

AN MULTI THRESHOLD MODEL FOR COVID PATIENTS WITH INITIAL IDENTIFICATION OF DISEASE

M. Ramkumar¹, V. Amirtha Preeya², V. Sathiyapriya³ and M. Marimuthu⁴

¹Department of Computer Science and Business Systems, Knowledge Institute of Technology, India

²Department of Computer Science Engineering, Presidency University, India

³Department of Computer Science and Engineering, Knowledge Institute of Technology, India

⁴Department of Computer Science and Engineering, Sona College of Technology, India

Abstract

Many strains of corona virus such as alpha, beta, gamma, delta, and omicron are still prevalent in various parts of the world. The new type of corona virus is called a variant when it is caused by more than one genetic mutation from the previous type of corona virus. Various strains around the world have come so far. The cough may persist for more than an hour or three or four times in 24 hours and body heat is high. You may not be able to feel the smell or taste. Researchers say that some people may have symptoms similar to those of a severe cold. In this paper, a multi threshold model was proposed to find the initial infection detection of COVID disease. Based on the initial health symptoms these methods observe the inputs of the patients. Then the observed symptoms are compared with the existing database and identify the spreading of the disease. This report was directly monitored by the patient and doctor. This model was helpful to provide the periodical monitoring and perfect treatments to the infected patients.

Keywords:

Alpha, Beta, Gamma, Delta, Omicron, COVID, Threshold Model

1. INTRODUCTION

The World Health Organization (WHO) says the Case Mortality Rate varies from country to country. It varies from 0.1 percent to 25 percent depending on the country. Although fears of corona infection are widespread, the mortality rate is very low [1]. The mortality rate is said to be between one percent and 2 percent. But could not say these are that for sure. According to the World Health Organization, the overall mortality rate (Infective Mortality Rate) ranges from 0.5 percent to 1 percent [2]. Although the number of deaths due to Govt-19 infection has not been confirmed, the number of deaths due to corona epidemic has increased in various parts of the world. Some of these deaths may be unaccounted for corona deaths [3]. At the same time some other deaths may be due to the corona crisis affecting services including health and transportation and the deaths of those suffering from other illnesses that are not treated in a timely manner [4]. When a person infected with corona is cough, the virus can mix with the air. Infection can occur by inhaling it or by touching the site of the virus particles and then touching the eyes, nose or mouth [5]. Tissue should be kept when ironing or sneezing. Do not touch face without washing hands [6]. Also stay away from people who are suspected to be infected. The World Health Organization (WHO) says the virus is unlikely to spread from infected feces [7].

The Viruses that enter your body's cells first invade them and bring them under control. The corona virus, officially referred to as SARS-COV-2, enters the body through inhalation (after coughing by someone nearby) or by touching the face after

touching an object that has spread the virus. It first infects the cells near the throat [8-9]. It travels to the airways and lungs and transforms them into "corona virus production plants". It creates many new viruses and injects them into the body, causing infections in more cells [10]. You will not get sick in the early stages. Some people never have symptoms. The time it takes to develop a disease, that is, the time it takes for an infection to develop and its symptoms to vary, varies from person to person. But on average it is on the scale of five days [11-12].

Eight out of 10 people infected with the corona virus are affected by Covid-19 disease. Fever and cough are the main symptoms. Body aches, dry throat, and even headaches may occur. But these do not have to come [13]. Fever and feeling uncomfortable can be caused by the action of your immune system against the spread of infection. This virus is a germ of infiltration. Other cells in the body sense that something is wrong and produce a chemical called cytokines [14]. These are the ones that act as the immune system. But it can also cause physical pain and fever. The corona virus cough is initially a dry cough and then when the virus becomes infected, irritation appears in the cells [15]. Some people have a runny nose when they cough - its thick mucus from the lung cells killed by the virus. It is treated with bed rest, drinking plenty of fluids and paracetamol. No special treatment is required at the hospital [16]. This condition lasts for about a week and most people will recover. This is because the immune system fights the virus. Nevertheless, some people develop severe Covid-19 disease. In this case, these are the things we can understand about this disease [17-19]. Studies also show that severe colds can cause symptoms such as runny nose.

When the immune system is activated against the virus, it develops into a disease. It sends chemical signals to cause inflammation in other parts of the body. But this needs to be carefully balanced. Excessive inflammation can cause major damage to the whole body. The virus causes an imbalance in the immune response process [20]. There is too much body inflammation. We do not know how to do this. If it can go from your mouth, through the trachea and into the small tubes of the lungs, then it can go and sit in the tiny air chambers. This is where the oxygen goes into the bloodstream and the carbon dioxide is removed [21]. However, in pneumonia, with water in these chambers, the breathing interval decreases and breathing becomes difficult. Some people may need a ventilator to breathe. The problem is that the immune system acts out of control and causes harm to the whole body [22]. When blood pressure drops to a dangerous level the function of the body organs decreases or stops completely. When there is widespread inflammation in the lungs and shortness of breath occurs, the lungs stop supplying the oxygen needed for survival. It may block the kidneys from being able to purify the blood. Your intestines may also be affected [23].

The COVID-19 corona virus, which is threatening the world, has started spreading rapidly in India. Worldwide, the number of people infected with the virus has exceeded 3 million. Isolation is the only way to prevent and escape the spread of the COVID-19 virus. The only thing that is recommended worldwide is isolation [24]. It is best to be alone to find out if we have an infection or not. Only then, even if we have an infection, can it be prevented from spreading to others. This COVID-19, which is haunting the people of the world with its fear, has also raised a lot of doubts in the minds of the people [25]. Many people are afraid that if we have this virus we will be isolated and bullied. No one can deny it. Isolation is something that is said for us and for those who depend on us. If we follow it properly, we can easily save ourselves and our family from infection. Usually, a virus transforms into two types. One of which transforms when passed from one to another [26]. This type of transformation is called subtle mutation. This is a slight transformation. The resulting corona types are delta, beta, gamma type corona. The mutual formation of two types of viruses is called a major mutation. That is how the delta Cron came to be, along with the delta and the omicron, the recombination type corona. i.e. hybrid corona. This corona will act like a new virus [27]. The World Health Organization states that the XE type corona variant is a hybrid of two subtypes of Omicron, BA.1 and BA.2. This XE variant belongs to Omicron. However, there are significant differences in the mode of transmission, severity, and disease characteristics. The World Health Organization says the XE variant appears to be spreading much faster than the previous variant of the corona virus [28]. The World Health Organization reports that the prevalence rate of omicron is about 10 percent higher than the initial estimate of BA.2. Common symptoms of corona are: fever, sore throat, sore throat, cough, runny nose, skin irritation, discoloration, gastric problems. There is no evidence that the XE variant is very serious. And all the omicron types released so far have been shown to be of lesser intensity [29]. So there is not enough evidence to make conclusions about the severity of this XE variant or the effectiveness of the vaccine. Although the Covit-19 vaccine does not provide full protection against the new variant, it does reduce the risk of hospitalization and the risk of death. Scientists are also currently exploring how fully vaccinated people can be protected against the XE variant.

2. LITERATURE REVIEW

Fakhry, A et al. [1] discussed the traveled or been in contact with a person who has been exposed to corona infection, stay away from it. Avoid contact with others, especially if you have mild symptoms. Wear a mask. Even if you go to the doctor it is not known if it is fully confirmed. This is because the virus infects and it takes 14 days for symptoms to appear. Loey, M et al. [2] discussed the contact your state corona helpline. Health officials will then collect your samples. If you find out you have an infection you will be treated in the loneliness ward. Wash hands for at least 20 seconds. Pay attention to all parts of your hands. Rinse well with soap and water. Avoid touching your eyes, nose, and mouth so that the virus can spread through your body. Use tissue paper if you cough or sneeze. Kavitha, M et al. [4] discussed to put it in the trash and wash your hands. Use only disposable tissues rather than handkerchiefs. If you do not have tissue paper, keep using your elbow bundle. Madaan, V et al. [6] discussed to

avoid touching too many buttons, such as handles, elevator buttons, etc. Stay away from people who have symptoms like fever, cough, and respiratory problems. If you have a fever, cough, or breathing problems, stay home without going anywhere.

Alaif, T et al. [7] discussed the virus cannot be suppressed by the immune system, it can spread to all parts of the body, causing further damage. This condition can be treated by interfering with the functioning of the body. It includes treatments including ECMO. Fouladi, S et al. [10] discussed an artificial lung that takes blood out of thick tubes, oxidizes it, and injects it back into the body. But when the organs are unable to keep the body alive, it can cause death. For some, the onset of the corona virus infection may be severe. This can happen 7 - 10 days after the infection and difficulty in breathing. Fathan, A et al. [12] discussed the inflammation of the lungs. This is because your body's immune system is fighting this virus. Some may also need to go to the hospital for oxygen therapy. This problem can take exactly two to eight weeks. The World Health Organization estimates that one in 20 people with corona virus need intensive care. They may need life-saving equipment. Stevens, S. S et al. [15] discussed whatever the disease, it takes a few days to recover from the intensive care unit. It is customary for them to be transferred to a public room before they return home. They are more likely to have weakened muscles because they have been in hospital for long days. It takes a while for the muscles to grow back. Some people who leave the intensive care unit may have hallucinations or even depression. Schuller, B. W et al. [16] discussed the number of new cases of corona virus infection is increasing by millions every day, and the number of deaths is in the thousands. Curfew orders and other restrictions are in place in many countries. International events and festivals are canceled or postponed. At the same time, some countries are successfully implementing anti-virus measures.

3. PROPOSED MODEL

The proposed multi threshold model (MTM) If COVID 19 is severe, it can lead to pneumonia, kidney failure, severe respiratory problems, and even death in the acute stage. Usually these symptoms appear in an average of five days. It is also said that he can spread the infection before some people are diagnosed with the disease.

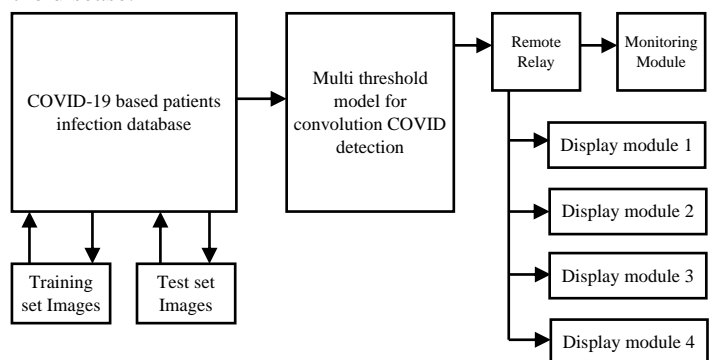


Fig.1. Multi Threshold Monitoring Block

Symptoms such as dizziness, dry throat, and persistent runny nose are common in people with corona delta type strain. At the same time, even if the victim does not realize that their health is deteriorating, it will worsen his condition and push him to a

dangerous level. Researchers believe that vomiting, diarrhea, and muscle cramps in the abdomen may be signs of corona virus infection in children.

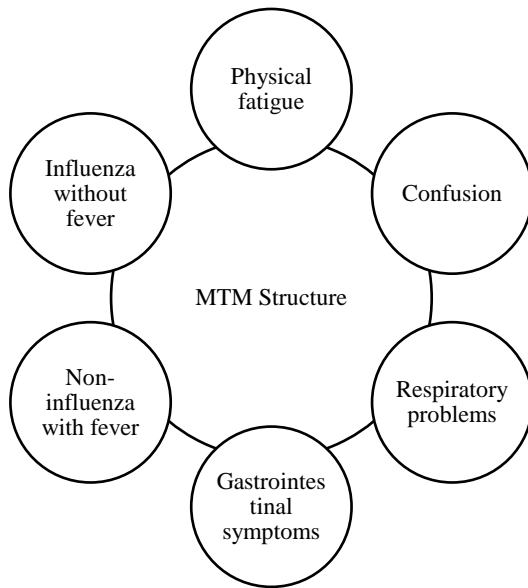


Fig.2. MTM Structure

- Influenza without fever: headache, nausea, muscle aches, colds, sore throat, chest pain.
- Non-influenza with fever: Headache, nausea, muscle aches, runny nose, sore throat, loss of appetite, sore throat or speech impediment.
- Gastrointestinal symptoms: headache, nausea, fever, chills, sore throat, loss of appetite, chest pain, diarrhea.
- Physical fatigue (first stage severity): headache, nausea, fever, chills, sore throat, loss of appetite, chest pain, diarrhea, muscle aches, sore throat or speech impediment, physical fatigue.
- Confusion (secondary severity): Headache, nausea, fever, chills, sore throat, chest pain, diarrhea, muscle aches, sore throat or speech impediment, physical exhaustion, inability to think clearly.
- Stomach and respiratory problems (extreme severity): headache, loss of appetite, fever, runny nose, sore throat, loss of appetite, chest pain, abdominal pain, diarrhea, muscle aches, sore throat or speech impediment, fatigue, shortness of breath Difficulty in letting go.

Many viral infections have symptoms similar to those of Govit-19 infection. These symptoms are especially prevalent in the winter. Corona virus infection is one of the three main symptoms, and more than half are likely to have COVID-19. They may be infected with other viruses. Still, it is good to experiment and confirm it. Most people with corona virus infection can be cured by taking adequate rest and taking painkillers such as paracetamol. But, the main reason for going to the hospital for treatment is because of the problem in breathing. Physicians who examine the victim's lungs will find that it is severely affected and will recommend oxygen therapy or ventilator therapy.

- The intensive care unit is the hospital unit where the most severely ill are admitted.

- Patients with corona virus infection will receive oxygen therapy.
- The amount of oxygen injected into the most severely affected patients is completely different from that given to others.
- In severe cases, ventilators may be used to repair the problem.

4. RESULTS AND DISCUSSION

The proposed Multi threshold model (MTM) was compared with the existing Convolution Neural Network for Covid-19 detection (CNNCD), Covid-19 Classification and Detection Model using Deep Learning (CDMDP), Diagnosing COVID-19 Symptoms Using Fuzzy Logic (DCSFL) and Accurate COVID-19 Health Outcome Prediction (ACHOP) There are two main methods used in corona testing are Rapid Kit and RT-PCR. In addition, the CB-NAAT system, which tests the corona with tuberculosis equipment, is less commonly used. Pooled RT-PCR testing is also performed modernly in the RT-PCR system. In this method the corona test can be performed on up to 5 people at a time. But there is more problem in this as the results are the same result for 5 people and not separately.

Table.1. Comparison of Throat infection identification

Samples	CNNCD	CDMDP	DCSFL	ACHOP	MTM
1000	69.23	80.68	61.00	62.48	90.17
2000	69.12	80.70	60.83	62.21	89.67
3000	69.10	81.58	61.56	62.51	89.79
4000	72.20	84.41	64.90	66.02	93.02
5000	73.40	85.73	65.63	67.34	93.40
6000	74.01	86.56	66.52	67.88	93.97
7000	74.42	86.96	66.60	68.18	93.67

Currently the Rapid Kit testing system in India is being done at an early stage for most people with corona symptoms. The Medical Association of India recently announced that the results of this test were incorrect. It is noteworthy that Rapid Kit testing has been banned in India for 2 days. Not only the Rapid Kit, but sometimes the RT-PCR system also gets erroneous results.

Table.2. Comparison of fever infection identification

Samples	CNNCD	CDMDP	DCSFL	ACHOP	MTM
1000	60.72	84.31	63.51	66.68	90.01
2000	62.21	86.28	65.93	68.88	90.00
3000	63.01	87.41	66.34	69.68	91.20
4000	65.34	88.60	67.94	70.35	91.68
5000	66.35	88.99	70.26	71.78	93.11
6000	66.99	90.51	71.51	72.87	94.27
7000	67.65	90.75	74.24	73.35	95.04

RT-PCR test: Samples of throat mucus and nasal mucus of those with first corona symptoms are collected with a cotton swab. Sometimes mucus samples from the lungs are also collected with Broncho Scope instruments. The samples collected in this way are

tested with RT-PCR instruments for the presence of the corona gene. It is worth noting that this experiment requires a lot of time and money.

Table.3. Comparison of Nasal congestion identification

Samples	CNNCD	CDMDP	DCSFL	ACHOP	MTM
1000	70.61	80.21	63.35	65.67	90.01
2000	72.24	81.95	64.93	67.09	91.30
3000	72.72	84.29	67.13	68.35	92.31
4000	74.01	85.10	68.76	70.34	93.20
5000	76.12	87.39	69.90	72.81	93.57
6000	77.61	89.32	72.10	74.25	94.61
7000	79.42	91.05	73.25	75.97	95.38

The big problem with this method at present is that the mucus samples taken do not have the full corona virus size. About 80% of people are infected with the corona virus without any symptoms. If a person is infected with a corona infection without any obvious symptoms, such as colds and coughs, the test result will be incorrect. To avoid this, you should have a staff member selected to collect the samples. The corona results are likely to be erroneous even if the testing staff is negligent when he collects the samples without proper training.

Table.4. Comparison of virus spreading Monitoring

Samples	CNNCD	CDMDP	DCSFL	ACHOP	MTM
1000	69.35	82.95	70.91	74.11	89.27
2000	69.68	84.45	71.50	75.98	90.31
3000	71.02	85.56	72.48	76.81	90.44
4000	72.16	85.94	73.69	77.72	91.40
5000	73.21	86.95	74.83	78.64	90.97
6000	73.92	87.88	75.94	79.97	92.21
7000	75.22	88.88	76.64	80.84	92.32

Also known as the Rapid Kit, the test is performed on the body of the person with the corona injection. That is, a corona test can only get a good result if the corona infection infects a person's body, and his immune system exploits the immune system against that infection. If the corona virus infects a person's body and does not cause any infections such as colds, coughs, or lung infections, the chances of a corona test result being high are high.

Table.5. Comparison of various symptoms monitoring

Samples	CNNCD	CDMDP	DCSFL	ACHOP	MTM
1000	71.65	85.25	67.51	71.37	90.18
2000	71.98	86.75	68.10	73.24	91.19
3000	73.32	87.86	69.08	74.07	91.35
4000	74.46	88.24	70.29	74.98	92.31
5000	75.51	89.25	71.43	75.90	91.88
6000	76.22	90.18	72.54	77.23	93.08
7000	77.52	91.18	73.24	78.31	93.24

The test results are incorrect for reasons such as incorrect samples and no corona virus symptoms. It has been reported that

30 per cent of corona tests in India and around the world have erroneous results. Corona virus is a newly developed viral infection. So the tools used to find it are also new. Everything is in testing stages. So there is a possibility of error in the test kits as well. It will take some time to fix this. It is also important to note that medical institutions do not guarantee that any corona test instrument will give a complete result.

Table.6. Comparison of test monitoring

Samples	CNNCD	CDMDP	DCSFL	ACHOP	MTM
1000	75.78	57.71	64.57	81.82	96.87
2000	75.45	56.21	63.98	79.95	95.86
3000	74.11	55.10	63.00	79.12	95.70
4000	72.97	54.72	61.79	78.21	94.74
5000	71.92	53.71	60.65	77.29	95.17
6000	71.21	52.78	59.54	75.96	93.97
7000	69.91	51.78	58.84	74.88	93.81

In the body of a person affected by corona initially his immune system is functioning very fast. Thus, when the immune system is active, the corona germs in the body of some people remain silent. Disappears without revealing his presence. Corona viruses manifest themselves when the person's immune system is completely weakened and pushed to the severity of the disease. The medical world is now concerned that the corona is still playing.

Table.7. Comparison of patient monitoring

Samples	CNNCD	CDMDP	DCSFL	ACHOP	MTM
1000	78.08	60.01	61.17	79.08	97.78
2000	77.75	58.51	60.58	77.21	96.74
3000	76.41	57.40	59.60	76.38	96.61
4000	75.27	57.02	58.39	75.47	95.65
5000	74.22	56.01	57.25	74.55	96.08
6000	73.51	55.08	56.14	73.22	94.84
7000	72.21	54.08	55.44	72.35	94.73

In addition, two reasons are given for the erroneous test results. Studies show that these corona viruses destroy the D4 cell in our immune system. That is, D4 are the opposite cells in the blood. The presence of the corona virus in our cells is not obvious as the corona virus destroys it. So studies have shown that there is something wrong with test results. HIV Tests for the HIV virus also have similar problems. Doctors point out that the corona virus destroys D4 cells and then disappears safely.

Table.8. Comparison of health condition monitoring

Samples	CNNCD	CDMDP	DCSFL	ACHOP	MTM
1000	76.82	67.75	68.73	87.52	97.04
2000	75.19	66.01	67.15	86.10	95.75
3000	74.71	63.67	64.95	84.84	94.74
4000	73.42	62.86	63.32	82.85	93.85
5000	71.31	60.57	62.18	80.38	93.48

6000	69.82	58.64	59.98	78.94	92.44
7000	68.01	56.91	58.83	77.22	91.67

The Blood or urine tests are not performed to detect the presence of this COVID-19 virus infection in the corona family. Usually if you have an infection you may think that you will ask for blood or urine to test it. However, they do not ask for blood or urine to diagnose this COVID-19 virus infection. It can even be said that this test is a bit rugged. But, it's something that can be done quickly. But more than all this, the most important thing is to make sure you review your symptoms several times before you go for the test.

Table.9. Comparison of test report monitoring

Samples	CNNCD	CDMDP	DCSFL	ACHOP	MTM
1000	80.37	75.35	84.60	86.02	96.48
2000	77.95	73.15	84.61	84.53	94.51
3000	77.54	72.35	83.41	83.73	93.38
4000	75.94	71.68	82.93	81.40	92.19
5000	73.62	70.25	81.50	80.39	91.80
6000	72.37	69.16	80.34	79.75	90.28
7000	69.64	68.68	79.57	79.09	90.04

The COVID-19 test only collects mucus from a person's nose. A long tube is inserted into the nose to remove mucus from the throat. If this experiment is necessary, it is to be quiet. It does not take even 10 to 15 seconds to take this. The mucus is packed in a container and sent to a laboratory.

Table.10. Comparison of isolation monitoring

Samples	CNNCD	CDMDP	DCSFL	ACHOP	MTM
1000	66.67	83.95	59.31	68.02	97.84
2000	66.34	82.45	58.72	66.15	96.80
3000	65.00	81.34	57.74	65.32	96.67
4000	63.86	80.96	56.53	64.41	95.71
5000	62.81	79.95	55.39	63.49	96.14
6000	62.10	79.02	54.28	62.16	94.90
7000	60.80	78.02	53.58	61.29	94.79

5. CONCLUSION

The laboratories in the field of scientific and industrial research, science and technology, with PSL-3 (survival status) facilities, allow viruses to function as additional testing and testing sites for culture and research. After the test, you will be prompted to join immediately based on your itinerary. Even if the test results are positive, prepare yourself without panic. If you want, you can take the blanket, water or household food you need. Rest is something that is very necessary. In any case, it takes one or 2 days for the test results to come out. Until then you need to wait patiently. Even if you are isolated, you do not need to be afraid of it. Because you can keep your mobile phone free. The proposed Multi threshold model (MTM) was compared with the existing Convolution Neural Network for Covid-19 detection (CNNCD), Covid-19 Classification and Detection Model using

Deep Learning (CDMDP), Diagnosing COVID-19 Symptoms Using Fuzzy Logic (DCSFL) and Accurate COVID-19 Health Outcome Prediction (ACHOP) That way, you can stay in touch with your family and friends. Therefore, there is no need to fear finding the corona. It is enough to take precautions and cooperate with doctors in case of infection. Since it is a contagious disease, feel free to take time to spend with your family without any fear.

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