COVID-19 Detection using A.I.

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Aim:

1] To develop the COVID-19 screening tool from the general symptoms.
2] Train the tool for Normal, Cold Flu and Corona (Mild and Sever) symptoms, so it can predict the Disease from given symptoms accurately.
3] To suggests the Predicted Person to do RT-PCR test, Chest X-ray or Lung CT Scan for confirmation of Corona.

Introduction:

If not the most deadly, the novel corona virus (COVID-19) is one of the most contagious diseases to have hit our green planet in the past decades[1]. As governments and health organizations scramble to contain the spread of corona virus, they need all the help they can get, including from artificial intelligence[2-3]. Though current AI technologies are far from replicating human intelligence, they are proving to be very helpful in corona detection through thermal scanner,Face recognition with mask, Surveillance through drone while lockdown, tracking the outbreak, diagnosing patients, disinfecting areas, and speeding up the process of finding a cure for COVID-19[4].

Corona virus disease (COVID-19) is an infectious disease caused by a new virus which causes respiratory illness (like the flu) with symptoms such as a cough, fever, and in more severe cases, difficulty breathing. For most people, the new Corona virus causes only mild or moderate symptoms, such as fever and cough. For some, especially older adults and people with existing health problems, it can cause more severe illness, including pneumonia[5]. Spread of corona may be unknown and it might be reach to small cities also. For precaution and public safety Government already took decision for lockdown or Community lockdown[6]. Due to lockdown it is necessary to monitor each suspected person. But mostly symptoms may be of cold flue or similar diseases. Also due to shortage of test kit, doctors first manually test for Coronas symptoms and if necessary then take its COVID-19 test. Due to large population and heavily lockdown it is not possible for every people to go to doctor for basic test.

For this purpose we develop the screening tool which takes some basic symptoms and using its deep learning knowledge it display the results. This device is in small size or it can be install on PCs or Laptop. This device minimizes the excess burden on doctors, so they can concentrate their attention wherever necessary. Data science and machine learning might be two of the most effective weapons we have in the fight against the corona virus outbreak.

Block Diagram:

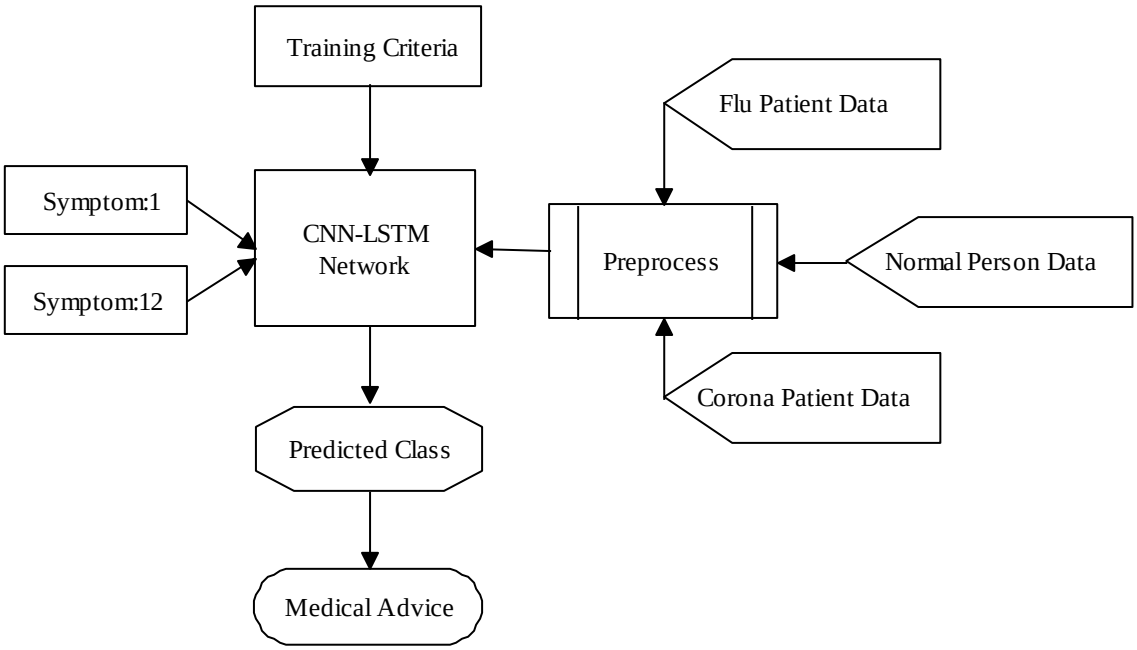

Figure: Overall Architecture

What is A.I.:

AI is a powerful tool for predicting & Classification of disease. Newer techniques such as deep learning can help make sense of unstructured data. These algorithms run on artificial neural networks, which consist of thousands of small interconnected processors, much like the neurons in the brain. The processors are arranged in layers, and data is evaluated at each layer and either discarded or passed onto the next layer. By cycling data through the layers in a feedback loop, a deep learning algorithm learns how to, for example, identify cars in YouTube videos.

Researchers teach deep learning algorithms to understand unstructured data by training them to recognize the components of particular types of items. For example, researchers can teach an algorithm to recognize a cup by training it with images of several types of handles and rims. That way it can recognize multiple types of cups, not just cups that have a particular set of characteristics.
Any AI model is only as good as the data used to train it. The accuracy of AI systems is highly dependent on the amount and quality of the data they learn from.

Symptoms considered are:

No.	Symptom	No.	Symptom
1.	Age	7.	Cough
2.	Gender	8.	Sputum
3.	Old	9.	Dizziness
4.	Habbit	10.	Tight chest
5.	Days Count	11.	Dyspnea
6.	Body Temp	12.	Sore Throat

Although it’s too early to tell whether we’re headed in the right direction, the efforts are commendable. Every day saved in finding the corona virus vaccine can save hundreds—or thousands—of lives.

Working:

Proposed Software should is Easy to use. Operator must fill the answer in User interface by asking to Patient. 12 symptoms are taken for consideration. All the symptoms are simple check based. After filling the input, our algorithm predict the class to whom given attributes match.

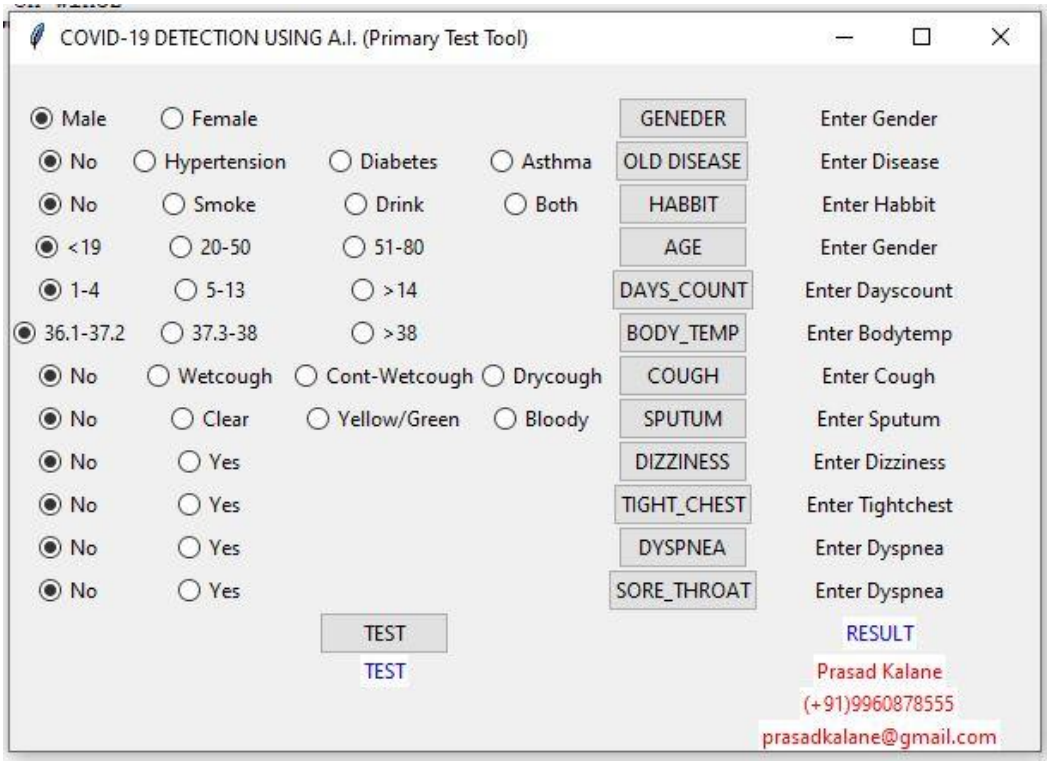

Figure: Main Panel

Experiments & Results:

Proposed system is tested on various Normal, Cold flu Patients. Corona Patient (Mild and Sever is tested on symptoms available on web). Average accuracy is 0.97% for testing dataset.

Execution Time:

Execution time required for overall test is 10.14 seconds.

Demo: https://youtu.be/edccF913ZR4

Necessary Hardware:

1] Laptop or PC

2] Digital Thermometer

Necessary software:

1] Python

Platform Flexibility:

- It can also deploy on web similar to Google corona virus screening site (Alphabet's Verily).

- Also it can be developed as a kit using raspberry pi.
- It is also possible to deploy to android for mobile users.

Results of Proposed method is shown below.

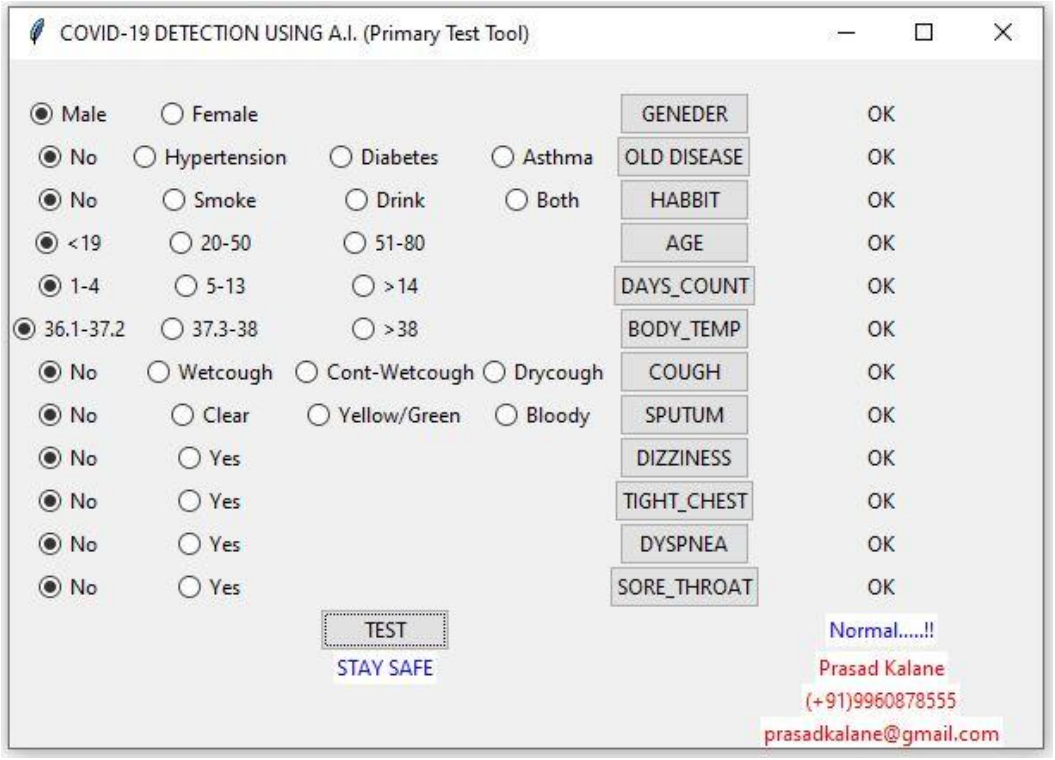

Figure: Result for Normal Condition

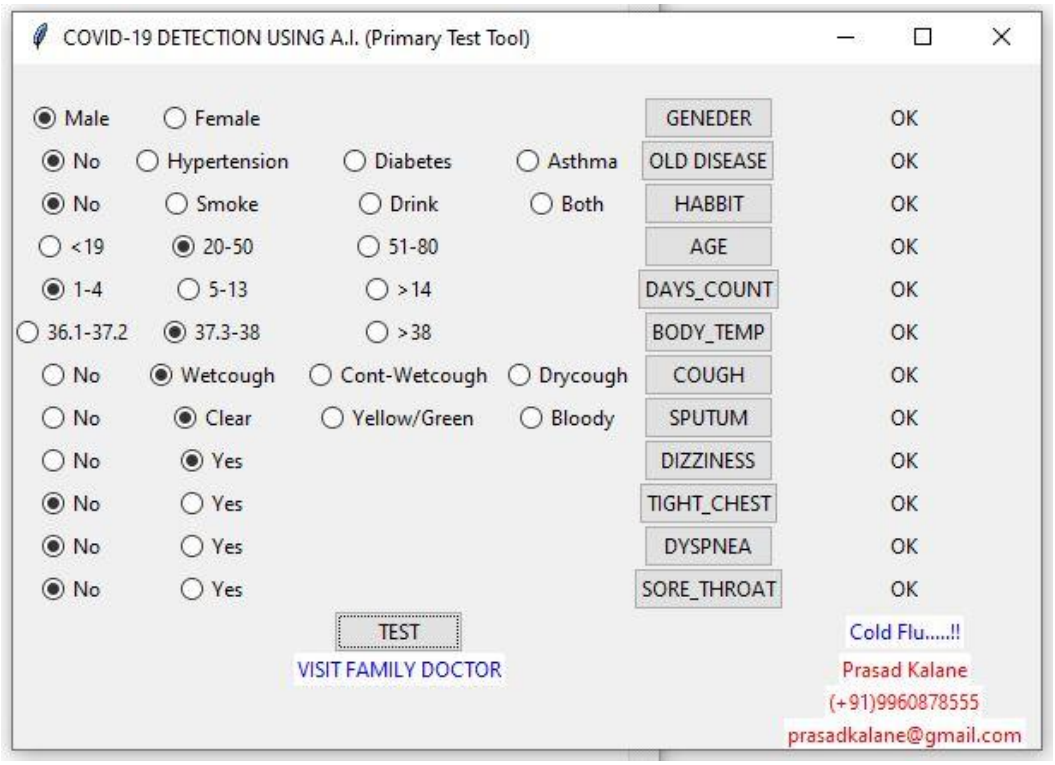

Figure: Result for Cold Flu Condition

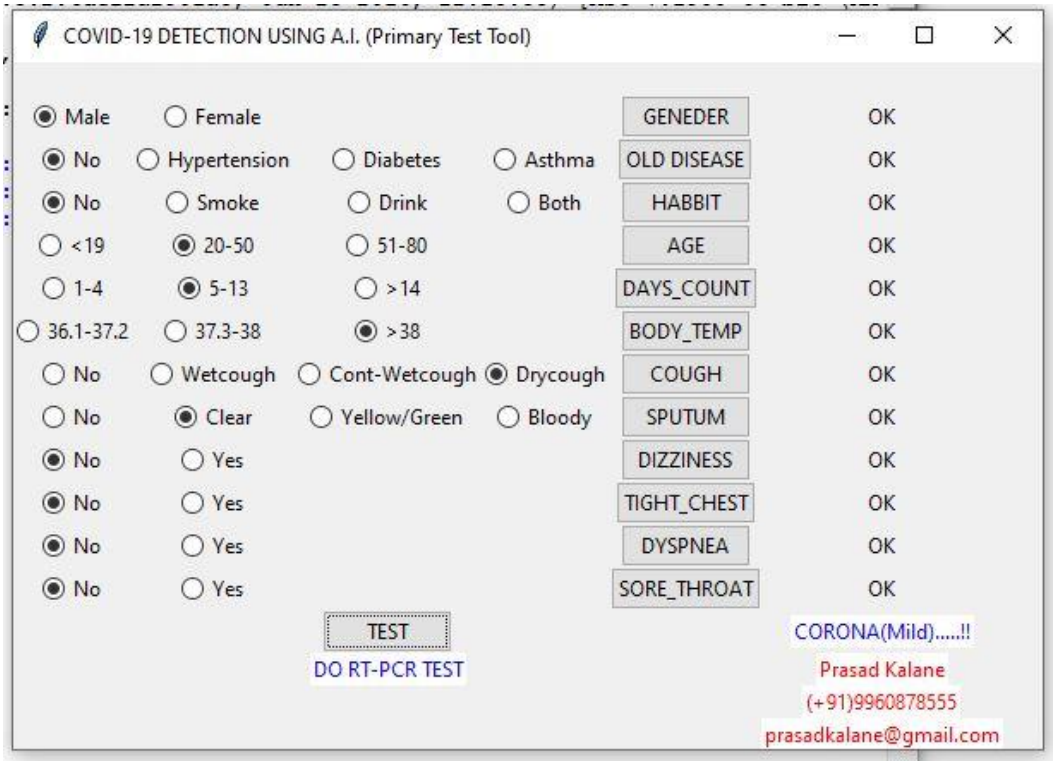

Figure: Result for Corona Mild Condition

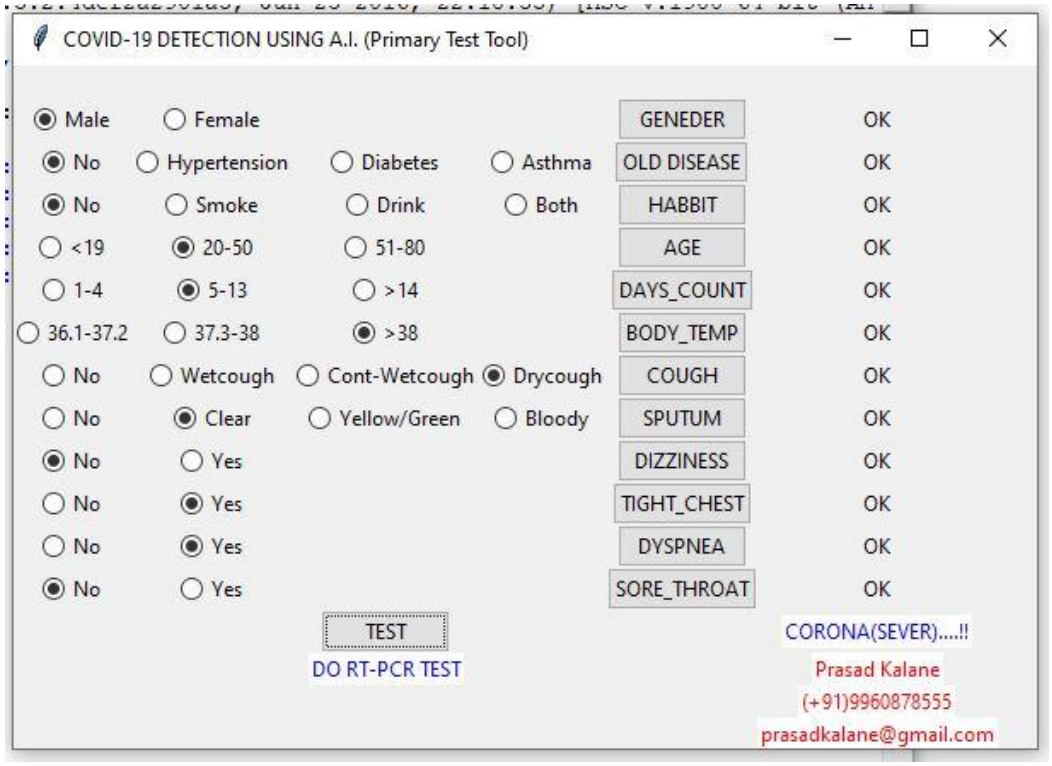

Figure: Result for Corona Sever Condition

Future Scope:

In this project we measure the body temperature manually, instead we will measure it automatically using Image Processing using Thermal Images. We will capture the image of person and then predict temperature using distribution of temperature densities.

Conclusion:

Proposed Model gives the Primary test results of Corona which minimize the load on doctors. Also it reduces the risk of getting infected of corona as large patients needs to screen every day. As people with general symptoms come for test with a fear whether they are corona positive or not. Proposed model gives result for normal, cold flu and corona (mild or sever) accurately within 10.14. seconds. This model can de deploy on web, or in android or on raspberry pi kit.

References:

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[6] LOCKDOWN: Which countries are on coronavirus lockdown? What's happening in India, Italy and Spain, Sunni Upal, 23 Mar 2020, 12:32, Updated: 24 Mar 2020, 16:4 https://www.thesun.co.uk/news/11233604/which-countries-are-on-coronavirus-lockdown-spain-italy/