1. The general trend of AI-based and non-AI-based applications helps general medical professionals identify COVID-19 symptoms. Tracking and monitoring of individuals. can predict Future planning for this disease and the possibility of its recurrence. Fourth) Drop cases and deaths This technology can track and predict the evolution of the nature of the virus from available data, social media, and media platforms, about Infection risks and possible spread. Moreover, it can predict the number of positive cases and deaths in any region. Artificial intelligence can help Identify and take on the most vulnerable regions, people, and countries Accordingly [10].
Iv) Development of medicines and vaccines	Artificial intelligence is used in drug research by analyzing available data about COVID-19. It is useful for drug delivery design and development. This technology is used to speed up drug testing in real-time, As the standard test takes a lot of time and thus helps with that Significantly speed up this process, which may not be possible with a file Human [6,7]. It can help determine which drugs are useful to treat Covid-19 patients. It has become a powerful tool for diagnostic testing Designs and the development of vaccination [9,11]. AI is helping at a much faster rate than usual in developing vaccines and treatments and in developing clinical trials.
vi) Reducing the workload of health care workers	Due to the sudden and massive increase in patient numbers during the COVID-19 pandemic, healthcare professionals have a very high workload. Here, artificial intelligence is used to reduce the workload of healthcare workers [12e17]. Helps in early diagnosis and Providing treatment at an early stage using digital methods and Decision science offers the best training for students and clinicians Regarding this new disease [18, 19]. AI could impact patient care in the future and address further potential challenges that reduce workload from doctors.
vii) Continuous prevention of disease	With the help of real-time data analysis, mining, and processing, AI can provide up-to-date information that is useful in predicting potential sites of infection and preventing this disease. Artificial intelligence is useful for preventing diseases and viruses in the future, with Help from the previous directed data on the data prevailing in a different time. Identifies the characteristics, causes, and causes of the spread of infection. In the future, this will become an important technology for Fighting other dangerous epidemics. can provide Preventive measures and fight many incurable diseases. In the future, AI will play a vital role in providing more predictive and Preventive health care[13,14,15,16]

3. Proposals

We have developed a framework, MADAM ID (for virus data mining and virus detection automated models for virus detection); It is an upcoming and useful tool to identify early infection due to coronavirus and also helps monitor the condition of infected patients and predict new infections.

We are building a model to predict cases of virus infection and assess the state of the spread of the virus. This model is not only useful in treating COVID-19 infected patients but also for monitoring their proper health.

This model can track the COVID-19 crisis at different age levels as well as different levels such as medical, molecular, and epidemiological applications. It is also useful to facilitate the search for this virus using the analysis of available data.

We will use how to extract, analyze and search for data in different health systems through one of the technology tools (data mining). This paper explains the vision of predicting cases of HIV infection and assessing the status of the spread of the virus. And the general arrangement for extracting the required data through electronic databases, to combat the virus and reduce the damage resulting from it by making relief arrangements from a comprehensive point of view and by analyzing the results of data surveys. Where it depends on the use of test models to assess the validity and integrity of data and to identify research methods that define test criteria that can exceed the limits of the available data, such as using the model proposed in Figure 1 "as follows

• (Bayes network) to enable the decision-maker to know the causes of the spread of the disease. Data mining tools will be adapted to data mining.

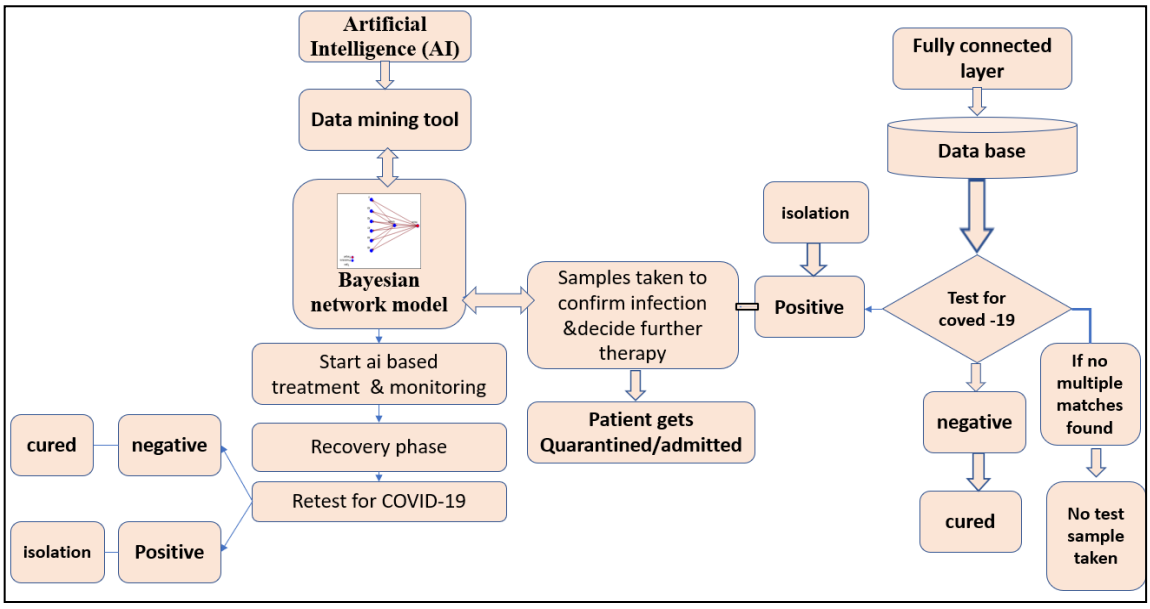

Figure 1: physician identify the possible match of covid -19 symptom with AI Support

(Bayes Network) to enable the decision-maker to know the reasons for the spread of the disease. The data mining tools will be adapted to extract data from the database through the Moodle application shown in Figure 1. After the symptoms start on the patient, samples are taken to confirm the infection and determine the additional treatment, and the patient receives

the appropriate treatment and is quarantined/recognized until the patient reaches the stage of recovery. It uses technology tools (data mining). To predict virus cases and assess the spread of the virus. The general arrangement of data extraction through the electronic database

4. Testing the (COVID-19 symptoms Key) by using the Bayesian network model

The Bayesian network model provides a brief way to describe the joint probability distribution for a certain group of the random variables (x1 x2x3 x4 x5, y) Conditional probabilities for each variable show that the values of the data are divided into proportion to the origin of the node and the similar node. As an alternative for the analysis process, you can use them as an indicator of the evaluative figure to compare the accuracy of the model that was predicted based on the figure and is used as an indicator of the process of prediction and the probability of testing the flexibility (feedback value and objectivity.)

a. As it is the case with the node of probability. The figure shows that each model produces similar results. but the model (the retrained model is used for comparison of the data for these standards) of flexibility and objectivity) it is a little better because it contains a higher level than that of confidence in its prospects,

b. We can suppose that v forms a set of the classy random variables and that v=g e the figure will be a continual ring so we can find the direction of the node v and a set of the directive edges

c. The model of the Bayesian network consists of the figure G besides the table of THE conditional probability for each specific node of the original node value

d. Thus, it will be possible to calculate the joint probability distribution of the random variables in the shape OF V AS producer for the conditional probabilities of all the nodes, due to the value of each node,

e. A set of variables is given in the shape of V and a sample of the adjacent data as in table 2 and figure 2. that show the presence of the task for installing the Bayesian network model. It is called for identifying the edges of the figure the structural building of the variables.

Table 2: The following notation is used throughout this algorithm description

G	A directed acyclic graph
D	A Dataset
$X_1, X_2, X_3, X_4, X_5, Y$	Target variable

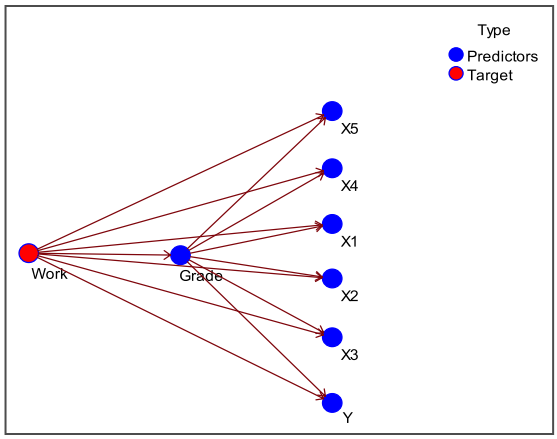

Figure 2: Bayesian Network

Table 3: conditional probabilities of grade

Parents	Probability		
Work	1	2	3
1	0.38	0.31	0.31
2	0.08	0.58	0.33

- The probability for the occurrence of the flexibility is none,38% in the first case
- The probability of the occurrence of the non-objectivity,58% in the first case

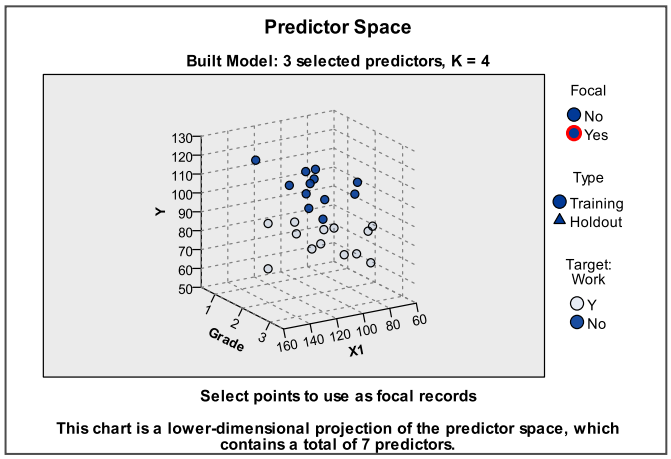

Figure 3: predictor space

Figure 3 shows the probability and expectation of the 3 dimensions and the distance that contains "v". random probabilities as shown in dark blue for non-probability of the occurrence for which the measurement is run and the light blue color which achieves the probability of the occurrence for the event, table 4 shows the probabilities and the expectations of the 3 dimensions and the distances.

Table 4: possibilities and expectation triple dimensions and distances

Point Type	X	Y	V4
order set	0	0.7778	Grade
scale	0	6.2222	Bias
scale	0	5.4444	Y
scale	0	4.6667	X3
scale	0	3.8889	X5
scale	0	3.1111	X1
scale	0	2.3333	X2
scale	0	1.5556	X4
scale	1	5.25	Bias
scale	1	3.5	Hidden layer activation: Hyperbolic tangent Output layer activation: Soft max
scale	1	1.75	Hidden layer activation: Hyperbolic tangent Output layer activation: Soft max
set	2	3.5	Work

$$I(X_i, X_j) = \sum_{X_i, X_j} \mathrm{P_r}(X_i, X_j) \mathrm{Log}\left(\frac{\mathrm{P_r}(X_i, X_j)}{\mathrm{P_r}(X_i)\mathrm{P_r}(X_j)}\right)$$

We start by replacing the information exchanged between the two predictors with the information exchanged between the two conditional predictions given the goal.

$$I(X_i, X_j \,|y) = \sum_{X_i, X_j} \mathrm{P_r}(X_i, X_j, y_k) \mathrm{Log}\left(\frac{\mathrm{P_r}(X_i, X_j \,|y_k)}{\mathrm{P_r}(X_i \,|y_k)\mathrm{P_r}(X_j \,|y_k)}\right)$$

We can build the network by using the calculation between each pair of the variables by using the algorithms for building as the maximum level as it starts with the extended tree with the non-existence of the edges and the signs of the random variable as an approach. Then, it will be found the variable of the non-controller, whose weight with one of the observables is the maximum limit. Then, this variable will coincide with this variable and add its edge to the tree. this process is repeated till the sign is put on all the variables with setting standards for the measurement to the indicator of the assessment. So, we can find the picture or the shape of the probabilities of the variable x2 which is shown clearly in Table 5 as below. We can find in the table 5 cases for the probabilities as the following " in the first case the highest rate of probability of the occurrence of the objectivity is.40%, the second case with 1,%, the third case is 50%, the fourth case is,71%, the fifth case is 50% and the sixth case is 50%:

Table 5 : Photos of the possibilities of the variable

Conditional Probabilities of X2

Parents		Probability				
Grade	Work	< 84.2	84.2 ~ 95.4	95.4 ~ 106.6	106.6 ~ 117.8	> 117.8
1	1	0.40	0.40	0.20	0.00	0.00
1	2	1.00	0.00	0.00	0.00	0.00
2	1	0.00	0.00	0.25	0.25	0.50
2	2	0.00	0.00	0.14	0.14	0.71
3	1	0.25	0.00	0.00	0.50	0.25
3	2	0.00	0.25	0.00	0.25	0.50

"figure" no 5 And no 6 shows the probabilities and the expectations that can build the net by using the non-directive tree for the result into one of the outputs, then the node of the root is chosen and the direction from all the edges to be outside it for each variable of the random variables is identified, for the several predictions and probabilities that can be written or recorded to become the indicator of the measurement,

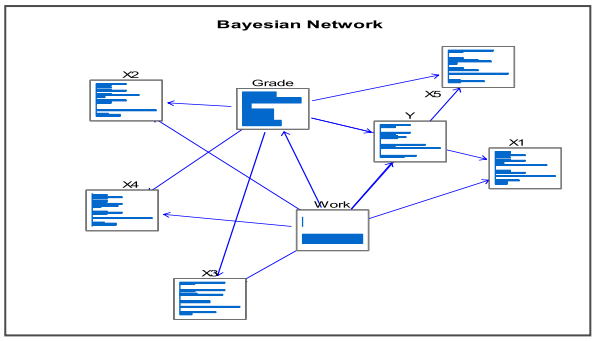

Figure 5: illustrates the possibilities and the network can be constructed expectation

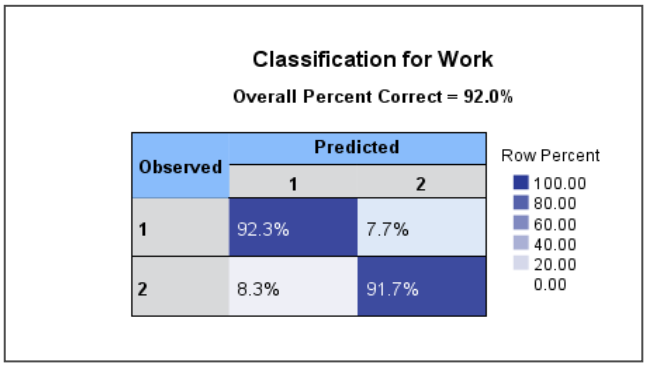

Figure 6: shows the variables and the average rating correct proportions

In this tactic, we find several results for the occurrence that appears better largely. Several of the degrees of decline is < 0.998, or better, it is encouraging, to ensure the improvement in the model of analysis the classes then operating this technology to enable making the comparison between 2 or more models of the same type, the analytical output. this indicates that the function of the Bayesian network can properly predict the rate of 97,85% from the cases that are still very good.

5. Evaluation (Analysis of the results)

Artificial Intelligence is an upcoming and useful tool to identify early infections due to coronavirus and also helps in monitoring the condition of the infected patients. It can significantly improve treatment consistency and decision-making by developing useful algorithms. AI is not only helpful in the treatment of COVID-19 infected patients but also for their proper health monitoring. It can track the crisis of COVID-19 at different scales such as medical, molecular, and epidemiological applications. It is also helpful to facilitate the research on this virus using analyzing the available data. AI can help in developing proper treatment regimens, prevention strategies, drug and vaccine development.

6. Conclusion

The pandemic has created an unprecedented global crisis – a global health crisis, with massive human losses – that has led to the most severe recession the world has seen since World War II." The report predicted a contraction in the global economy and average per capita income this year, pushing millions of people into extreme poverty. Therefore, this paper uses strategies 'Frequency', 'logistic regression' and 'hierarchy of clustering' are useful approaches .This paper can be An important tool to fight disease and limit its spread It helps in decision-making and monitoring of results For the age groups most at risk of contracting the disease, using a strategy System analysis and data mining, and applications Means of measuring the future of this research flow Monitoring may include this can be It is achieved by applying techniques such as Automatic update of the means of measurement and it will be Combined in more than one way in the future Proposed concept with modeling techniques to approach So that the system can detect and Reduce management risks.

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