



VIVEKANAND EDUCATION SOCIETY'S INSTITUTE OF TECHNOLOGY, MUMBAI

Knock - Covid 19 (Let's fight Covid 19 together)

TEAM PIED PIPER

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Theme – HEALTHCARE

Problem Statement - Harnessing the power of Computer Vision, Neural Networks and Data Analysis to ameliorate the complications in cardiac and respiratory system through early detection of COVID19 coupled by the assistance provided by a chatbot.





Deep Learning Model



python™



Flask

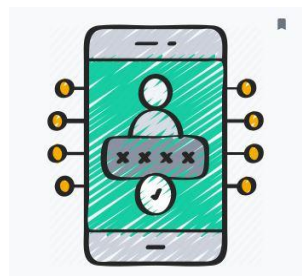
Web-App



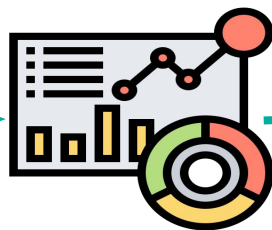
android

Android App

TECH - STACK



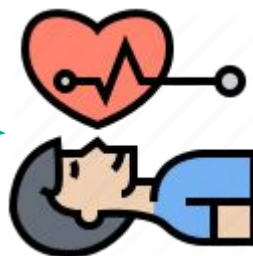
User
Authentication



Live
Dashboard



Chest X-Ray
images
classification



Cardiac Arrest
Detection



Covid19 +ve



Covid 19
-ve

Chatbot
Assistance





DEPENDENCIES

FOR WEB-APP:-

Python
Flask
PyTorch
SQLAlchemy
TorchVision
Pillow
PIL

FOR ANDROID APPLICATION:-

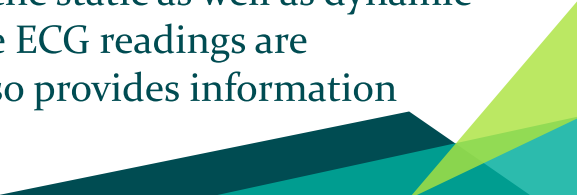
Android Studio
Kotlin
XML
Firebase
TensorflowLite model




LACUNA IN THE EXISTING SYSTEMS

The main and the only drawback of the current existing system is that all the work has been done using the uci repository dataset which takes into account only the parameters which are static. By static we mean the attributes used are extracted from the historical patient records. So, in order to prevent code blue situation the attributes take into consideration are not sufficient. For preventing code blue situation and for efficient utilization of resources, continuous evaluation of the patient's ECG readings is a must. Various ECG parameters (related values) need to be considered for better results

As mentioned above, the existing systems take into account only static parameters. The proposed system will not only take into account these static parameters but will also take into account the data obtained from continuous monitoring of patients. The ECG ratings of the patients are evaluated and then converted into textual form. So the proposed system is taking into account the static as well as dynamic parameters. Hence, the patient admitted is continuously monitored and the ECG readings are continuously recorded. So our system not only predicts heart disease but also provides information about whether the code blue situation is going to occur or not.



GOALS OF KNOCK COVID

- Comparative study of evaluation parameters related to heart diseases.
 - Interpreting the output and accordingly checking for anomalies.
 - Classifying the output according to the classes.
 - Conducting research on which deep neural network architectures are best suited for classification of Chest XRAY Images.
 - Providing assistance using chatbot.
 - A real-time dashboard and time series analysis of the pandemic.
- 



Cardiac Arrest Prediction To Prevent Code Blue Situation due to COVID19

NEWS • INTERVENTIONAL

‘Terrible’ Spike in Cardiac Arrest Deaths During Lombardy’s COVID-19 Surge

Investigators believe theirs are the first published data showing high numbers of at-home cardiac arrests amid the pandemic.



IN THE NEWS

A new potential risk of COVID-19: Sudden cardiac death

Paul Basilio, MDLinx | March 26, 2020

As of Thursday afternoon, the total number of confirmed COVID-19 cases is 521,086, with 23,568 deaths globally. In the United States, the number of cases has [increased](#) to 79,785, with 1,124 deaths across all 50 states plus Washington, DC.

[News](#) > [Medscape Medical News](#)

Cardiac Arrests Out-of-Hospital Soar During COVID-19 in Italy

Patrice Wendling

April 30, 2020

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[Read Comments](#)

Heart-wrenching

New York City

Cardiac-arrest 911 calls

To April 5th



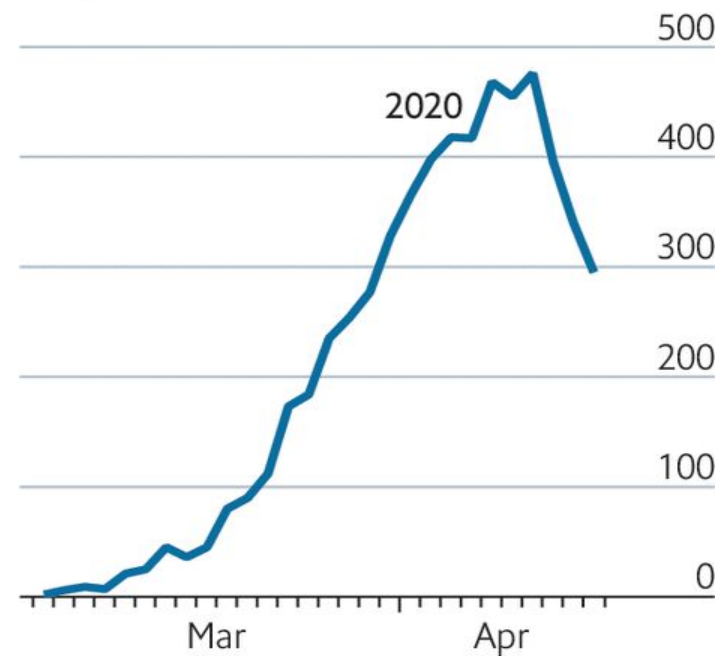
Cardiac-arrest deaths

To April 5th



Confirmed covid-19 deaths*

To April 10th



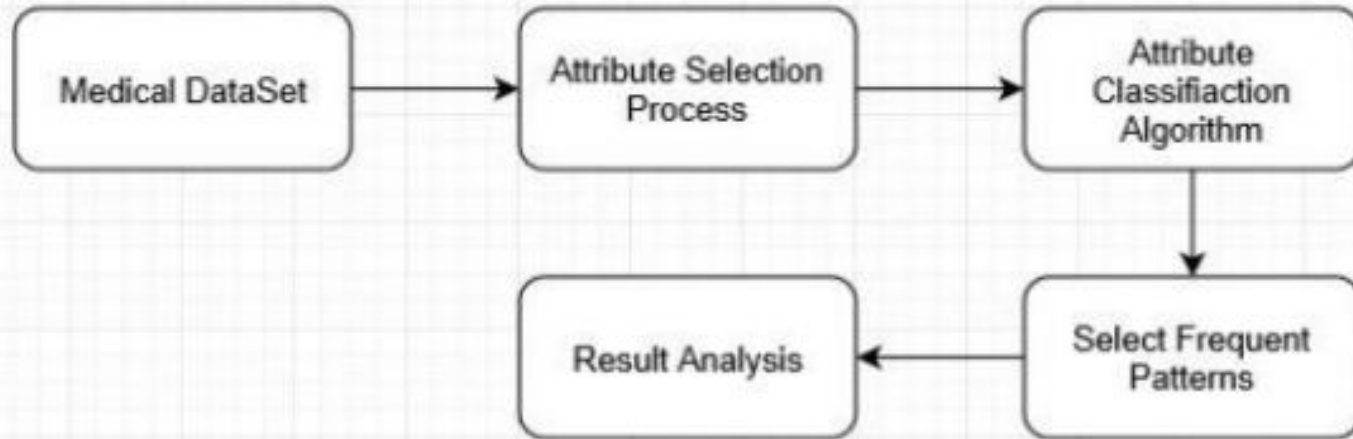
Sources: New York City Fire Department; New York City Department of Health *Deaths are reported with a significant lag and may be revised later

SOLUTION FOR PREVENTION OF CARDIAC ARREST

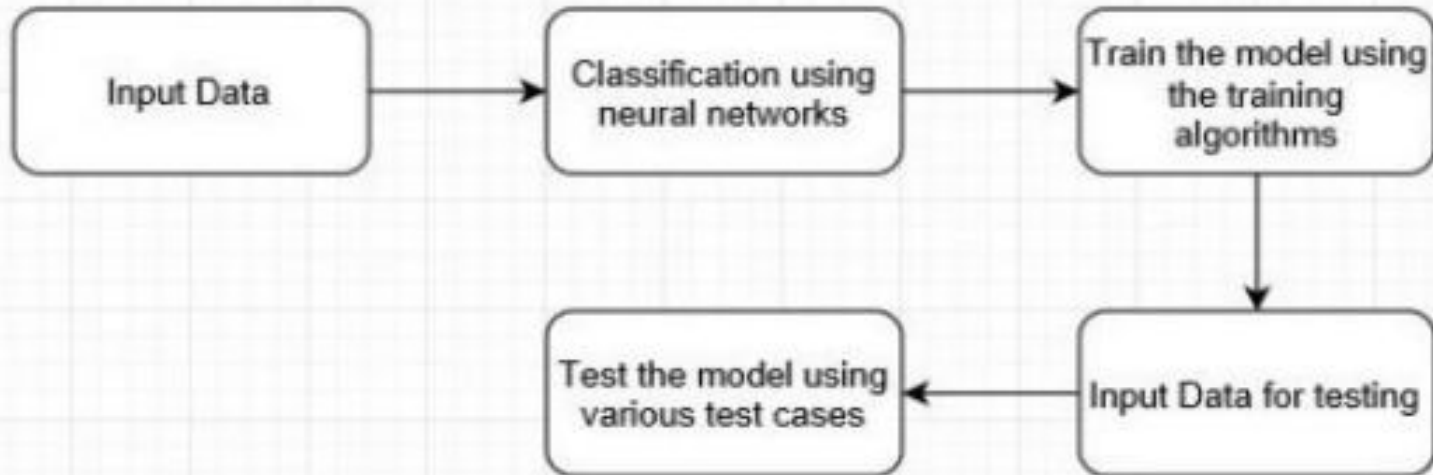
Cardiac arrest is the abrupt loss of heart function in a person who may or may not has been diagnosed with heart disease. Cardiac arrest is often fatal if appropriate steps aren't taken immediately. Cardiac arrest may be caused by irregular heart rhythms, called arrhythmias. Since cardiac arrest is a major emergency situation, hence Hospitals use code names to alert their staff about an emergency.

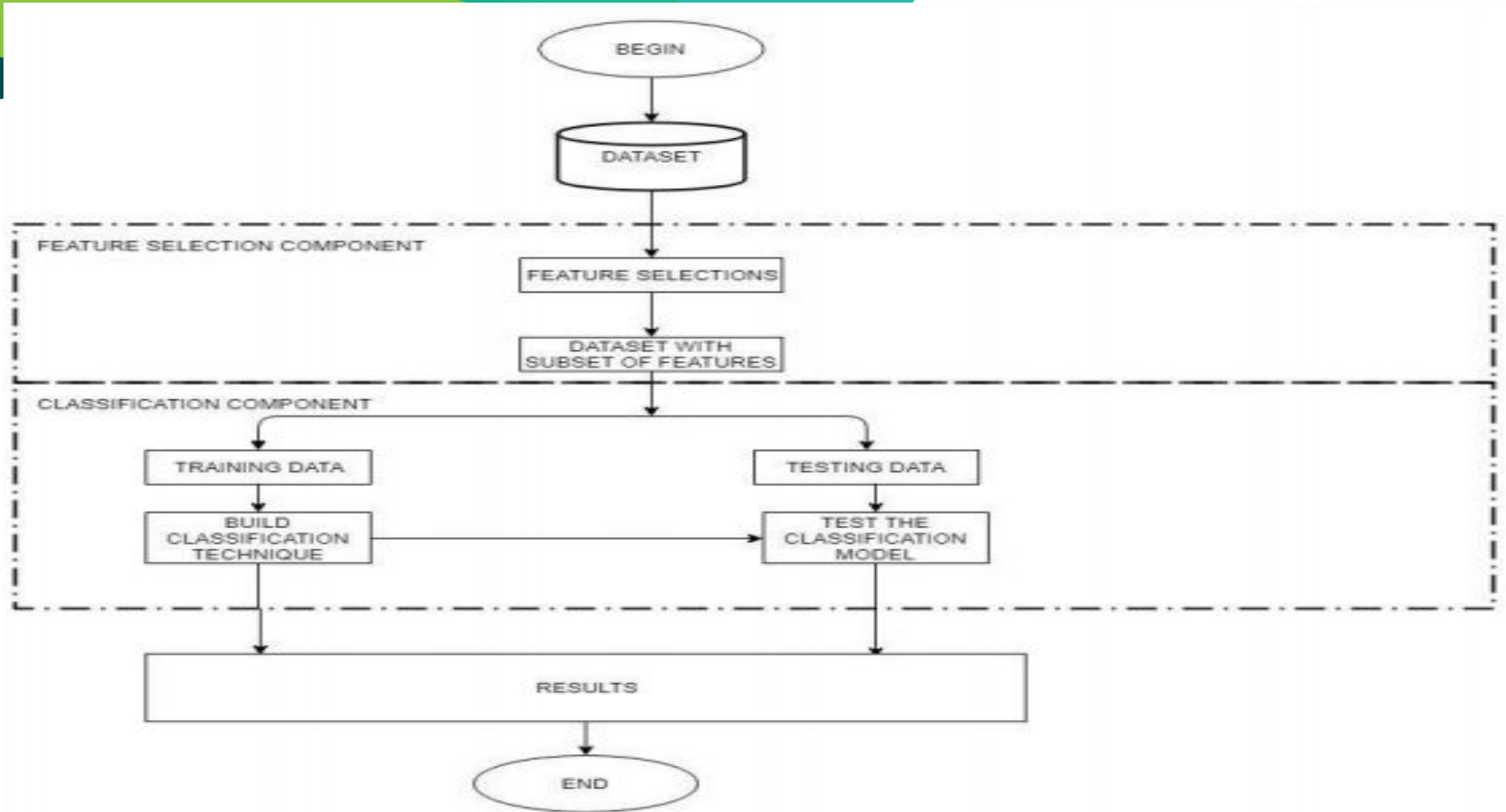
We propose Health System that preemptively flags patients who are likely to go into cardiac arrest, using signals extracted from demographic information, hospitalization history, vitals and laboratory measurements in patient-level electronic medical records. We find that early prediction of Code Blue is possible and when compared with state of the art existing method used by hospitals (MEWS - Modified Early Warning Score), our methods will perform significantly better.

1. Proposed Framework



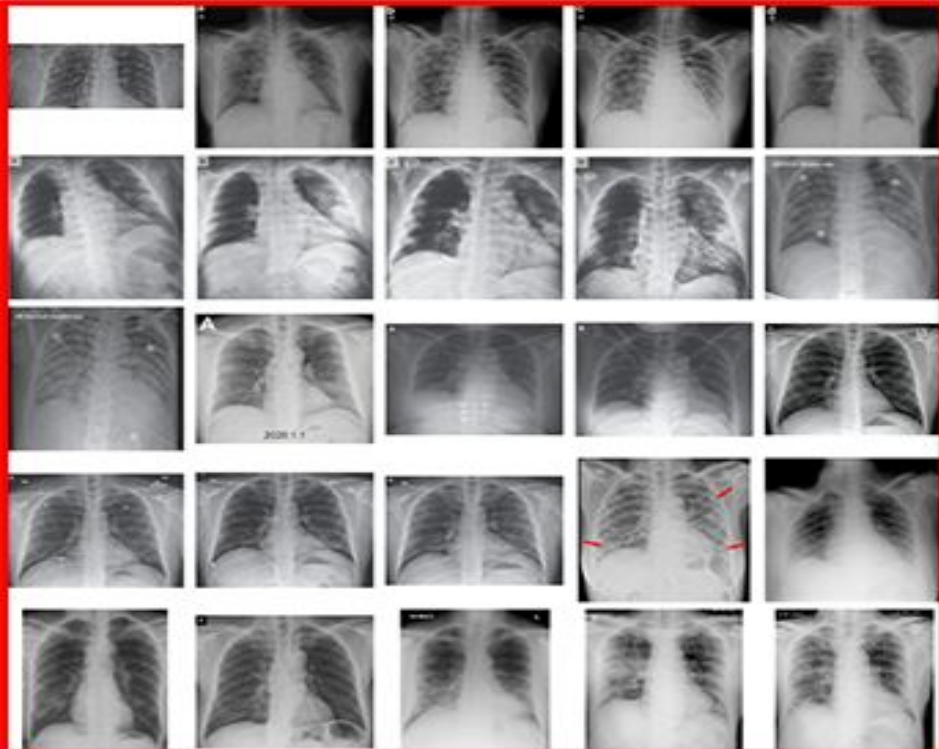
2. Training and Testing the Model



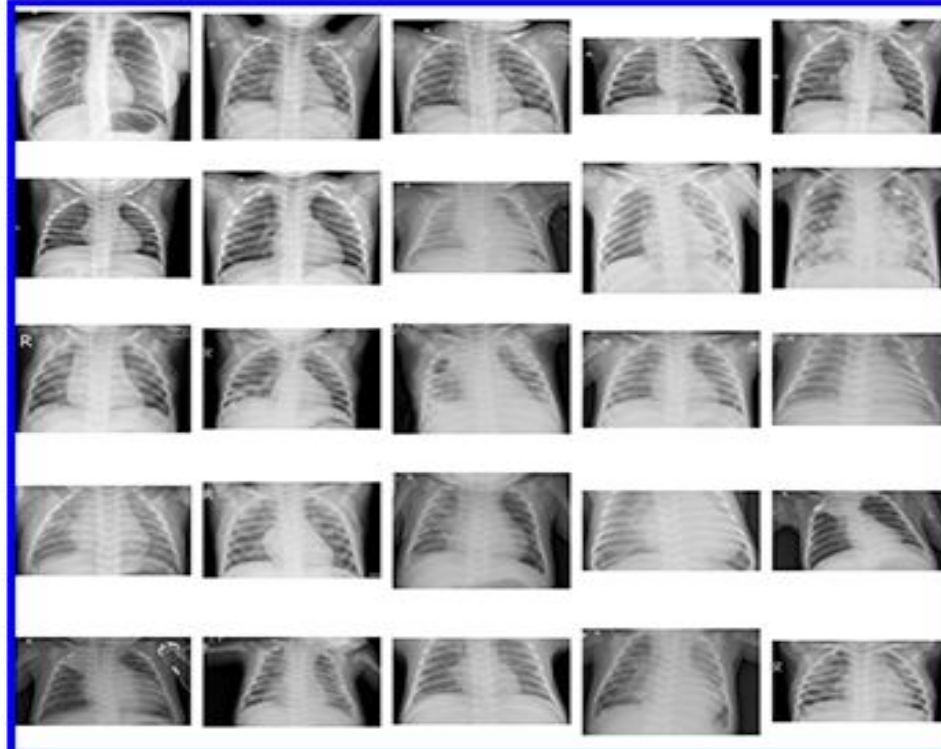


DETECTION OF COVID19 USING CHEST XRAY IMAGES WITH NEURAL NETWORKS

COVID-19 +



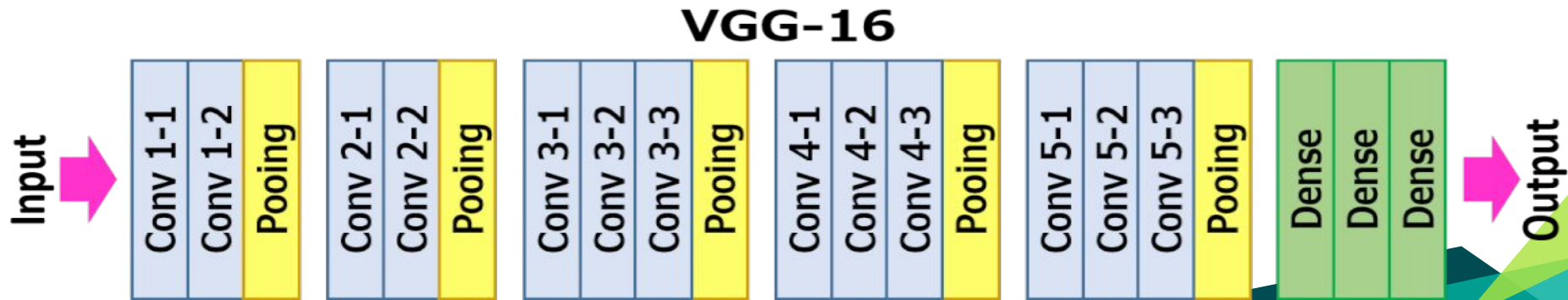
COVID-19 -



COVID-19 attacks the epithelial cells that line our respiratory tract, we can use X-rays to analyze the health of a patient's lungs. Given that nearly all hospitals have X-ray imaging machines, it could be possible to use X-rays to test for COVID-19 without the dedicated test kits.

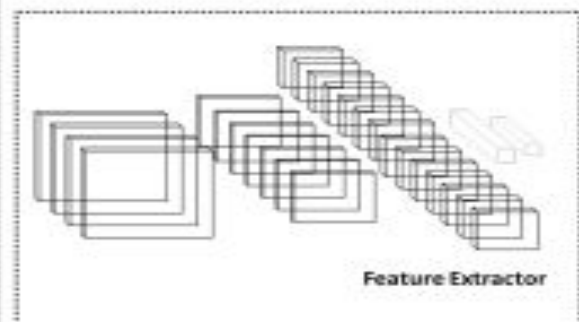
A drawback is that X-ray analysis requires a radiology expert and takes significant time — which is precious when people are sick around the world. Therefore developing an automated analysis system is required to save medical professionals valuable time.

Deep neural network architecture VGG16 is used for implementation



Training

Labels



Decomposition



Composition

DeTraC

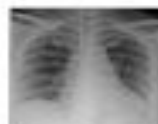
Testing



Deep features



Softmax



Positive CXRs with
COVID-19

CHATBOT

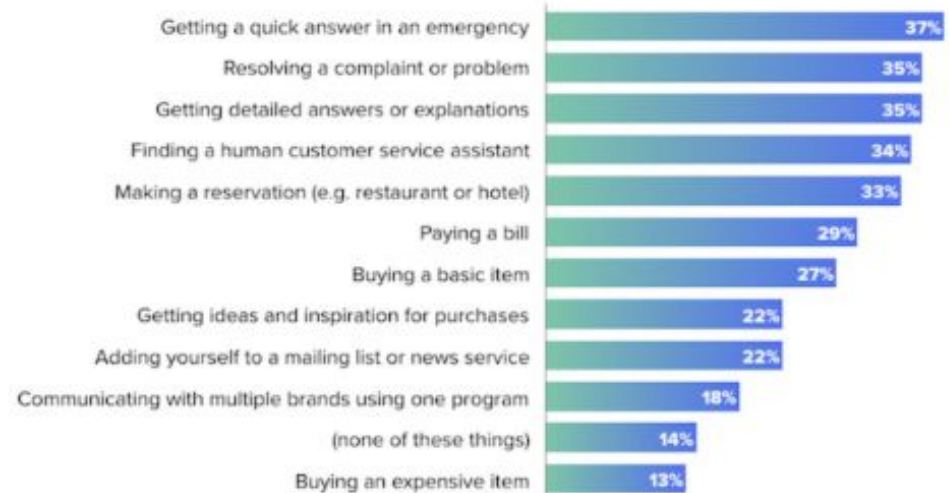


COVID Based Chatbot:

1. Model that addresses COVID19 virus queries.
2. Handle high volumes of questions.
3. Bot will alleviate pressure from front line staff.
4. Specialized bot for COVID19 outbreak impacting on business.
5. In emergency redirect to nearest covid relief center.

Predicted Use Cases for Chatbots

What do you predict you would use a chatbot for?



2018 State of Chatbots Report



Thanks!

Any questions?