Effective Heart Disease Prediction using IBM

Auto AI Services

Introduction

Cardiovascular diseases (CVDs) are the number 1 cause of death globally, taking an estimated 17.9 million lives each year, which accounts for 31% of all deaths worldwide. Heart failure is a common event caused by CVDs. According to WHO data, heart disease is the leading cause of mortality globally, resulting in 17.9 million deaths annually [1]. The most behavioural risk factors for cardiovascular disease and stroke are unhealthy food, lack of physical activity, smoking, and alcohol drinking [1]. A heart attack occurs when the heart's blood circulation is obstructed by arteries plaque build-up. A thrombus in an artery causes a stroke by impeding blood flow to the brain [2]. The symptoms are common to other illnesses and might be confused with indicators of ageing, making diagnosis difficult for practitioners. Precision prediction and timely identification of cardiac disease are essential for improving patient survival rate. Because of the increased collection of medical data, practitioners now have a great opportunity to promote healthcare diagnosis. ML, which is a part of AI plays a vital role in many applications like text detection and recognition [3], early prediction [4], power quality disturbance detection [5], truck traffic classification [6], and agriculture [7]. ML has now become an essential tool in the healthcare sector to aid with patient diagnosis. The current methods for predicting and diagnosing cardiac disease are mostly dependent on practitioners' evaluation of a patient's medical history, signs, and physical assessment reports. Nowadays, information about patients with clinical reports is widely accessible in databases in the healthcare field, and it is rising rapidly day by day. In this article, the UCI ML repository's Cleveland HD dataset was utilized for developing the prediction model to heart disease. The machine is trained for learning patterns

based on the features that are already present in the dataset. Classification is an effective ML approach for prediction. When properly trained with adequate data, classification is an effective supervised ML method for identifying disease [8].

Literature Survey

Nave Bayes, random forest, PART, C4.5, and multilevel perceptron algorithm-based predictive model accuracy to HD dataset were determined to be in the range of 75.58%– 83.17% [9]. Moreover, Nave Bayes algorithm has the highest accuracy as 83.17%, while other algorithms have less than 80% accuracy [9]. Kumar et al. discovered that the Random Woodland ML classifier had an 85 percent precision for cardiovascular disease [10]. Gudadhe *et al*. [11] described the framework for predicting the heart disease using SVM and obtained the accuracy as 80.41%. Kahramanli and Allahverdi [12] combined fuzzy and crisp values in health data and attained accuracy rates of 84.24% to Pima Indian diabetes dataset and 86.8% for the Cleveland HD dataset, respectively. Various ML classification models [13–17] could be used to improve intelligence. Kahramanli and Allahverdi [12] established the artificial and fuzzy-based model to the Pima Indian diabetes dataset and the Cleveland HD dataset and found 84.24% and 86.8% accuracy, respectively. Olaniyi *et al*. [18] established a prediction model and achieved an accuracy of 85% using feedforward multilayer perceptron (MLP) and 87.5% using SVM on the UCI ML datasets. Polat *et al*. [19] have employed k-nearest neighbour algorithm and an artificial immune recognition framework and achieved 87% accuracy on the Cleveland dataset. On a Cleveland dataset, Detrano et al. [20] achieved 77% using the logistic regression algorithm. Saw *et al*. [21] have implemented the improved logistic regression classification model for heart disease dataset. The fast decision tree and C4.5 tree have been employed for HD prediction [22]. As a result of the proposed model's initial phase, trees and features have been extracted. The genetic and fuzzy logic-based approach has been proposed [23] which is a hybrid model to instantly generate the rules using a fitness function, appropriate genetic operators, and a rule encoding method. Teekaraman *et al*., employed contemporary ML techniques to construct healthcare heart disease predictive model. The Cleveland HD dataset was subjected to SVM with radial basis function (RBF) kernel, Gaussian Naive Bayes, logistic regression, Light GBM, XG Boost, and random forest algorithm, and the best performing prediction model for early diagnosis of heart disease was found by Teekaraman *et al* ., [24]

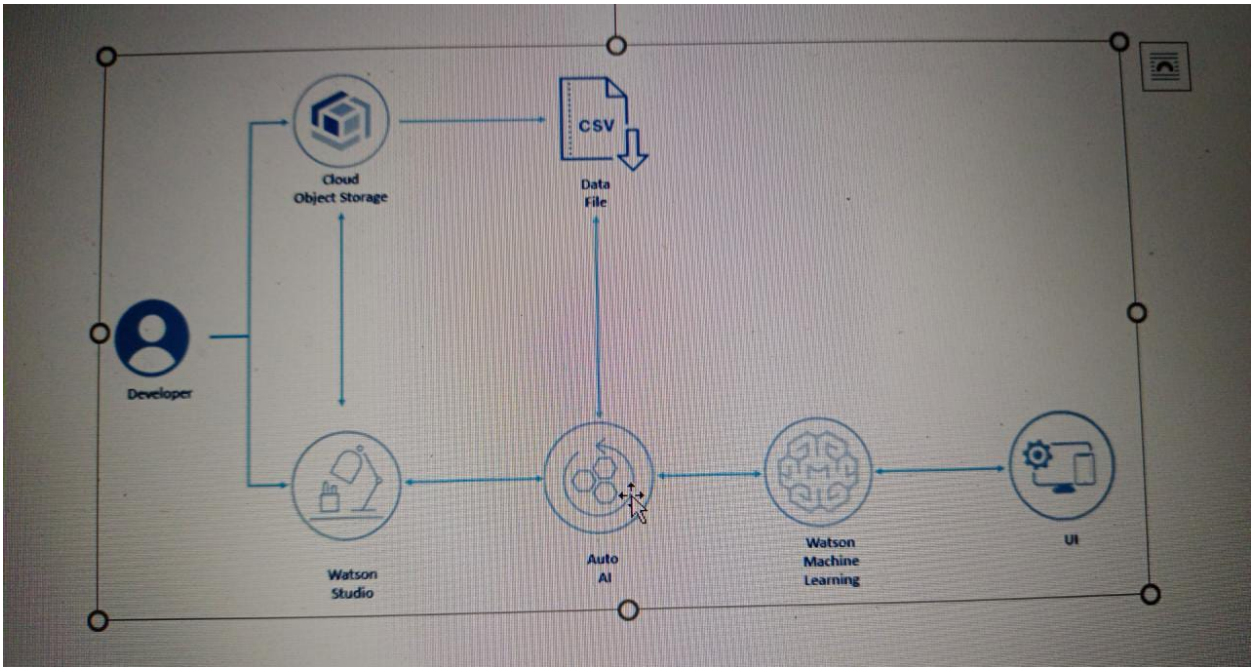
In this Project I have built a model using Auto AI and build a webpage application where we can showcase the prediction of Heart failure.

Services Used:

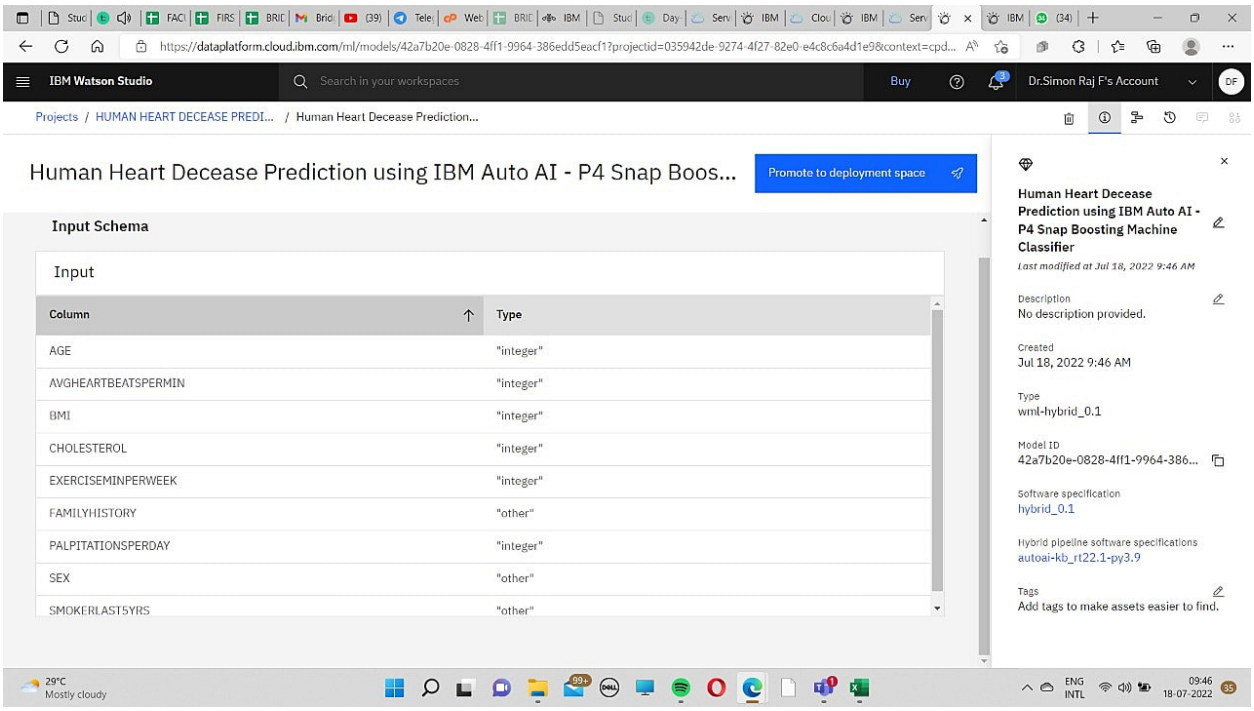
IBM Watson Studio

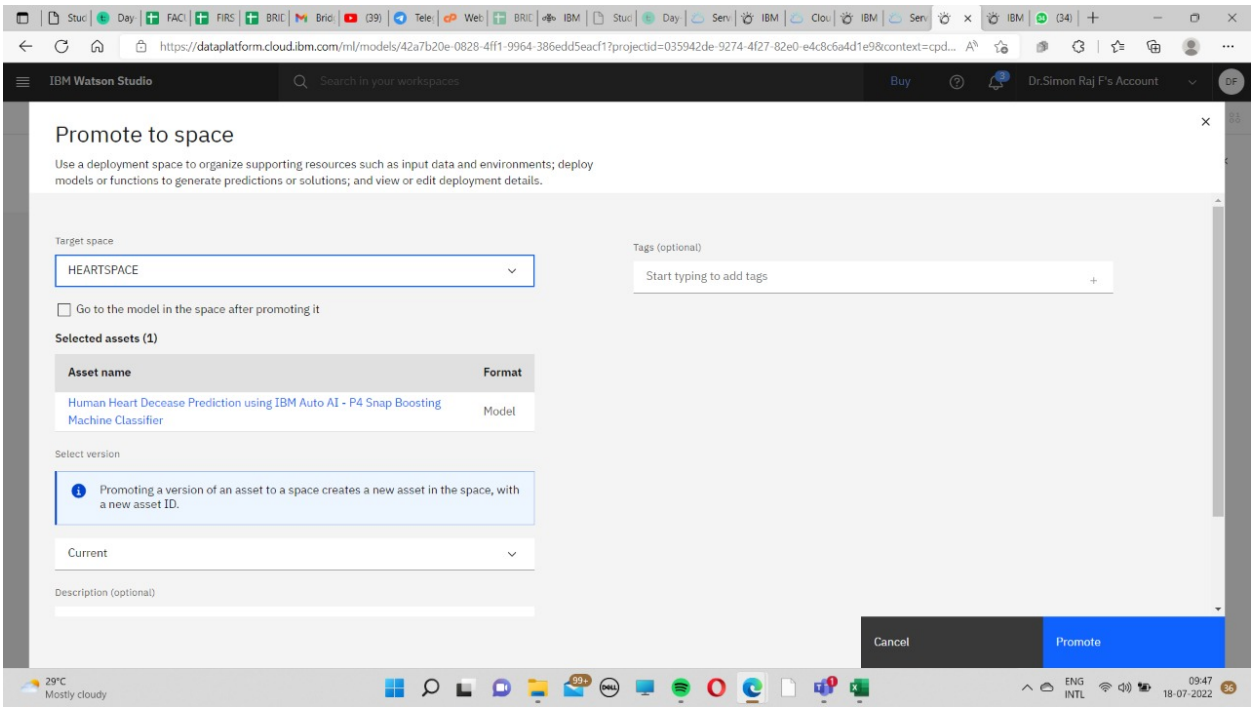
- IBM Watson Machine Learning
- Node-RED
- IBM Cloud Object Storage

Technical Architecture:

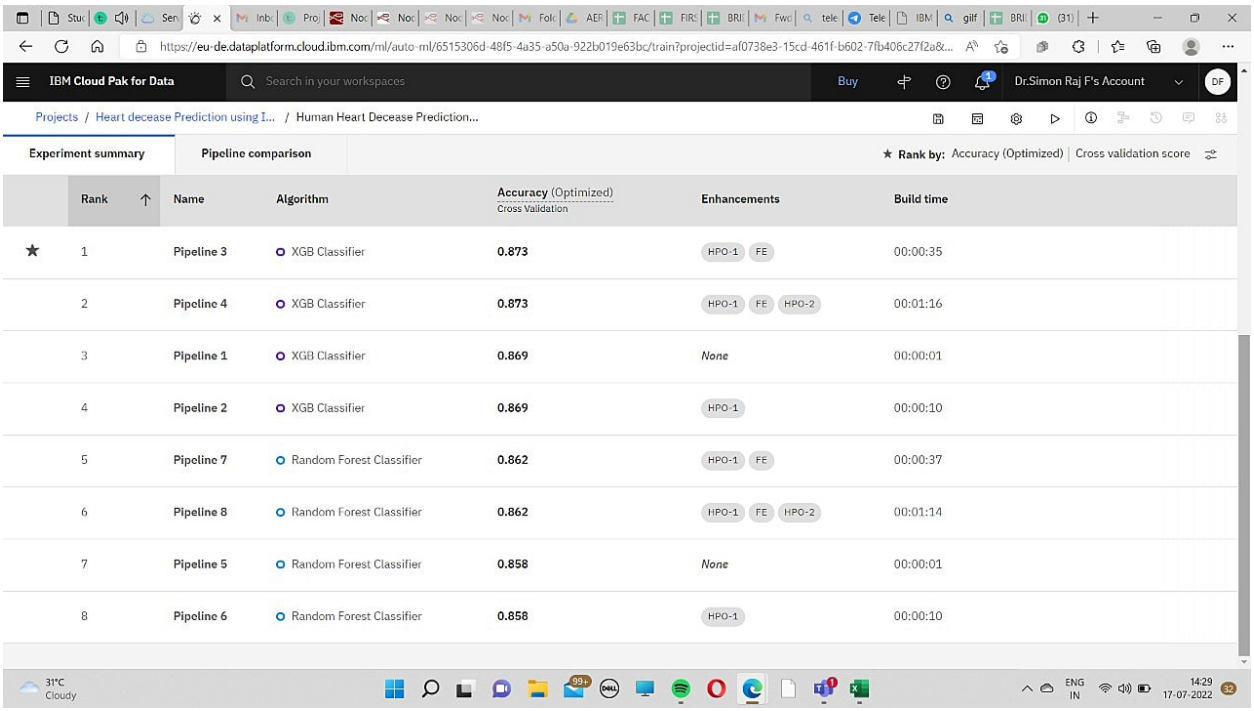


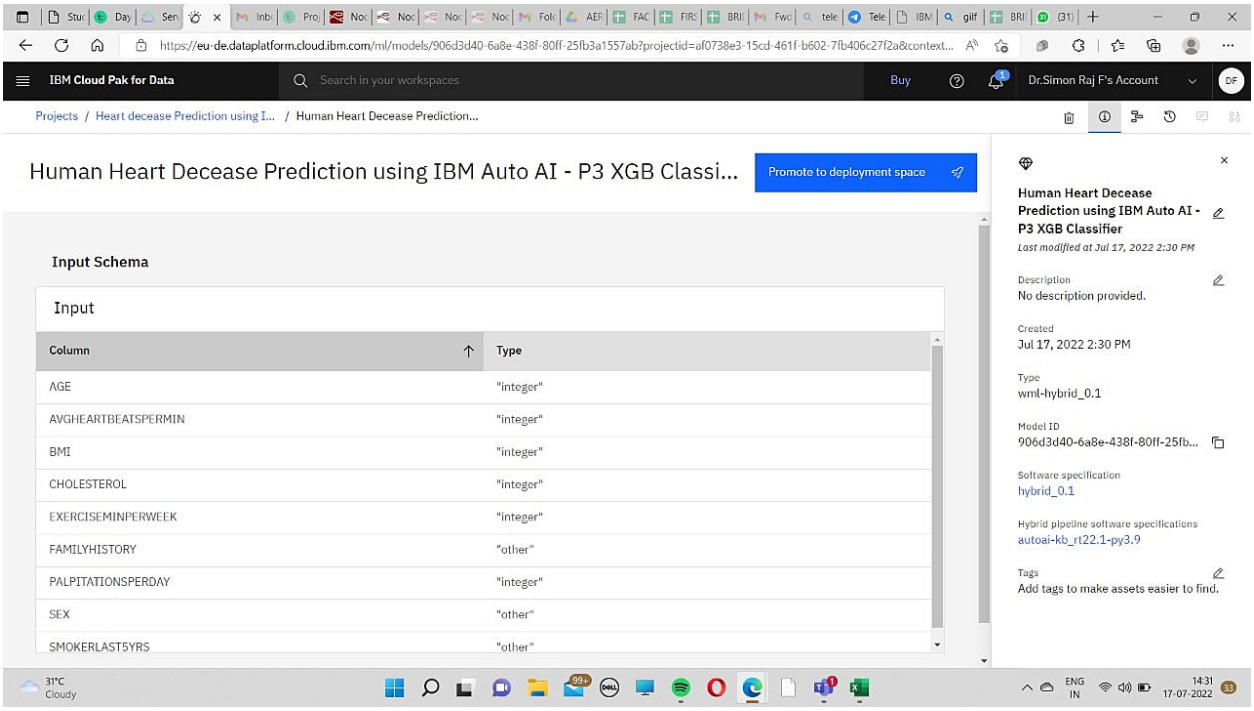
Effective Heart decease Pridiction using Auto AI



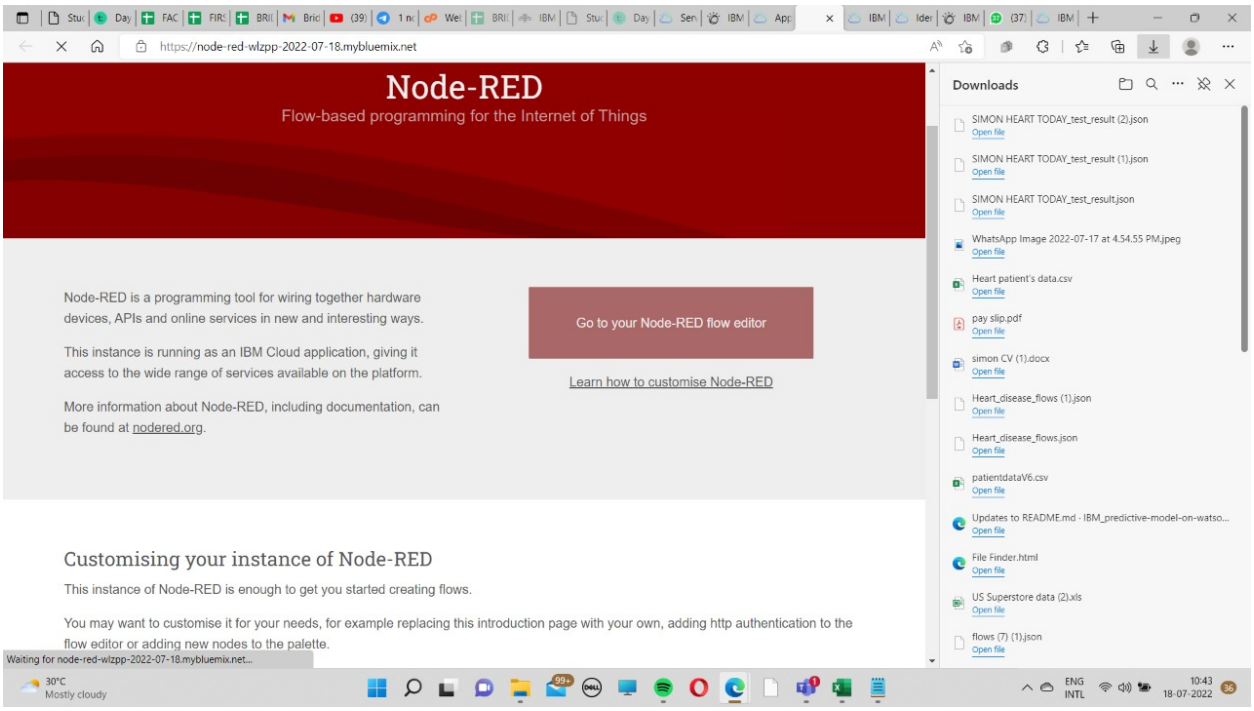


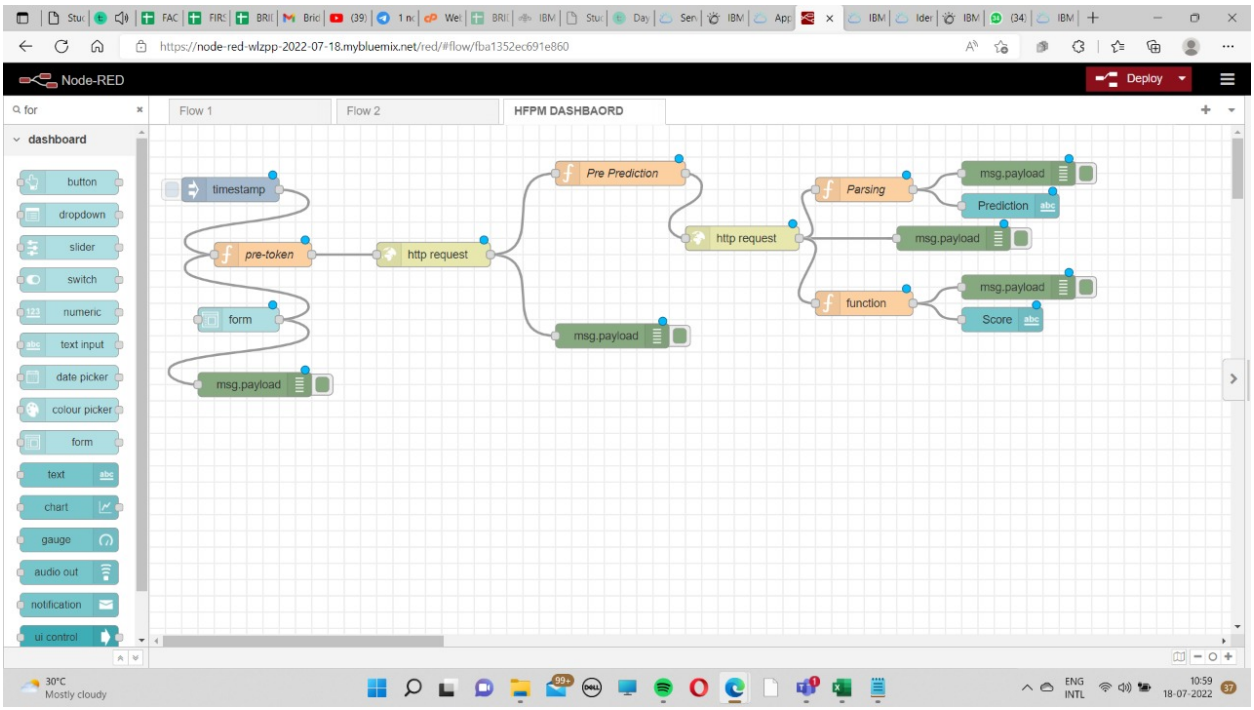
Effective Heart decease Pridiction using Auto AI



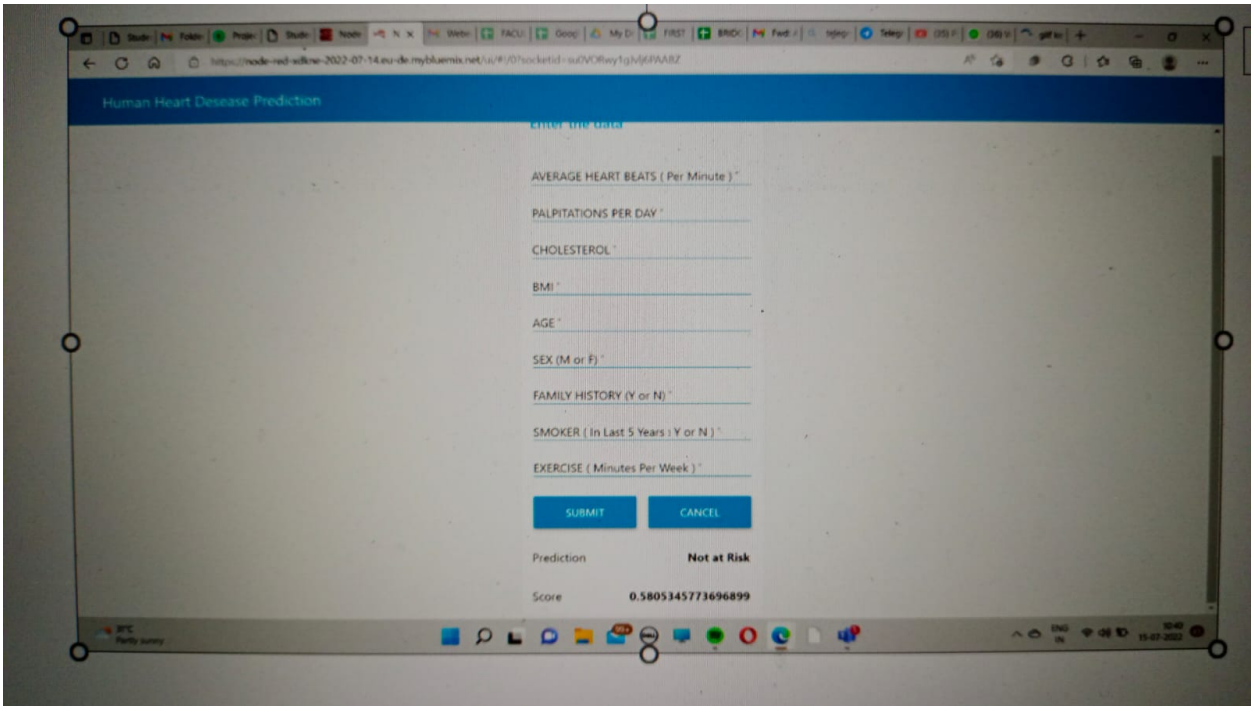


Effective Heart decease Pridiction using Auto AI





OUTPUT



Conclusion

In this project we have made webpage application model for predicting Human Heart decease prediction using IBM cloud-based Auto AI Techniques. Using such model and using huge collection of medical data, we can give warning or alert for patient using their medical record.

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