

# Proposal of DPPM based IOT-Cloud convergent Monitoring system for focused seriation & tracing of 2019-nCoV

Srinivasa Rao Gundu<sup>1</sup>, P Charan Arur<sup>2</sup> Dr. T.Anuradha<sup>3</sup>

Ph.D. Research scholar, Department of Computer Science, Dravidian University, AP, India<sup>1</sup>,  
IEEE Member India,<sup>2</sup>

Professor-in-Computer Science & Registrar of Dravidian University<sup>3</sup>.

**Abstract:** Coronavirus has shown its dangerous effects on human civilization across the globe. Many theories have spread over the media, predicting as a Biological weapon by China or due to the food hobbits in woohan. Cause may anything but spreading of this virus has a typical nature. Present progression of this deadly virus is predicted and analyzed by many research groups around the world. Many of the current studies has limited by predicting the spreading nature of this virus, and many of those studies lack in proposing any monitoring system at individual level. To find a better vaccine for this virus is only possible if and only if, it is predicted properly about the pervasive nature of this virus. This has paper discussed the Proposal of 'IOT (Internet of Things) Cloud Convergent Computation' for the determination of 'Dynamic pervasive predictive model (DPPM)' for tracing of COVID-19 Trends and Solution. IOT - Cloud Convergent Monitoring system is proposed for the critical evaluation process. This estimates the current trends with the help of available data from the Wearable Adhesive RFID Micro Patches which are connected to the IOT Cloud convergent Monitoring system. Then Dynamic pervasive predictive model (DPPM) is possible to obtain using Omega function which is discussed in this paper. Dynamic pervasive predictive algorithm is flexible in updating the latest information and the get proper estimation of the corona virus across the globe and its effects locally and globally

**Keywords:** Corona virus, Biological weapon, 2019-nCoV Virus, IOT Cloud Convergent Computation, Dynamic pervasive predictive model, COVID-19 Trends, Wearable Adhesive RFID Micro Patches.

## I.INTRODUCTION

Devastating and debris avalanche corona virus is erupted from the Latin word which means a crown. It is a group of viruses such as SARS-CoV, HCoV NL63, HKU1 etc which was first discovered around 90 years from now in 1930s in animals and in the humans after 30 years from then in 1960s.

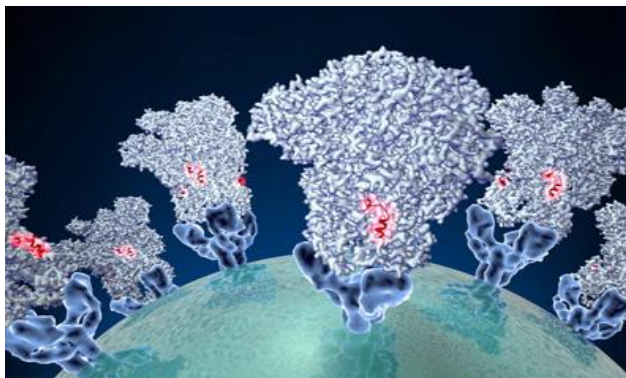


Fig.1. Structure of Corona Virus as observed in electron microscope [1]

Corona viruses are extraordinary viruses which has a nature of serving as the RNA messengers and also possible to change its form into protein in a cell where it resides. This protein will start making the replication functions as since they have recruited the viral genomes. These activities will cross the borders of cellular boundaries which results in devastating conditions. An analysis shows the below details such as,

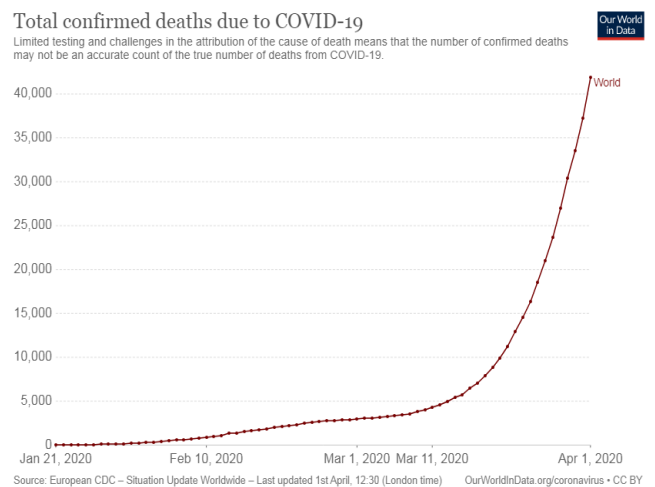


Fig. 2. Total number of Corona deaths as on April 1, 2020[2]

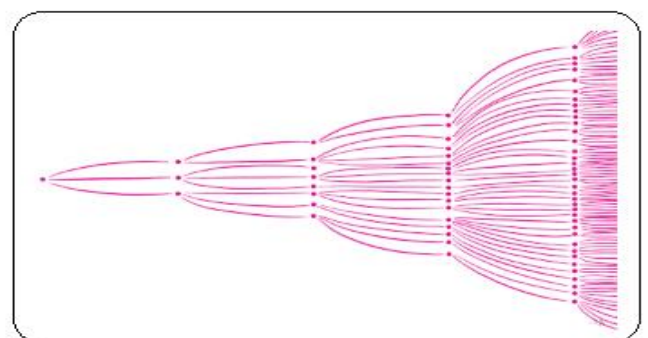


Fig.3. Pervasive nature of COVID-19 viruses [3].

The immediate solution to this problem is to break the chain reaction. The first step is to maintain social distance and living isolated environments. But it is not a permanent solution for these deadly dangerous viruses. These invisible viruses have swallowed much of the human population, economy, and many more developmental aspects [4].

The best solution is to get prepared with a proper vaccine for this vaccine. The development of a vaccine is only possible when and only when one could predict with a proper model to represent the current situation. Employing high-end mathematics and appropriate computations would predict the present status [5].

## II. IOT AND CLOUD TECHNOLOGIES

Generally, IoT is a collection of sophisticated devices that can be connected through a network and perform some operations by some communication [4]. Improved and efficient services are possible to provide its clients/end-users at an advanced level. Billions of clients' devices are feasible and possible to extend. IOT consumes less electrical/battery power. I can be concurrent with cloud and likely to connect with Big data. IOT says it is possible to connect any time, any place, and anything either by the device itself or by using any interface. IoT uses RFID tags, sensors, Nanotechnology,[6]Smart networks such as mesh topology.

IoT is first tested in the 1970's and tried to develop this technology. This word is first used by Kevin Ashton and John Romkey is considered as father of IOT. From the year 2008 IOT is available to general public.

John Mc Karthy is considered as father of cloud computing. It has three major elements as user-interface, back-support and network management divisions. Cloud has three major services [7], they are Software-as-a-Service, Platform-as-a-Service and Infrastructure -as-a-Service. This technology takes the advantage from Web 2.0. Cloud is a scalable technology with less capital investment. It is a Quick, reliable and secured technology.

Cloud computing provides a way to rent the infrastructure, run the environment and to have the services on pay and use model. Cloud style of delivering the services is defined by 'Reese'. As per Reese cloud services are delivered with (i). Service access via web,(ii). Zero capital investment, (iii). Pay per use model or metered services. Cloud computing, is a newly developed model with a collection of resources. This cloud computing is a web-based advancement. Cloud computing, provides the platform for the services, and applications. Cloud computing provides a way to configure and adjust. It would be easy to turn off the services when there is no requirement. Cloud computing is a decentralized way of computing with location independence, device independence computational process [8].

The contents are dynamic and intended for the general public from all corners of the world. A word 'ubiquitous' is used for the cloud which means 'being present everywhere at the same time'. These contents are configurable and sharable. There are three technologies which work behind cloud computing. They are

- i. Virtualization: It shares the resources among the users.
- ii. Service Oriented Architecture (SOA): provides a facility to use the applications as a service irrespective of vendors or technology.
- iii. Utility computing: This service model provides computing resources to the end user and the user can manage his part of the infrastructure.

## III. NEED FOR THE CONVERGENCE OF IOT AND CLOUD TECHNOLOGIES

Convergence of IOT and Cloud will yield good results, due to the below combinational advantages,

IOT has a pervasive in its nature where as Cloud has the Ubiquitous in its nature

IOT is real world where as cloud uses virtual resources

IOT has the limited computation and cloud has the unlimited computational capabilities

IOT has the limited storage capacity and cloud has the un-limited capacity of storing

IOT has the big data source where as cloud can manage the big data

## IV. LITERATURE REVIEW

1. Alessio Botta et al [13]says that as combining the Cloud based processing and Internet of Things, the properties, characteristics and essential specialized information about the two advancements are gathered. The likenesses are looked at and their issues that happen during the combination of these two technologies are to be observed.

2. Christos Stergiou et al [14]proposed an investigation on the security related issues of Cloud and IoT advancement. The general attributes are assembled to observe the advantages of their combination. The security related issues of coordinating Cloud and IoT are analyzed

3. Entao Luo et al [15]manages the safety with respect to security of the gadgets which store the information of healthcare issues. The ongoing improvement in innovation can't satisfy the difficulties looked by the security of information. A few assaults like information loss during transmission and other viable information security issues.

4. Ganapathy S et al [16] has proposed characterization and rule extraction framework, that has includes a Temporal Fuzzy Min-Max Pattern Classification calculation arrange and a Particle Swarm Optimization

calculation rule extraction. The arrangement achievements of TFMM-PSO give better outcomes when looked at.

5. Gelogo Y.E [17]clarifies about the central of IoT that add to the utilizations of U-Healthcare system. This system has a clever information server to store the patient information.

V. IOT / CLOUD CONVERGENT MONITORING SYSTEM FOR CRITICAL EVALUATION PROCESS (PROPOSED SYSTEM)

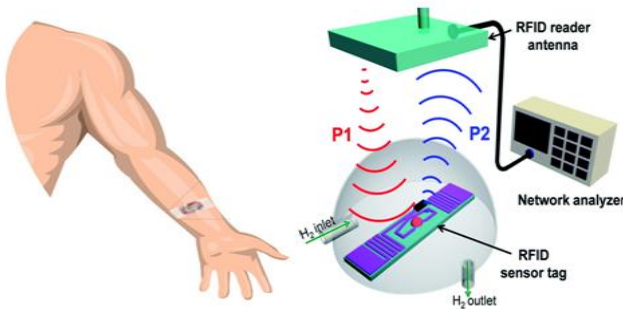


Fig.4. Wearable Adhesive RFID Micro Patches in IOT Cloud convergent Monitoring system.

Wearable Adhesive RFID Micro Patches (WARFIDMP) are commercially available [8] today which can be used for the Monitoring system. These are cortisol sensing patches which are molecularly selective nano-porous membrane-based. These patches are wearable organic electrochemical patches that are non-invasive. At every Commercial Malls and Airports, Railway stations A network analyser is needed to establish and make every individual to pass through such checking which would report to the network.

However IOT-Cloud convergent system is a best solution as of today [9]. IOT creates large amount of data and the cloud is the only solution where these data can flow into the data centres. Cloud is pay and use model and not a monopoly model where the power of sharing the data is vested in some organizations like government bodies. Therefore the scientists around world could get updated information without any delay [10] analysis of available data and getting the data in an appropriate manner we have today Big data. Emergence of technologies like cloud is the end of monopoly on computational resources and a step towards the democratic sharing of computational resources.

The process of monitoring is needed to be using the software based GPS equipments. Generally RFID Patches will have lesser signal range and they are not possible to access from remote locations. Any network connected hand held scanner would report to the network system which would keep informing the monitoring system. This is a combination of hardware assisted software equipped GPS based monitoring system.

This model will undergo 4 levels

Level-1:Device Level: Physical devices are connected - Generally in IOT they are called as things and these are the end points.

Level-2:Connection Level: This connection establishes connection using some networks and provide some information to the sever in the form of a request.

Level-3:Data Collection Level: In this level the data is collected from different geographical locations.

Level-4:Processing Level: Computation process under goes such as evaluation, calculations and prediction part.

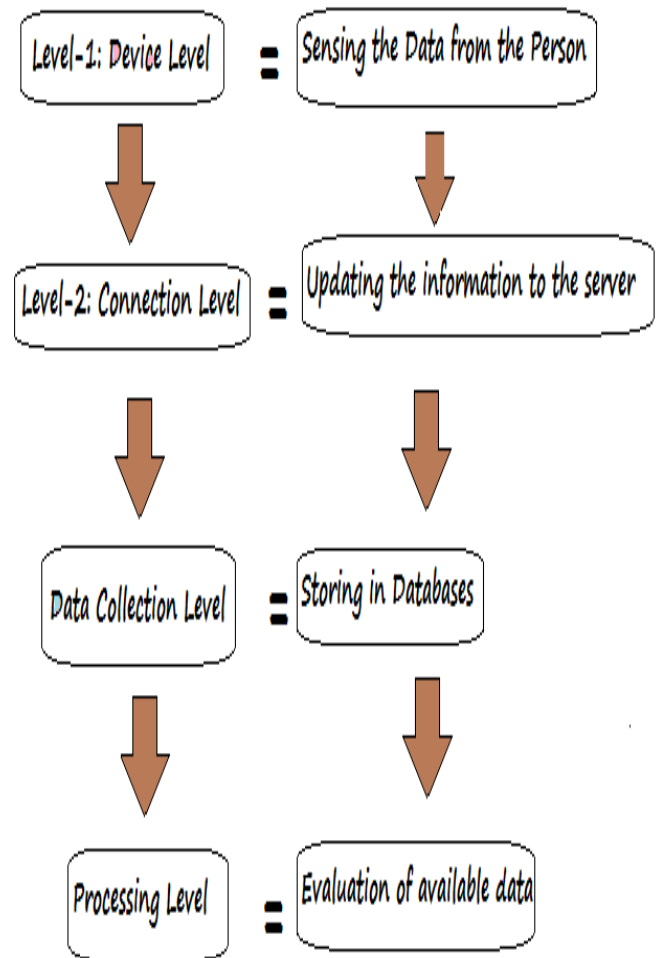


Fig.5 Levels in Proposed Model

As the convergence of IOT with cloud will result in as given below,

- Sensing-as-a- Service (SEaaS),
- Updating-as-a- Service (UpaaS)
- Storing -as-a- Service (StaaS)
- Processing -as-a - Service (PaaS)



Fig.6. Convergence of IOT with Cloud Results

## VI. DATA EVALUATION PROCESS

The below data is need to be evaluated to model the present condition such as the given below.

It might be a Bio weapon, or Originated from the sea food market at Wuhan, or 5G Mobile network, but known to the world from the day of 23 Jan 2020. If this day is considered as the day-1 started for our predictive analysis, till 31 march 2020, it is 68 days. Within these 68 days the below are to be considered,

Parameter set -1~*Number set*: No of suspects, No of tests conducted, No of positive cases, No of negative cases, No of treatment given, No of treatment succussed, No of treatment failed, No of People died. This parameter is connected with time.

We would write them as given way, Here  $dx/dt$  is a smallest part of a 'x' function which has the nature to in comparison with time.

- No of suspects (S)-  $dx/dt*(S)$
- No of tests conducted (TC)-  $dx/dt*(TC)$
- No of positive cases (PC)-  $dx/dt*(PC)$
- No of negative cases (NC)-  $dx/dt*(NC)$
- No of treatment given (TG)-  $dx/dt*(TG)$
- No of treatment succussed (TS)-  $dx/dt*(TS)$
- No of treatment failed (TF)-  $dx/dt*(TF)$
- No of People died (PD)-  $dx/dt*(PD)$

Parameter set -2~ *Rate set*: Rate of increase in suspects, Rate of increase in positive cases, Rate of increase in

negative cases, Rate of increase in survived, Rate of increase in died.

We would write them as given below with a multiplicative rate based function which has the impact of time such as given below,

- Rate of increase in suspects -  $R*(IS)/dt$
- Rate of increase in positive cases-  $R*(PC)/dt$
- Rate of increase in negative cases-  $R*(NC)/dt$
- Rate of increase in survived cases-  $R*(ISC)/dt$
- Rate of increase in died- $R*(ID)/dt$

Parameter set -3 ~ *Population set*: Total world Population[ which is included Number of Continents-7 { Continent-1 -Africa, Continent-2 -Americas(South and North), Continent-3 -Antarctica, Continent-4 -Asia, Continent-5 -Australia, Continent-6 -Oceania, Continent-7 -Europe}], Continent wise- population-Nos

Parameter set -4~ *Evaluation set*: Estimation of Parameter set -3 (Parameter set -1(Parameter set -2))), which predicts a summary of total population of the world interms of how its affected with its rates.

All together to make a Dynamic pervasive predictive coefficient. Let us call this as Omega ' $\omega$ '. This Omega is a function represents a model to show the pervasive nature and the current trends of the Covid-19 virus across the globe.

The trend of this corona virus spreading is not in geometrical progression as all people think. It is at basic level in arithmetic progression and later at one stage based on 'favourable conditions' like not taking the proper precautions it is transforming into geometrical progression and becomes un-controllable which is seen in Italy and Spain. In this entire scenario Russia has shown an impressive narrow escape from the corona virus even though it is a neighbour country of china.

These parameters may look simple but while collecting the data and updating them and making the predictive analysis is not a simple task. This activity involves complexed and complicated evaluation process. Let it be assumed from the local and international media Bureaus update the situation using large number of communicational devices to their head quarters using some networks and dump lot of data, store them in some data centers and use them whenever they need for different purposes such as news broad casting purpose. Here it is possible to make use of IOT based cloud computing applications which would serve the purpose.

## VII. PROPOSAL OF DYNAMIC PERVERSIVE PREDICTIVE (DPP)ALGORITHM

Start

Step-1- evaluation function Omega ( $\omega$ ) (population set, number set,

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                                rate set)
return(evaluation set= mapping (population set,
                                number set)*
                                rate set)

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Step- 2- declaration part::

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declaration of Population set
declaration of Number set
declaration of Rate set

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Step-3- display result of Evaluation function  
Omega (Population set, Number set, Rate set)

Stop

### VIII. LIMITATIONS OF PROPOSED PROCESS

1. As since many number of information is getting updated to the server, server may become slower.
2. It is always may not be possible to track the person if he/she removes his/her Patch.
3. One has to monitor 24\*7\*365 and any major issues has to be reported, this is regarding to one person. Across the globe tracing all the people may not be such simple as like our assumption.
4. Every Patch works like IP Address and then creating that many number of IP Addresses is not possible as on today.
5. Load on local and global servers gets increased and may not be possible to control by any means as on today.
6. Illegal access through hacking by the terrorist groups may result in devastating conditions.
7. Storage of such data in any data center is not possible as on today our technology permits.
8. There are no Open standards for IOT.
9. Signals sometimes may trouble in accessing the data while monitoring

### IX . CONCLUSIONS AND FUTURE WORK

Different Government Heads and thier local bodies , Non-profitable organizations and the Researchers are needed to communicate and bring down the entire CORONA virus and its effects as on today.

IOT Convergent cloud computation looks to be a better solution in this regard. To find a better vaccine for this virus is only possible if and only if, it is predicted properly about the pervasive nature of this virus. This paper discussed the Proposal of 'IOT (Internet of Things) Cloud Convergent Computation' for the determination of 'Dynamic pervasive predictive model (DPPM)' for tracing of COVID-19 Trends and Solution. IOT - Cloud Convergent Monitoring system is proposed for the critical evaluation process.

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#### First Author (Corresponding Author)



Mr.G.Srinivasa Rao pursued Bachelor of Science from Osmania University of Hyderabad, India in 2006 and Master of Computer Applications from Osmania University in year 2013. He is currently pursuing Ph.D. in the Department of Computer Sciences, Dravidian University, Kuppam since 2014. Thesis Submitted – Awaiting for VIVA VOCE Examination. Presently working as Senior Software Trainer as Re-joined and Continued after submission of Ph.D. Thesis from Feb- 2019 to till date. He is a member of Internet Society Global Member, also the Member of International Association of Engineers. Presently Associate Reviewer & Member of the International Board of Reviewers International Journal of Community Development and Management Studies (IJCDMS), INFORMING SCIENCE INSTITUTE. His main research work focuses on Load balancing, Cloud computing. His Research Interests are Cloud Computing, Mobile Cloud Computing, Data Mining, Big Data, Artificial Intelligence and Internet of things. His publication record as follows, published paper in relevance to the current research in Web of Science -1 Paper, and published papers in UGC Approved Journals -3, published papers in IEEE Conferences in relevance to other topic-2, Published papers in relevance to other topic- 1, and attended 14 Conferences.

#### Third Author (Research Supervisor)



Prof. T. Anuradha has pursued Master of Computer Applications from Sri Padmavathi Mahila Viswa Vidyalayam, Tirupati. She has pursued her Ph.D. from Sri Padmavathi Mahila Viswa Vidyalayam, Tirupati. She is working as the Professor in the Department of Computer Science, and Presently she is the Registrar of Dravidian University. Her Areas of Research Interests are Data Mining & data warehousing, Neural Networks, Cloud computing, Wireless Sensor Networks. Under her Guidance 2 M.Phil Degrees are awarded and 1 pursuing, 2 Ph.D s are awarded ,5 pursuing and 1 submitted,. She has the Publication record of 17 International Journals, 2 International Conference Proceedings , 4 International Conferences , 8 National Conference Proceedings , 3 National Conferences. She Organized 2 Conferences.