A STUDY ON PREDICTION OF HEALTH CARE DATA USING MACHINE LEARNING

[1]Raja Bhargava, Cheedella Chandra Sekhar

[1]Assistant Professor, Department of CSE, PBR Visvodaya Institute of Technology and Science, Kavali

[2]Assistant Professor, Department of CSE, PBR Visvodaya Institute of Technology and Science, Kavali

Abstract_

Adaptable Critical Patient Caring device is a key problem for hospitals in growing nations like Bangladesh. Most of the medical institution in Bangladesh lack serving appropriate fitness provider due to unavailability of appropriate, effortless and scalable clever systems. The intention of this task is to build an sufficient machine for hospitals to serve vital sufferers with a real-time remarks method. In this paper, we suggest a time-honored architecture, related terminology and a classificatory mannequin for watching indispensable patient's fitness situation with computer gaining knowledge of and IBM cloud computing as Platform as a provider (PaaS). Machine Learning (ML) primarily based fitness prediction of the sufferers is the key thought of this research. IBM Cloud, IBM Watson studio is the platform for this lookup to shop and preserve our records and ml models. For our ml models, we have chosen the following Base Predictors: Naïve Bayes, Logistic Regression, KNeighbors Classifier, Decision Tree Classifier, Random Forest Classifier, Gradient Boosting Classifier, and MLP Classifier. For enhancing the accuracy of the model, the bagging technique of ensemble getting to know has been used. The following algorithms are used for ensemble learning: Bagging Random Forest, Bagging Extra Trees, Bagging KNeighbors, Bagging SVC, and Bagging Ridge. We have developed a cellular utility named "Critical Patient Management System - CPMS" for real-time statistics and records view. The gadget structure is designed in such a way that the ml fashions can educate and install in a real-time interval by way of retrieving the statistics from IBM Cloud and the cloud records can additionally be accessed via CPMS in a requested time interval. To assist the doctors, the ml fashions will predict the circumstance of a patient. If the prediction based totally on the circumstance receives worse, the CPMS will ship an SMS to the obligation health practitioner and nurse for getting immediately interest to the patient. Combining with the ml fashions and cellular application, the venture can also serve as a clever healthcare answer for the hospitals

1.INTRODUCTION

Critical Patient Caring or monitoring System is a procedure the place a medical doctor can always display greater than one patient, for greater than one parameter at a time in a far flung location and additionally can have manipulate over medicinal drug dosage [1]. Development and assessment of the ICU decision-support structures would be extensively facilitated via these systems. Devices such as essential signal monitors, mechanical ventilators and dialysis

1357

machines, and some others extra are used to aid integral sufferers whose our bodies want time to get better and repair. Most of the machines are managed manually by way of supervising the patient's situation and take a look at reports. So, we concept to automate the system and decision-making potential with the assist of present day technology, in particular the auto deployable computer gaining knowledge of fashions and cloud computing. Machine gaining knowledge of fashions can predict the close to future circumstance of the patients, whether or not their circumstance will make bigger or decrease, whether or not they want any immediately aid or not. To generalize our fashions and data, we have chosen IBM Cloud as a PaaS which altogether spans public, non-public and hybrid environments [2]. As initially, we can't install our fashions directly, we had to use IBM Cloud, IBM Watson Studio for storing, trying out and deploying our entire system. The ml fashions run inside the cloud carrier and additionally trains with the auto-deployed data, the CPMS additionally can get admission to the Cloud offerings thru Bluemix [3]. The most tremendous of this paper incorporates the auto deployable desktop mastering mannequin inside the cloud storage with noteworthy accuracy. Also, checking out and tuning methods and parameter choosing, placing for extraordinary laptop mastering algorithms

2.LITERATURE SURVEY

2.1 Mistry, J., & Inden, B. (2018). An approach to sign language translation using the Intel Realsense camera

An Intel RealSense digital camera is used for translating static guide American Sign Language gestures into text. The device makes use of palm orientation and finger joint records as inputs for both a guide vector laptop or a neural community whose structure has been optimized by way of a genetic algorithm. A information set consisting of a hundred samples of 26 gestures (the letters of the alphabet) is extracted from 10 participants. When evaluating the distinctive inexperienced persons in mixture with exceptional popular preprocessing techniques, the best accuracy of 95% is finished through a help vector computer with a scaling method, as properly as essential thing analysis, used for preprocessing. The perfect performing neural community device reaches 92.1% however produces predictions an awful lot faster. We additionally current a easy software program solution that makes use of the skilled classifiers to allow undemanding signal language translation.

2.2 Ruiz, V. M., Saenz, L., Lopez-Magallon, A., Shields, A., Ogoe, H. A., Suresh, S., & Tsui, F. R. (2019). Early Prediction of Critical Events for Infants with Single Ventricle Physiology in Critical Care Using Routinely Collected Data. The Journal of Thoracic and Cardiovascular Surgery

Objective: Critical activities are frequent and challenging to predict amongst toddlers with congenital coronary heart disorder and are related with mortality and long-term sequelae. We aimed to acquire early prediction of integral events, that is, cardiopulmonary resuscitation, emergency endotracheal intubation, and extracorporeal membrane oxygenation in babies with

single-ventricle physiology earlier than second-stage surgery. We hypothesized that naïve Bayesian fashions realized from professional know-how and scientific facts can predict crucial activities early and accurately.

Methods: We accrued ninety three sufferers with single-ventricle physiology admitted to intensive care gadgets in a single tertiary pediatric health facility between 2014 and 2017. Using understanding elicited from skilled cardiac-intensive-care-unit vendors and machine-learning techniques, we developed and evaluated the Cardiac-intensive-care Warning INdex (C-WIN) system, consisting of a set of naïve Bayesian fashions that leverage robotically gathered data. We evaluated predictive overall performance the use of the vicinity below the receiver running attribute curve, sensitivity, and specificity. We carried out the contrast at 5 distinct prediction horizons: 1, 2, 4, 6, and eight hours earlier than the onset of quintessential events.

Results: The place underneath the receiver running attribute curves of the C-WIN fashions ranged between 0.73 and 0.88 at one of a kind prediction horizons. At 1 hour earlier than integral events, C-WIN used to be in a position to realize activities with an region beneath the receiver running attribute curve of 0.88 (95% self assurance interval, 0.84-0.92) and a sensitivity of 84% at the 81% specificity level.

3.PROPOSED SYSTEM

Machine learning methods are gaining popularity in the research community as a way to automate the process and more accurately predict diseases. Machine Learning methods facilitate the development of intelligence into a machine, allowing it to perform better in the future by leveraging previously learned experience. Machine learning methods applied to electronic health record datasets could provide valuable information and health risk prediction.

3.1 IMPLEMENTATION

In this paper author is describing concept to automate abnormal health condition using machine learning algorithms such as Support Vector Machine (SVM), KNearest Neighbours (KNN), Decision Tree, Naïve Bayes and Ensemble Algorithm. In this project author is proposing following modules

1) IBM Cloud: This module can be used to store and run ML algorithms and whenever patient mobile sense patient vitals then it will send to IBM cloud and IBM cloud will apply machine learning algorithms on received patient vitals to detect patient condition, if condition is not stable then it will send SMS message to doctor about patient condition. Here to implement this module we need to purchase IBM cloud space using CREDIT CARD details and for students its difficult to manage this payment so I am building this cloud as a dummy cloud which can run in single or other laptop running in LAN. For example you can run dummy cloud in one laptop and can run client from other laptop connecting in LAN. For SMS services also we need to pay money to purchase SMS so we are avoiding this SMS service.

2) Dataset module: using this module we will upload dataset into dummy cloud

3) Preprocess module: using this module we will replace missing or alphabets values to numerical values as 0 or 1.

4) Machine Learning module: using this module we train dataset with multiple machine learning algorithms and evaluate their performance and whatever algorithm performing well will use that algorithm to predict patient condition.

5) Mobile/Client Module: In this module author is saying patient smart phone will sense his body temperature, blood pressure and other vitals and then send to IBM cloud for monitoring. Here we don't have any sensors so we are uploading test data from client application and then client will send that test data to dummy cloud and dummy cloud will apply machine learning algorithms and then predict patient condition and send result back to client.

To develop this project we have designed two applications

1) Cloud Application: In this application we can upload dataset and then pre-process dataset and apply machine learning to build train model. This application accept vitals from client/mobile application and then apply machine learning algorithms to predict patient condition and send predicted value back to client application.

2) Client Application: This application upload file which contains patient vitals and send this vitals to cloud application and get result back.
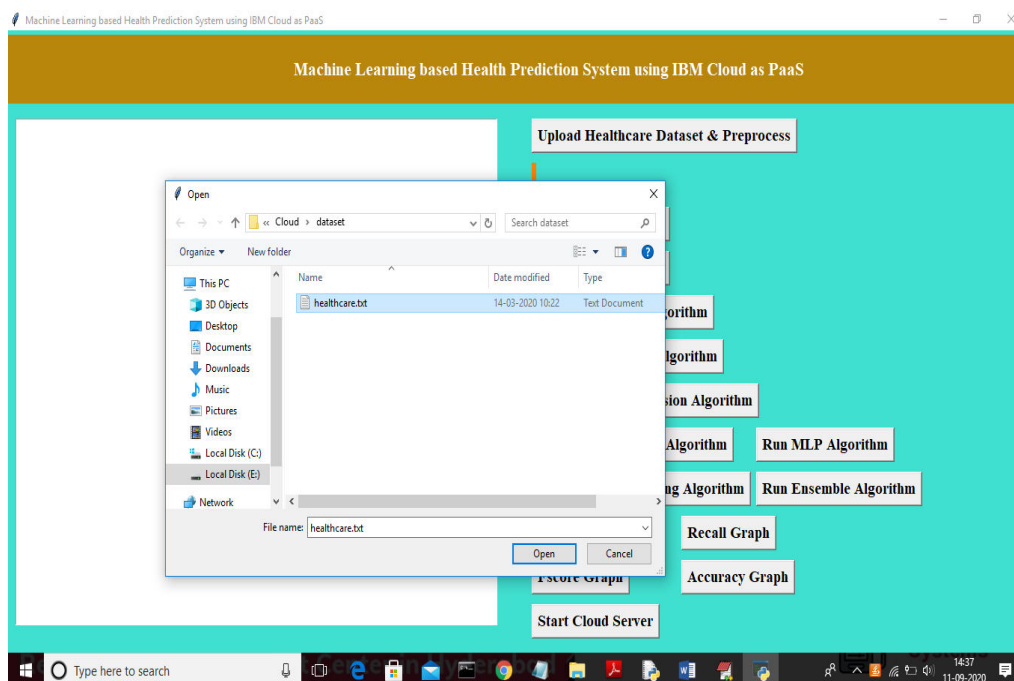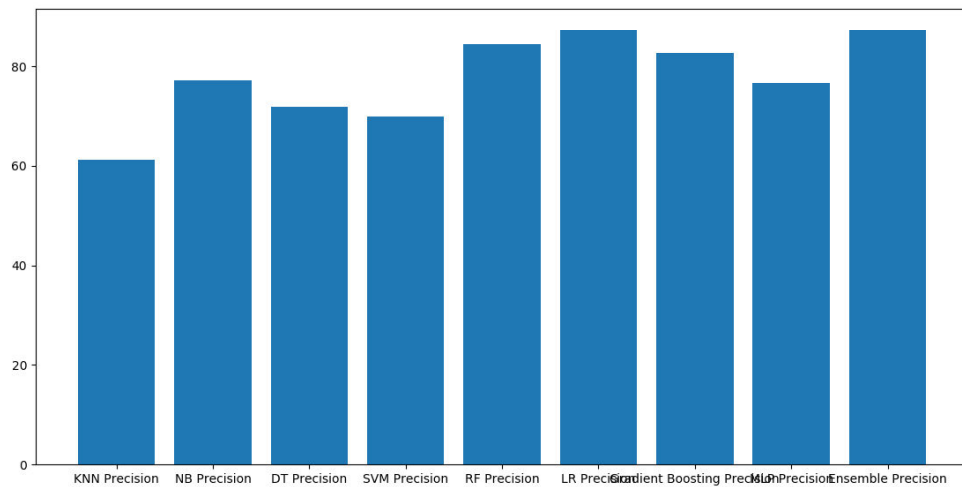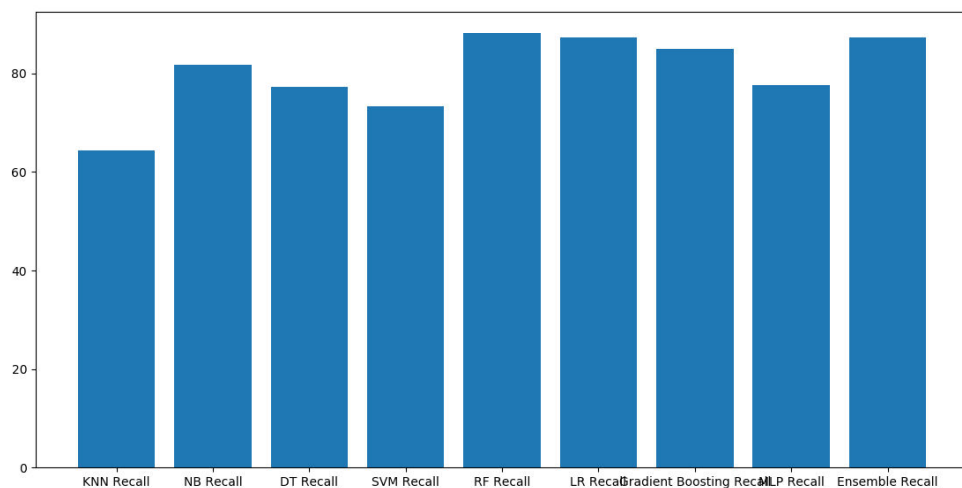
4.RESULTS AND DISCUSSION

Fig 1:In above screen uploading health care dataset and after uploading dataset will get below screen

Fig 2:In above screen x-axis represents algorithm names and y-axis represents precision of those algorithms and from all algorithms ensemble is performing well. Now click on 'Recall Graph' button to get below graph of recall

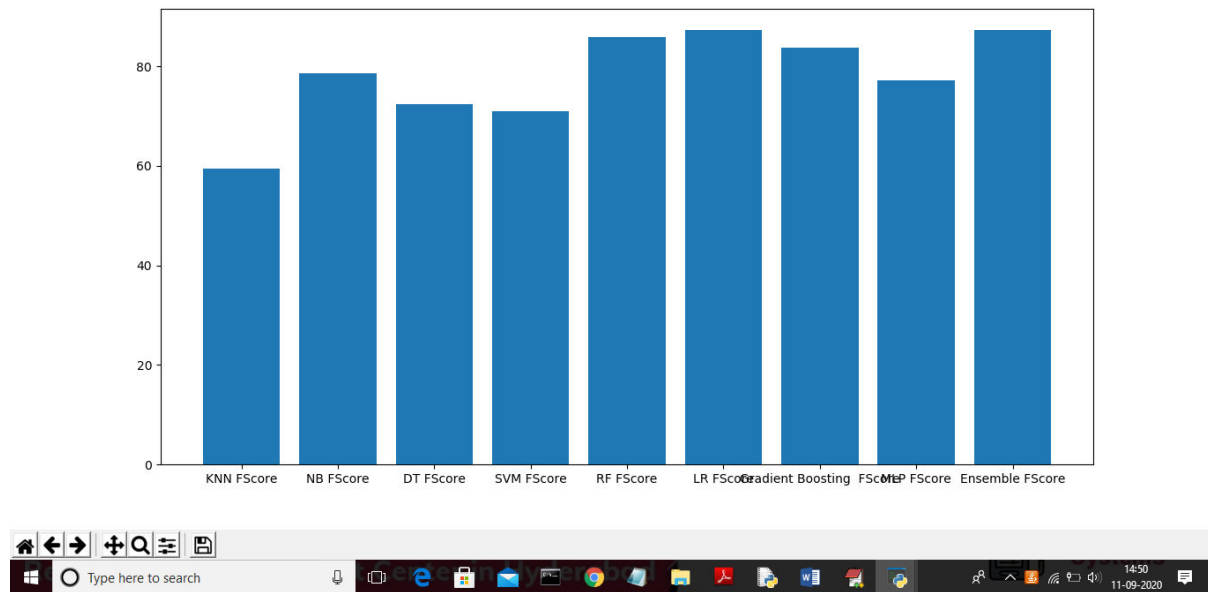**Fig 3:Now click on 'FScore Graph' button to get below FMeasure graph**

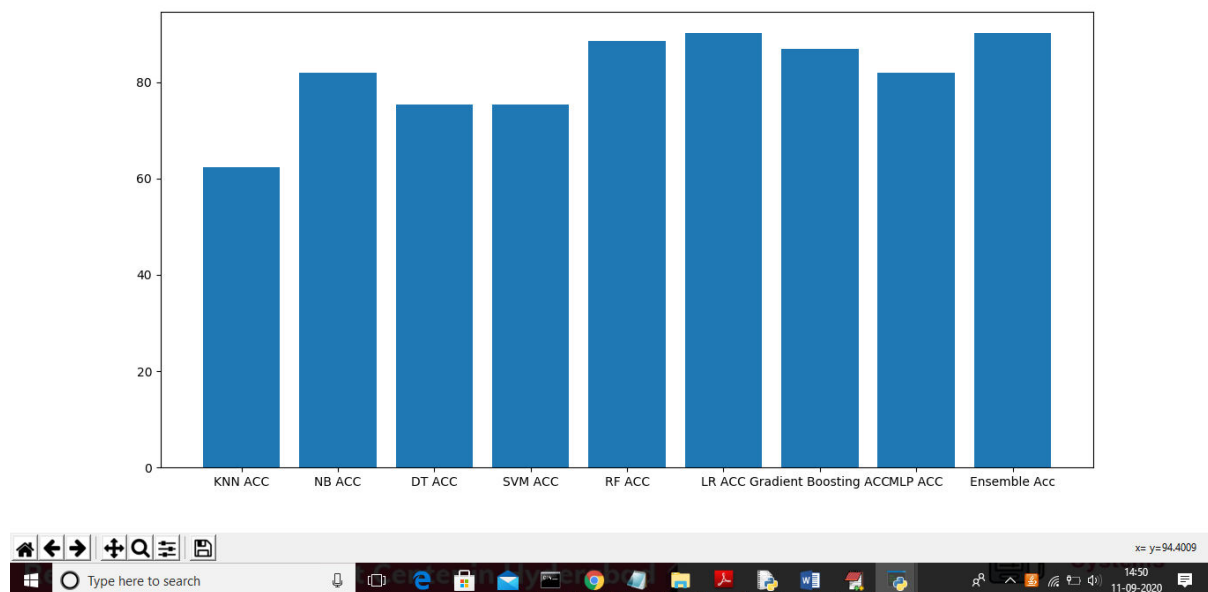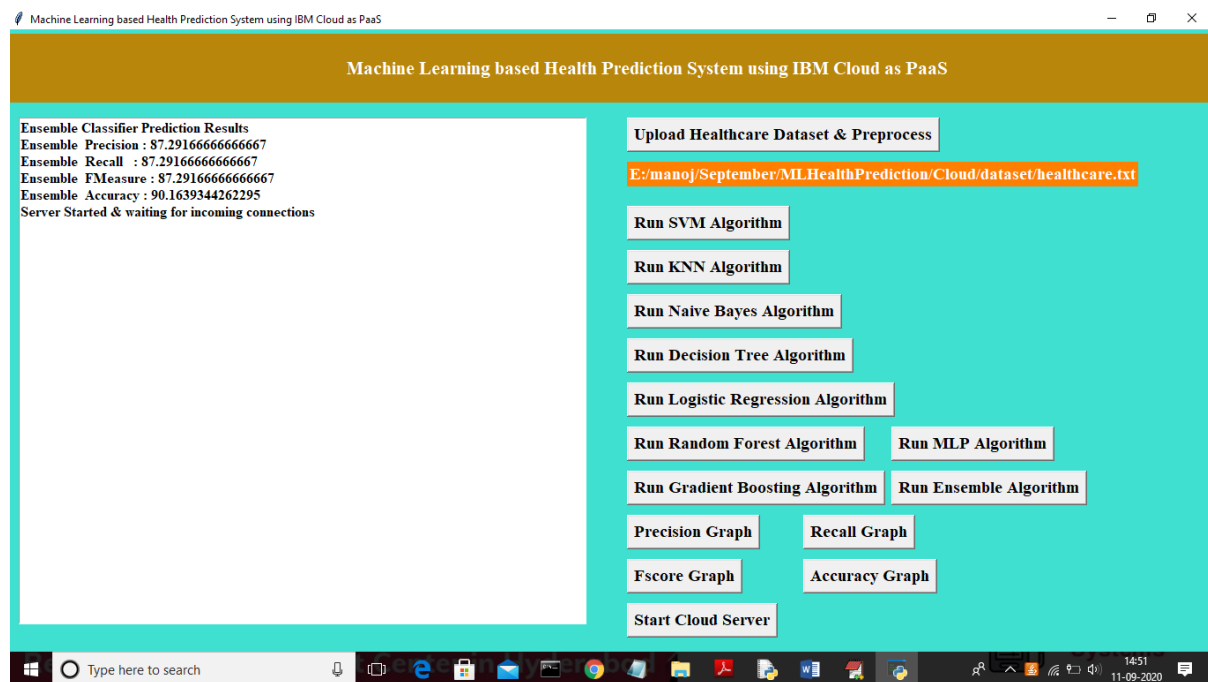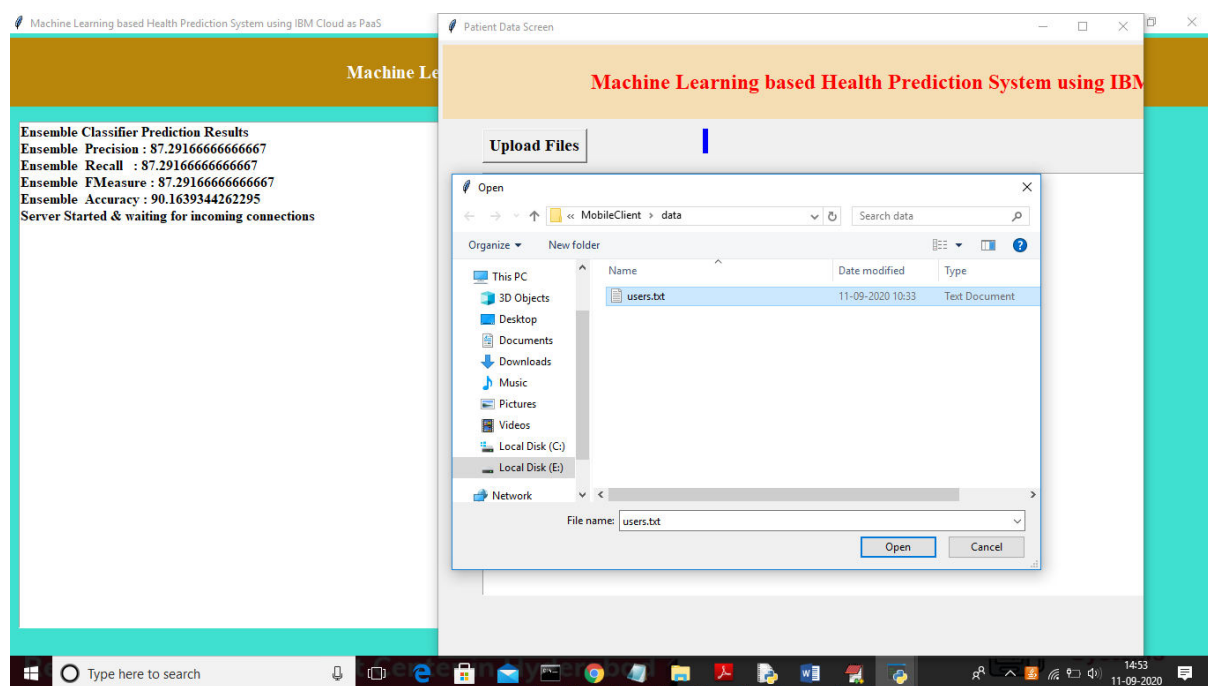**Fig 4:Now click on "Accuracy Graph' button to get below accuracy graph**

Fig 5:Now click on "Start Cloud Server" button to start cloud server and get below screen

Fig 6:In above screen we can see cloud server started and ready to accept connections from client. Now double click on 'run.bat' file from 'MobileClient' folder to get below screen

Fig 7:In above screen from client application uploading 'users.txt' file with patient vitals and this vitals send to cloud server to get below prediction result
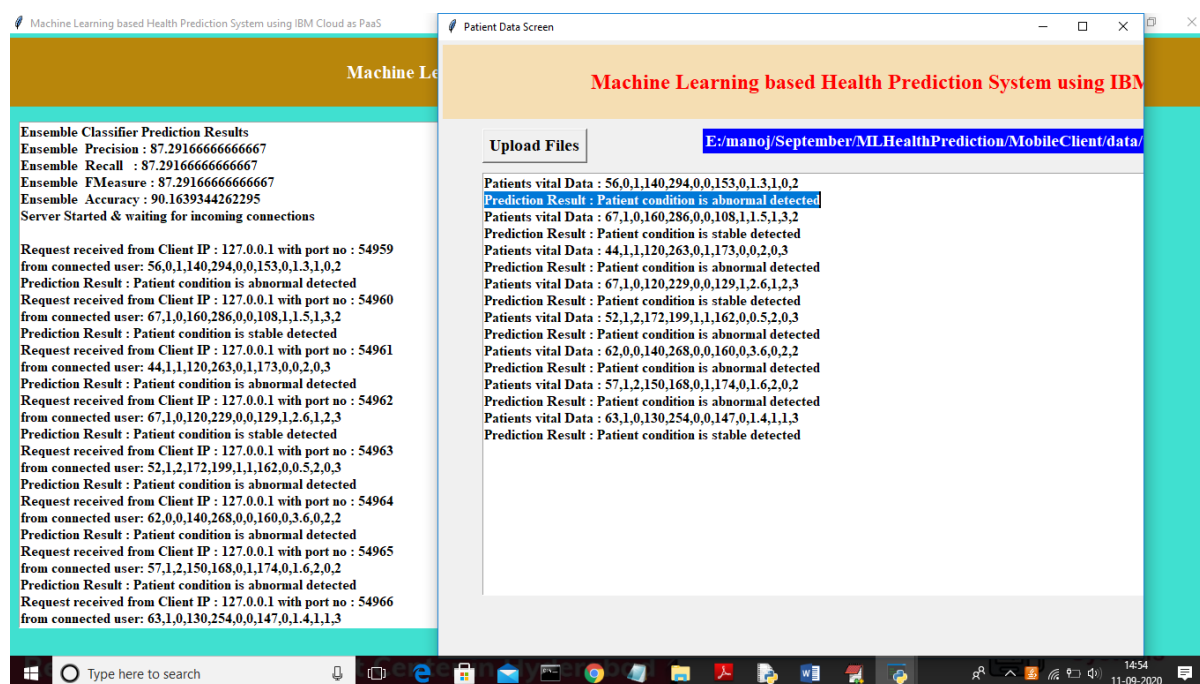
1363

Fig 8:In above screen data sent to server and server sent result back and in above client page first line contains patient vitals and second line displaying patient predicted condition based on vitals by machine learning algorithms. In above screen in first record we can see machine learning has predicted patient condition is abnormal.

5.CONLUSION

To supply higher remedy we require extra superior applied sciences at very low cost. We began this venture to convey out a desirable end result in the hospitals to serve the patient. We used some of the existed strategies and applied sciences to provide a new structure in the health center and nursing sector. Most of the ml fashions accuracy assorted from 80% to 92%. The lowest accuracy bought is 80%. An essential discovering of this undertaking is the terrific makes use of of laptop getting to know fashions for scientific sufferers and specific information manipulations. The IBM Cloud confirmed suitable promising movements through preserving extra than 90% success rate. Altogether the outcomes we bought from our assignment and experiments are displaying promise to upward shove this device in giant scale for city and low low-cost facet peoples. With the assist of this project, a digital physician can be installed to serve the humans higher and display sufferers with suitable care. This is additionally a decision-making assistant for the health practitioner as a clever fitness care system. As we have set up this task with very few parameters of the bodily segments, we can enhance this undertaking greater by using including full parameters to measure the human physique circulations. In the future, we are planning to set up an embedded machine to take a stay analyzing from Ventilator, Medicine Pump, Heart Monitor, and different ICU machines. This will additionally extend the ordinary working accuracy of this project.

BIBILOGRAPHY

[1] Gardner R.M., Shabot M.M. (2006) Patient-Monitoring Systems. In: Shortliffe E.H., Cimino J.J. (eds) Biomedical Informatics. Health Informatics. Springer, New York, NY

[2] Aggarwal, M., & Madhukar, M. (2017). IBM's Watson Analytics for Health Care: A Miracle Made True. In Cloud Computing Systems and Applications in Healthcare (pp. 117-134). IGI Global.

[3] "Rational Unified Process", URL: [online] Available: https://www.ibm.com/developerworks/rational/library/content/03July/10 00/1251/1251_bestpractices_TP026B.pdf.

[4] Anwar Islam, Tuhin Biswas. Health System in Bangladesh: Challenges and Opportunities. American Journal of Health Research. Vol. 2, No. 6, 2014, pp. 366-374. doi: 10.11648/j.ajhr.20140206.18

[5] P. Griffiths, A. R. Saucedo, P. Schmidt, G. Smith. Vital signs monitoring in hospitals at night. (n.d.). Retrieved from https://www.nursingtimes.net/clinical-archive/assessment-skills/vitalsigns-monitoring-in-hospitals-at-night/5089989.article.

[6] An Embedded, GSM based, Multiparameter, Realtime Patient Monitoring System and Control – An Implementation for ICU Patients. Kumar, R., & Rajasekaran, M. P. (2016, January). An IoT based patient monitoring system using raspberry Pi. In 2016 International Conference on Computing Technologies and Intelligent Data Engineering (ICCTIDE'16) (pp. 1-4). IEEE. [7] Nejkar, V. A., Nimbhorkar, S. R., Paliwal, J. K., & Shrivastav, A. A. (2018). Smart Nanny an IoT Based Baby Monitoring System. iManager's Journal on Computer Science, 6(1), 28.

[8] Ruiz, V. M., Saenz, L., Lopez-Magallon, A., Shields, A., Ogoe, H. A., Suresh, S., & Tsui, F. R. (2019). Early Prediction of Critical Events for Infants with Single Ventricle Physiology in Critical Care Using Routinely Collected Data. The Journal of Thoracic and Cardiovascular Surgery.

[9] Lin, K., Hu, Y., & Kong, G. (2019). Predicting In-hospital Mortality of Patients with Acute Kidney Injury in the ICU Using Random Forest Model. International Journal of Medical Informatics.

[10] Teres, D., Lemeshow, S., Avrunin, J. S., & Pastides, H. A. R. R. I. S. (1987). Validation of the mortality prediction model for ICU patients. Critical care medicine, 15(3), 208-213.