Applications of Blockchain to fight against COVID-19

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ABSTRACT
In this situation of pandemic, where the whole country and globe is drastically affected by COVID-19 the public sector and governments are continuously exploring new technologies to serve the different purposes to serve the citizens and the economy. Blockchain technology has gained attention across the globe of government as an emerging effective technology. Many government entities have taken steps to implement Blockchain technology. Blockchain has emerged as effective technology promising to emerge as a promising technology. The paper synthesizes literature related to application of Blockchain in different fields in the time of COVID-19. The analysis shows great potential for implementation of Blockchain to enable smart services. The study is about the application of Blockchain in different sectors such as: Contact Tracing, supply chain management, Insurance and disaster relief and weather. The study also focuses on the major issue faced by the clinicians, scientists and researchers studying data behind the crisis is that no such platform or source exits that have verified data which can be further used for study and analysis. Discussion and analysis of MiPasa for the seriousness of the ongoing situation and further what more can happen in future due to COVID-19. MiPasa is using data analytics and privacy tools; the objective is to collect data from different parts and levels.

Keywords: Bolckchain, Contact tracking, MiPasa, COVID-19

1. INTRODUCTION-

COVID-19 has affected almost all the countries across the globe. In this hard time there is a need of technology which can help the growth of economy and also help the health sector in monitoring the people affected by COVID-19. All the health care workers are facing challenges to find a cure for the disease and also find the vaccine in order to stop the spread of the COVID-19. It is seen that there is a constant rise in the people getting affected by COVID-19 across the globe. In this time were the world is facing problems of different types in different sector, climate has shown changes across the globe as the concentration level of harmful gases has reduced. In the end week of May the recorded cases were 57,92, 992 across the globe and 3,57,480 deaths were reported. In such hard time there is a need of technology which can help the health sector in different ways.

Blockchain has developed as a technology which has served different industries and sectors over the time and has created hype due to its applications in different fields COVID-19 has adversely affect the economy across the globe and has also affected the livelihood of the people. In this situation where people have to maintain social distance from each other in order to prevent them from COVID-19 it is important to find ways to serve the people both in terms of supplies and health. Blockchain helps in the saving and keeping safe of the data by high level of security.

In this hard time of COVID-19 Blockchain has emerged as a help in different fields such as: Contract Tracing, Supply Chain Management,
Disaster Relief and Insurance. At the same time there has been visible change in environment and decrease in the concentration of harmful gases and it could also be seen that Ozone layer has healed itself.

Figure 1: The Virus

Studied the application of Blockchain in the field of government services by studying the implementation of Blockchain for security benefits, challenges; hence showing the great potential of Blockchain for smart government services [1]. The study of mitigation has been done on the basis of the sensor networks [2]. The wavelet decomposition with the artificial intelligence conjunction model was studied for the analysis of the quality of water of river [3]. The soft computing techniques were used in order to estimate the spread of virus [4]. The HIV disease spread was studied in the areas of Asian region [5]. The variation in the magnetic fields and the temperature was studied [6]. The three species food chain system was studied using the lypunov function [7]. The big data analysis was done [8]. The Blockchain technology was applied to study the controlling of diabetes [9]. The numerical simulation was done for the COVID-19 virus [10]. The optimization techniques were studied [11]. The prediction of the daily rainfall was done using the ARIMA model [12]. The techniques of classification and grouping of the weather data was done and studied [13]. The model for air quality was studied [14]. Neural network model was used for forecasting nitrogen dioxide [15]. The magnetic effects and temperature for different system was studied [16]. Studied the fractal and wavelet to study air and water pollutants behavior, by calculating fractal dimension, Hurst exponent and predictability index; further concluding time series showing Brownian behavior [17-20]. The Blockchain applications were studied [21]. The bit coin and Blockchain study has been conducted [22]. The

modeling of random fuzziness has been done [23]. The IoT and Blockchain based smart cities study has been done [24]. Application of Blockchain has been studied [25]. Studied the details of IoT in terms of future application and research challenges and how IoT will creating a safer surrounding by keeping the data safe and secured [26]. Studied the application of Blockchain along with IoT, stating that Blockchain and IoT combination is powerful and can have great deal of applications and revolutionary changes in industries by making way for new business models [27]. Studied Sensing-as-a-Service (S2aaS) as emerging Internet of Things (IOT) business model pattern, further the conceptually application and the process of exchanging data for cash using bit coin is studied [28]. Studied the different applications of Blockchain along with crypto currency in terms of security and privacy of the users, further studies the application of Blockchain in multifaceted non monetary systems [29]. The temperature change and IOT based method has been discovered [30]. Studied the application of Bit coin in terms of cash transfer, the study includes proposing a system which will help in easy electronic transaction without relying on trust [31]. Studied the application of internet of things as a new technology which can connect different network of things which are in different domain, the study emphasis on the application of IoT on smart environment [32]. Studied the application of IOT in the field of health and reminder for medicine at home by reminding the medicine schedule, monitoring, updating the medicine data of elderly people as patients [33]. The spread of COVID-19 and time series analysis has been done for Saudi Arabia [34].

MiPasa is a new project which will work for the betterment as it will utilize the data analytics and tools and use it for public health. One of the applications of Blockchain is collection of data and collates patient's data clearly and checks the infected person's health and movements to assure social distance further also protect patient's ID.
Blockchain will play important role in connecting stakeholders in supply chain and provide single source of truth. Blockchain stores data providing verifiability, traceability and transparency.

S. No.	Author Name	Year	Study
1	Nakamoto	2008	Studied the application of Bit coin in terms of cash transfer, the study includes proposing a system which will help in easy electronic transaction without relying on trust
2	Noyen et. al.	2014	Studied Sensing-as-a-Service (S2aaS) as emerging Internet of Things (IOT) business model pattern, further the conceptually application and the process of exchanging data for cash using bit coin is studied
3	Rajguru et. al.	2015	Studied the application of internet of things as a new technology which can connect different network of things which are in different domain, the study emphasis on the application of IoT on smart environment
4	Zanjal et. al.	2016	Studied the application of IOT in the field of health and reminder for medicine at home by reminding the medicine schedule, monitoring, updating the medicine data of elderly people as patients
5	Christidis et. al.	2016	Studied the application of Blockchain along with IoT, stating that Blockchain and IoT combination is powerful and can have great deal of applications and revolutionary changes in industries by making way for new business models
6	Bhardwaj	2016	Studied the fractal and wavelet to study air and water pollutants behavior, by calculating fractal dimension, Hurst exponent and predictability index; further concluding time series showing Brownian behavior
7	Hou	2017	Studied the application of Blockchain in the china government
8	Miraz et. al.	2018	Studied the different applications of Blockchain along with crypto currency in terms of security and privacy of the users, further studies the application of Blockchain in multifaceted non monetary systems
9	Alketbi et. al.	2018	Studied the application of Blockchain in the field of government services by studying the implementation of Blockchain for security benefits, challenges; hence showing the great potential of Blockchain for smart government services
10	Rehman et. al.	2019	Studied the details of IoT in terms of future application and research challenges and how IoT will creating a safer surrounding by keeping the data safe and secured
11	Bhardwaj et. al.	2020	Study the application of Blockchain in the hard time of COVID-19 by implementing the new project and also the application of Blockchain in different fields in the time of COVID-19

Figure 2: The Spread of Virus across the globe

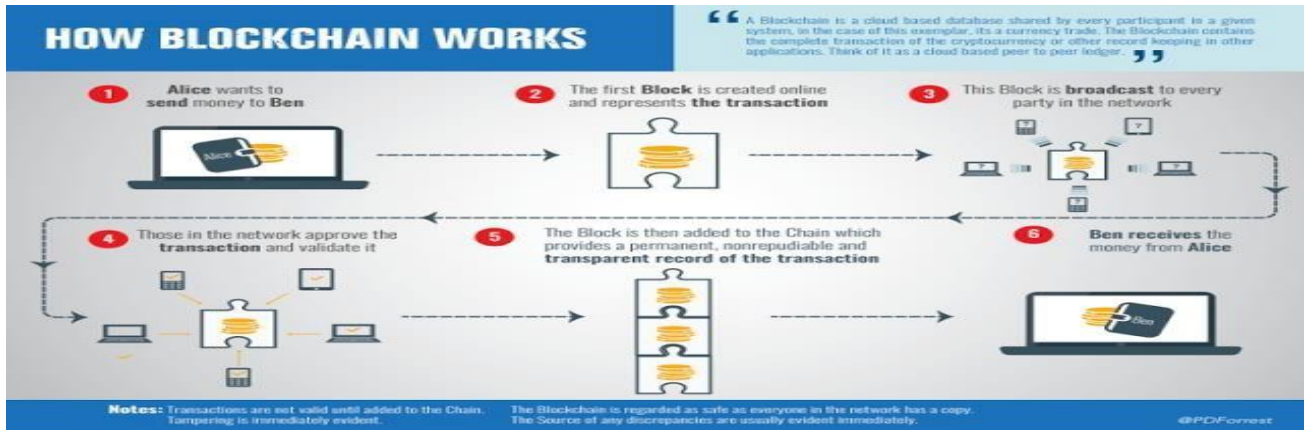Figure 3: The Spread of COVID-19 virus

Figure 4: An example showing working of Block chain

BLOCK CHAIN-Blockchain is a distributed data base existing on multiple computers at the same time. The block keeps adding as new sets of recordings are added in it. Every block has a time stamp and is linked to previous block and hence form a chain. The block chain is used because the collection of the data of weather which is worth too much is required to be kept in environment which will entrust proofs and transactions. The utility tokens tie it together in a efficient and secure manner. The technology with the help of which bit coin and other crypto currency work is known as Blockchain. Blockchain uses technology that uses completely decentralized network to record and process transactions. Blockchain has proved to be and will prove to be a revolutionary technology that will give new shape to future of internet.

APPLICATION OF BLOCKCHAIN IN DIFFERENT SECTORS:

1. CONTRACT TRACING- In this hard time of COVID-19 it is important to maintain correct

balance among the data collected and at the same time protecting of privacy. Blockchain does not have any central authority and the users have full authority on the personal data. The information for COVID-19 mitigation efforts can be shared at the time of protecting the identity and other private information. A Blockchain based system has been proposed for corona virus contact tracing using Bluetooth. Decentralized privacy preserving proximity tracing (DP-PPT), a protocol designed will be used to ensure user's privacy and reduce the risk of data misuse. Another Blockchain based solution has been developed which enables smart phones tracking also assuring user privacy. Useful information can be obtained by tracking COVID-19 which can be used by government and health care organization.

2. MANAGEMENT OF SUPPLY CHAIN- Due to COVID-19 major issues has come up across the global supply chain. The two very main

reasons are: many industries are closed due to safety concern and another reason is the increasing demand of basic commodities and medical supplies. Due to disturbances in the supply the future forecast is also difficult. Blockchain is suitable for supply chains as it connects all the stakeholders in a supply chain and provide single source of truth. It provides transparency and removes data silos while assuring security. TYMLEZ is a volunteered service which will meet the demands in medical product ecosystem
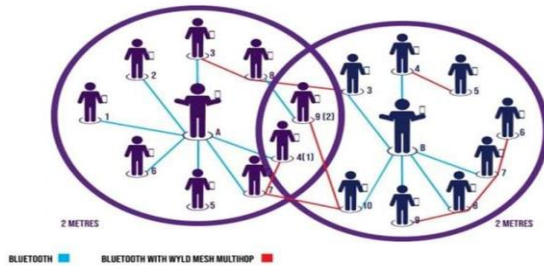

Figure 5: The Bluetooth connections

3. INSAURANCE & DISASTER RELIEF- The complete implementation of the lockdown introduced by the government across the globe has affected many businesses. The physical stores have been shut down; whereas the demand for the basic necessities still exists and is increasing. In this time of financial distress, government has worked in the direction of applying different measures in order to slow down or say control the down fall in the economy, by providing loans and financial life lines in order to some businesses afloat. In terms of loan and insurance industries block chain plays a different role in order to reduce the complications in applications and approval process by removing 3rd part intermediaries and reduces delays in processing. The application of Blockchain helps in fast processing time, lesser cost, less operational risk, fast settlement for all parties involved.

4. WEATHER- COVID-19 has affected almost all the countries across the globe but on the other hand COVID-19 has lead to positive impact on the environment. The global disturbance caused by COVID-19 has affected the nature, weather in numerous ways. The reduced travel plans has shown their effect by

fall in air pollution. It is recorded that in China there has been 25% fall in carbon emission and half (50%) fall in the nitrogen oxides emissions, which has further estimates that by this fall in the emission of these gases has lead to saving of 77000 lives over two months. Till 2020, it was seen that there was enormous release of greenhouse gases produced since the time of industrialization era which lead to increase in the average global temperatures on Earth, which also affected the glaciers as they started melting and hence rising sea level.
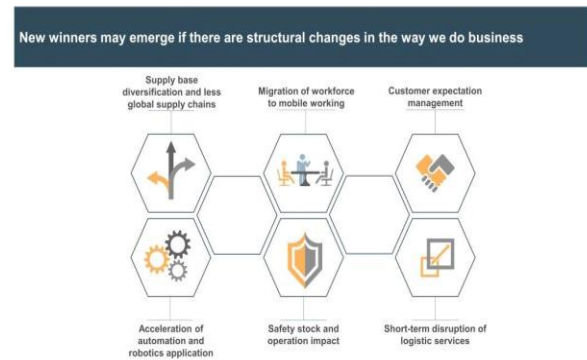

Figure 6: The Blockchain connections

The emerging technology and experts can help in providing data regarding COVID-19 which will help in the better understanding the situation. Major issue faced by the clinicians, scientists and researchers studying data behind the crisis is that no such platform or source exits that have verified data which can be further used for study and analysis. MiPasa is an attempt to study and analyze the seriousness of the ongoing situation and what more can happen in future due to COVID-19.

MiPasa: MiPasa is using data analytics and privacy tools which were earlier only available to the higher financial institutions and use it for the benefit of the people across the globe. The objective of the project is to collect data from different parts and levels. MiPasa has been made in the way such that it can synthesize data sources, check the inconsistency, identify the errors or misleading and easily combine the new data. MiPasa provides data using 3 levels of validation between disparate data sources: 1. Reconciliation of disparate data source like the WHO figures, 2. CDC figures and others, to ensure that the entered data is matching with the actual data, 3. It includes the checking of the data entered and actual data is correct

and similar with the help of WHO report in consistencies or bad data and give public health officials a way to analyze and take preventive measures to handle and answer to public and their sentiments.

The study of real time data from the trusted source helps in finding solution too many problems. The project is launched with the hope and objective that it will serve the purpose by actually mapping all the infected patients using privacy enabled self reporting. By the help of this map of infected patients the health works and scientists to trace the actual position and number of patients affected in the different areas. This will help the other people around to know whether they have been in contact with the person who is already infected by the virus and can immediately see doctors for help. With the help of this project and technology it will become quite easy to actually identify places where the quarantine centers can be set up and also verify self reported data, helping in knowing the spread of virus outbreak. The risk of exposure can also be calculated with the help of the data collected with the help of the application hence helping health officials understand that when, where and what quantity of resources must be made available for them, also will help in guiding the people of different areas to make a decision that whether they should go for a test or not.

CONCLUSION- It can hence be concluded that Blockchain technology has offered great potential in many COVID-19 impacted scenarios, especially in the supply chain. Due to the halt in the investments and requirement of immediate expanses, Blockchain will be forced into a temporary slowdown. Blockchain has emerged as a helping technology in the different sectors to easily conduct some activities which are very important at this time of COVID-19 and also has helped in making tools and applications which serve the purpose of analyzing and studying the pattern, nature and behavior that the virus is adapting and the number of cases.

The study also focused on the major issue faced by the clinicians, scientists and researchers studying data behind the crisis is that no such platform or source exits that have verified data which can be further used for study and analysis. The project MiPasa is studied as an attempt to analyze the seriousness of the ongoing situation and what more can happen in future due to COVID-19.

The study will help the government and concerned authorities by providing an insight for the application of Blockchain technology in our country in different sectors such as: contact tracing, supply chain management, insurance and disaster relief, weather; also understand how MiPasa will be helpful in this situation of pandemic.

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