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HEALTH PREDICTION USING MACHINE LEARNING

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Abstract:

Medical centres in agricultural countries, are very concerned about the adaptable critical patient care system. Because appropriate, easy-to-use, and flexible intelligent solutions are not readily available, a significant number of clinics in Bangladesh must rely on genuine health administration. Building a reliable system that medical clinics may use to treat high-priority patients via continuous input is the main objective of this project. In this study, we provide a hybrid approach to critical illness detection using machine learning and IBM's distributed computing platform as a service (PaaS), along with an associated phrase and classification model. The fundamental goal of this study is to estimate patients' health using Machine Learning (ML). This investigation will be place on IBM Cloud, namely IBM Watson Studio, where our data and ML models will be stored and updated. A selection of Base Predictors: Naïve Bayes, Logistic Regression, Decision Tree, Random Forest, Gradient Boosting, and MLP Classifiers have been made for our ML models. The packing strategy for outfit learning has been used to improve the model's accuracy. When it comes to group learning, the following formulas are used: Bagging Random Forest, Bagging Extra Trees, Bagging KNeighbors, Bagging SVC, + Ridge. "Critical Patient Management System - CPMS" is an adaptable program that we developed for continuous data and information viewing. By retrieving data from IBM Cloud and making it accessible via CPMS, the system engineering ensures that the ml models can prepare and deliver continuously within the specified time frame. Experts will be able to rely on the millilitre models to predict a patient's condition. The CPMS will notify the responsibility specialist and medical carer via SMS if the condition-based prediction worsens to the point where the patient is not receiving enough attention. The project has the potential to serve as an excellent solution for emergency clinics' medical services when combined with millilitre models and a mobile app.

Introduction:

A critical patient care or monitoring system allows an expert to remotely monitor many patients at once, control the dosage of their medications, and monitor their vital signs from any location [1]. These methods would be very helpful in evaluating and improving the chosen emotionally supporting networks in the intensive care unit. When a patient's body needs time to heal and recover, medical technology like dialysis machines, mechanical ventilators, vital sign monitors, and more are used to assist them. By controlling the patient's status and test results, most of the equipment are physically monitored. Consequently, we considered automating the cycle and dynamic capacity with the help of modern innovation, namely distributed computing and auto-deployable

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machine learning models. Whether a patient's health is going to worsen or improve in the near future, machine learning algorithms can predict this and determine whether they need immediate assistance. As a PaaS that generally spans public, private, and hybrid environments, we have settled on IBM Cloud to house our models and data [2]. Since we were initially unable to transmit our models directly, we had to use IBM Watson Studio on IBM Cloud to save, test, and transmit our whole system. Bluemix also provides access to the cloud services for the CPMS, and the ml models operate within the cloud administration while also preparing with the auto-conveyed data [3]. The most significant part of this work accurately expresses the auto-deployable ML model within the distributed storage. Methods for testing and adjusting, as well as methods for selecting and configuring boundaries, are also used to a variety of machine learning computations. According to reports, the health sector is one of the most neglected areas in Bangladesh when it comes to the use of technology [4]. It would seem that the wellness field is still trailing behind, even if other areas have taken this advantage to heart. In most cases, government initiatives to integrate technology into the healthcare sector have failed. Most instances result in death or permanent physical or mental impairment to patients due to inefficient treatment during a crisis; the main reason of this is the attending physician's inability to quickly evaluate the patient's vitals [5]. When the professional is not available, the main method of communication is via a mobile phone, which might lead to communication problems. By using Cloud Computing to access the patient's vitals from any distant location and Machine Learning to recommend a high-level course, our research presents a tool that allows the expert to remotely monitor the patient's vitals. This allows doctors to test several patients in the allotted amount of time. Regular updates may be sent to patients' loved ones even when they can't physically attend the facility.

Literature Survey

Here we have the Rational Unified Process laid out. The Rational Unified Process is a web-enabled database that communicates computer programming measures. It promotes group usefulness and communicates programming best practices via the use of rules, formats, and device coaches for all critical jobs in the programming lifecycle. Development teams may take use of UML, the industry standard, by using the database. A moderate approach to controlling task assignment within an advancement association is provided by it. It is likely to excel in producing high-quality software that satisfies end-user demands within the given budget and time schedule.

Tuhin Biswas and Anwar Islam were also involved. The Bangladeshi Health Care System: Challenges and Opportunities. Volume 2, Issue 6, pages 366-374, published 2014 in the American Journal of Health Research. published in the journal article with the DOI 10.11648/j.ajhr.20140206.18.

The public sector plays a crucial role in Bangladesh's healthcare system, providing funding, creating general approaches, and facilitating administrative conveyance. When it comes to distributing public monies, the healthcare system seems to get less attention, although having several insurmountable challenges. Globally, healthcare costs are equivalent to around 3%

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of GDP, as reported by the World Health Organisation in 2010. The government only pays for around a third of healthcare costs; the other two-thirds come from people's own pockets. Consequently, imbalance has a significant impact on the medical care system. Based on an analysis of supplemental data, this article evaluates the current and future prospects of the healthcare system in Bangladesh. The results imply that cultural responses to the variables influencing health are the most important, despite the fact that the healthcare system faces several obstacles including a scarcity of primary care offices, a trained personnel, insufficient financing, and political instability. Rather of following scientific or logical rules to the letter, people rely on a wide range of circumstances that impact their health. The fundamental rationale for a healthcare system is the worth of human life. The public's regard for human life has a significant impact on the human, material, and monetary resources distributed to healthcare. The success of any healthcare system is on how well its services are communicated and how easy it is for individuals to access, comprehend, and use them.

System Analysis

Existing System:

A Plethora of Health Risk Systems is accessible in the writing. Be that as it may, Most of the examination in the initials days zeroed in on creating Disease Risk Prediction Models utilizing Machine Learning for a solitary competitor Disease. These were generally the Binary Classification issues which given a clinical records directs if an individual is experiencing indicated illness. Issues of this sort are called as Single Label, Single Class Classification Emergence of antagonistic based techniques for existing calculations regularly produce unsatisfied outcomes

Proposed System

Machine learning approaches are rising to popularity in the academic community as a means to robotise interactions and more accurately predict illnesses. The goal of using Machine Learning methods is to improve a machine's performance by teaching it new information and then applying that knowledge in the future. Applying machine learning methods to a collection of electronic health records has the potential to provide valuable information and health risk prediction. Our original plan was to use distributed computing and auto-deployable machine learning models to automate the interaction and dynamic capacity. Whether a patient's health is going to worsen or improve in the near future, machine learning algorithms can predict this and determine whether they need immediate medical attention. To summarise our models and data, we have settled on IBM Cloud as our Platform as a Service (PaaS). This PaaS typically works in public, private, and hybrid environments [2]. We had to use IBM Cloud, IBM Watson Studio for storing, testing, and transmitting our complete system as we couldn't initially submit our models directly. We need more advanced technology at a low cost in order to provide better therapy. We started this project with the goal of improving patient care in emergency clinics. We reshaped the medical clinic and nursing area by making use of some of the existing approaches and advances. A significant chunk of the ml models saw an increase in accuracy from 80% to 92%.

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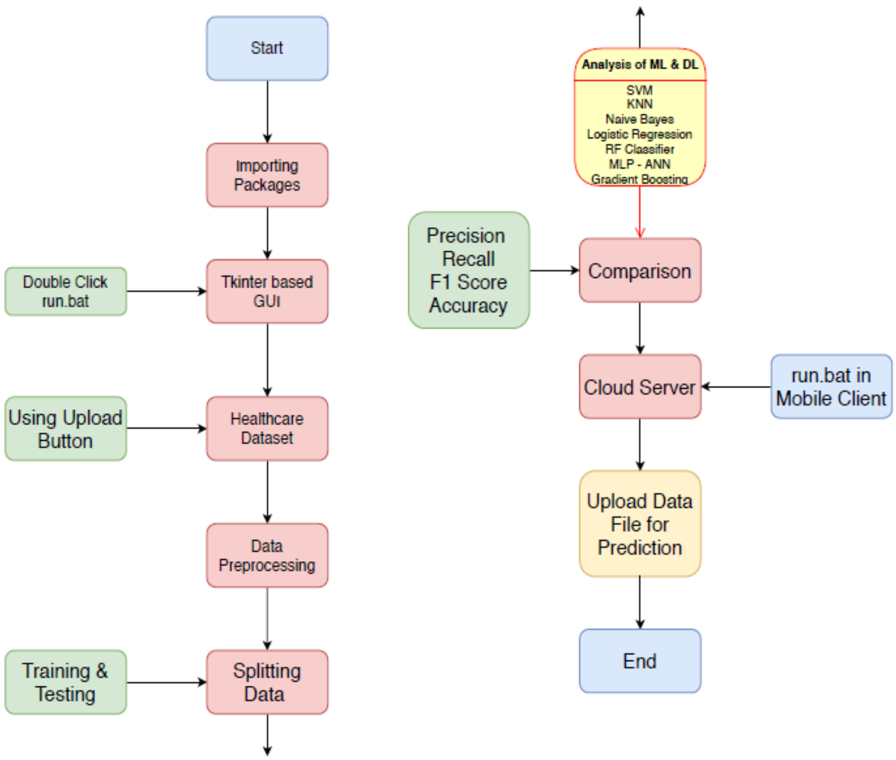

Result testing and analysis

The testing phase is the meat and potatoes of this undertaking. The project's requirements dictated that we use the waterfall technique for delivering features [28]. The data input method in IBM Cloud was first evaluated. To keep data intact, we had to resolve many Cloud-related concerns during this procedure [29]. As part of the registration and daily update schema, we transferred over 700 sample patient records from the hospital terminal. According to the data structure, we discovered the following statistics. IBM Cloud demonstrated a successful conversion of over 90% of the data from the terminal to the cloud. The Watson studio used this data to validate and assess the accuracy of the machine learning model. We created a Confusion Matrix and a Receiver Operating characteristic (ROC) curve to validate the models. To see whether the ROC Curve might provide the precise prediction domains, we watched it closely. Most of the regions under True Positive Rate were highlighted using the ROC Curve. ROC Heat Map Last but not least, the Watson Studio process required the deployment of machine learning models. As a deployment condition, we opted for the hourly parameter. Once the hospital terminal inputs the patient's hourly update, all the models will be installed. The accuracy of all deployed models will be evaluated using the evaluation curve. Here are the outcomes of our 12-hour examination. After verifying that the results for health status prediction and SMS task were adequate, we proceeded

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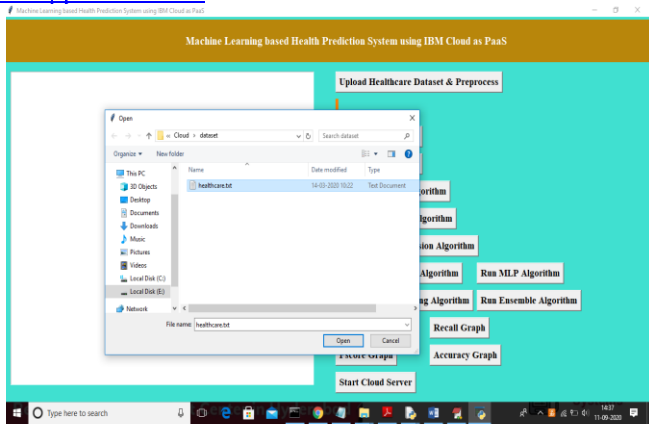
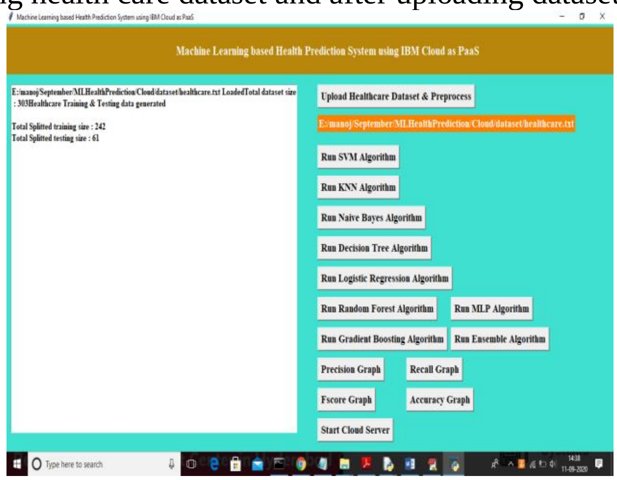
to test them in other scenarios. There were 560 SMS that were supposed to be delivered based on the logistic regression model's predictions; out of those, 485 were legitimate, 48 were incorrect, and 27 were not sent. The "Normal" and "Increasing" conditions had the highest number of incorrect predictions. All of the health criteria did not have a successful association, as this shows. The SMS API was unable to get the contact number from the central cloud storage, which resulted in unsuccessful sending attempts. Thus, the cause remained unknown. This could happen when there's a problem with the network or when the central server isn't responding. By breaking down the Android app into its component parts, we were able to confirm that it passed all of our tests. It took longer to update the reading in certain circumstances, such as the "Patient Condition" part. Even though the ML models were deployed on schedule, the android "Get" method was unable to get data from the database. In addition, we polled our fellow students and faculty at North South University, Dhaka for their thoughts on the app's UI and functionalities; the table below displays the results and comments.

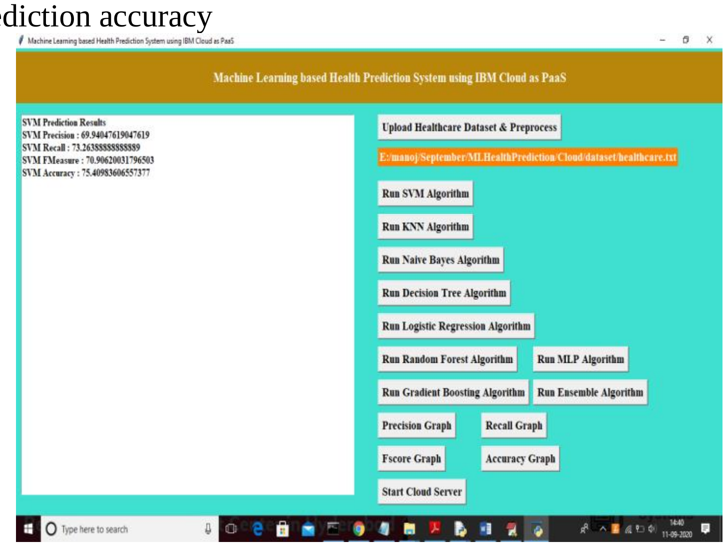
In above screen we can see various buttons are there to run different machine learning algorithms and after building machine learning models we can click on ‘Start Cloud Server’ button to start cloud and to accept request from client. Now click on ‘Upload Healthcare Dataset & Pre-process’ button to load dataset



In above screen uploading health care dataset and after uploading dataset will get below screen



In above screen dataset contains total 303 records and application using 80% dataset records for training and 20% for testing. Now dataset train and test dataset ready and now click on 'Run SVM Algorithm' button to apply SVM on train dataset and then evaluate its performance on test data to calculate prediction accuracy



In above screen SVM prediction accuracy on 20% test dataset is 75% and we can see precision,

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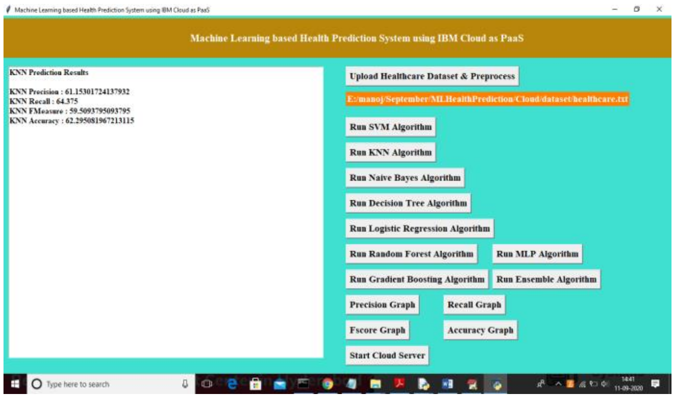
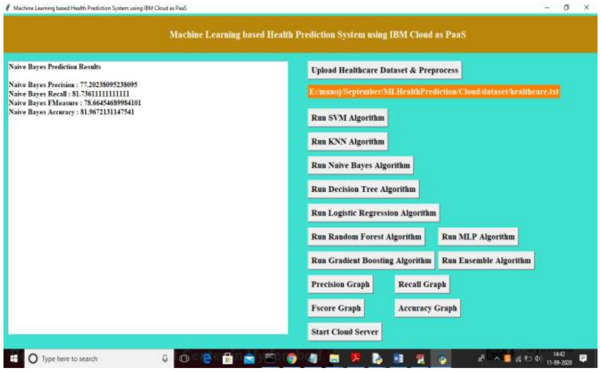
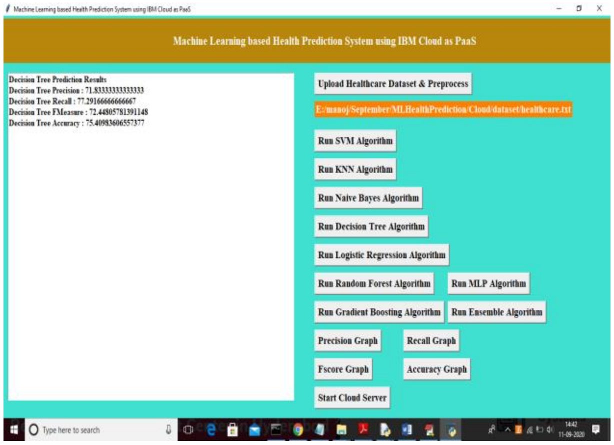
FMeasure and Recall values also. Now click on ‘Run KNN Algorithm’ button to generate KNN model



In above screen with KNN we got 62% accuracy and now click on ‘Run Naïve Bayes Algorithm’ button to generate its model



In above screen with Naïve Bayes we got 82% accuracy and now click on ‘Run Decision Tree Algorithm’ button to generate its model



In above screen with Decision tree we got 75% accuracy and now click on ‘Run Logistic

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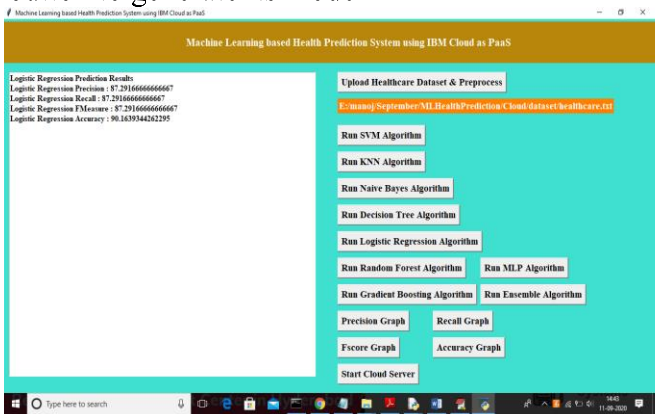
Regression Algorithm' button to generate its model



In above screen with Logistic Regression we got 90% accuracy and now click on 'Run Random Forest Algorithm' button to generate its model

Conclusion

Going online is something most of us do every day these days. since of this, the sites are vulnerable to assaults from the gatecrasher since different program merchants fight to build up new features and greater functionality in order to attract clients. But existing approaches aren't enough to safeguard consumers, who need a fast and accurate model that can distinguish between safe and dangerous websites. Our new ordering system will examine and detect harmful websites using artificial intelligence classifiers like support vector machine and random forest, as detailed in this research paper. innocent Bayes, calculated scores, and a small set of URLs (Uniform Resource Locators) derived from hidden characteristics allow the classifiers to forecast which URLs will lead to harmful websites. The first findings show that the arbitrary woodlands classifier outperforms competing AI classifiers with a 95% success rate. Malicious websites, address, artificial intelligence, detection, and harmful websites are some of the keyphrases.

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