Health Prediction System using Ensemble Algorithm

Mr. G. Kiran Kumar
Assistant Professor
Department of Computer Science and Engineering
Anurag Group of Institutions, Venkatapur, Hyderabad, Telangana, India

Parankusham Amulya	**Thaduri Sampath Reddy**	**Kommidi Nikitha Reddy**
Department of Computer	Department of Computer	Department of Computer
Science and Engineering	Science and Engineering	Science and Engineering
Anurag Group of Institutions	Anurag Group of Institutions	Anurag Group of Institutions
Venkatapur, Hyderabad,	Venkatapur, Hyderabad,	Venkatapur, Hyderabad,
Telangana, India	Telangana, India	Telangana, India

Abstract: Humans are considered to be the most intelligent species and are inherently more health conscious. Health is the most crucial aspect of a human life. Application of Machine learning methods on electronic health record dataset could help in prediction of health risks and even prevent them by providing necessary treatment. The aim of our project is to predict a patient's health based on features like cholesterol, Blood pressure etc. Dataset is provided to the model where Naïve Bayes Algorithm, Decision Tree Algorithms are applied with Ensemble Algorithm to classify the health of patient into two classes of stable and abnormal. Based on the classification, attention or treatment can be provided to the patient as early as possible.

Keywords: Health Prediction, Naïve Bayes, Decision Tree, Ensemble

I.   INTRODUCTION

Critical Patient Caring or monitoring System is a process where a doctor could be able toincessantly monitor more number of patients, for a multitude of parameters at in a remote place at once and also can be utilised to provide control over medicine dosage. These systems can greatly facilitate the development and evaluation of the ICU decision-support systems. Critical patients whose bodies need time to recover and repair are provided with devices such as vital sign monitors, mechanical ventilators and dialysis machines. Most of the machines require to be managed manually by supervising the patient's condition and test reports. So, the basic thought is to automate the process and decision-making ability with the help of modern technology, especially related the auto deployable machine learning models. These models can be

able to predict the near future condition of the patients, whether their condition will increase or decrease and if they need any immediate support or not.

II. PROPOSED COMPUTING MODEL

This section describes the proposed system overview and flowchart.

Proposed System Overview:

Machine Learning methods are gaining popularity to automate the process and predict diseases more accurately.These methods facilitate development of the intelligence into a machine, so that it can perform better in the future using the learned experience. Application of Machine learning methods on electronic health record dataset could provide valuable information regarding prediction of health risks. These models can be adapted, extended and customized to solve the Multi-label learning tasks.

We use three machine learning algorithms namely Naïve Bayes, Decision tree and Ensemble.

Naïve Bayes' Algorithm: Basically Naïve Bayes classifiers are simple "probabilistic classifiers" based on application of Bayes' theorem with strong independence assumptions between the features. They can be utilised to achieve higher accuracy levels.

Decision Tree Algorithm: Decision tree is a tree-structured classifier, where internal nodes represent the features of the considered dataset, branches represent the respective rules for the decision and each leaf node represents the specified output.

Ensemble Algorithm: Ensemble Algorithm combines various Machine Learning algorithms to produce better results for prediction. In our project we are have considered Naïve Bayes and Decision tree algorithms.

Flowchart:

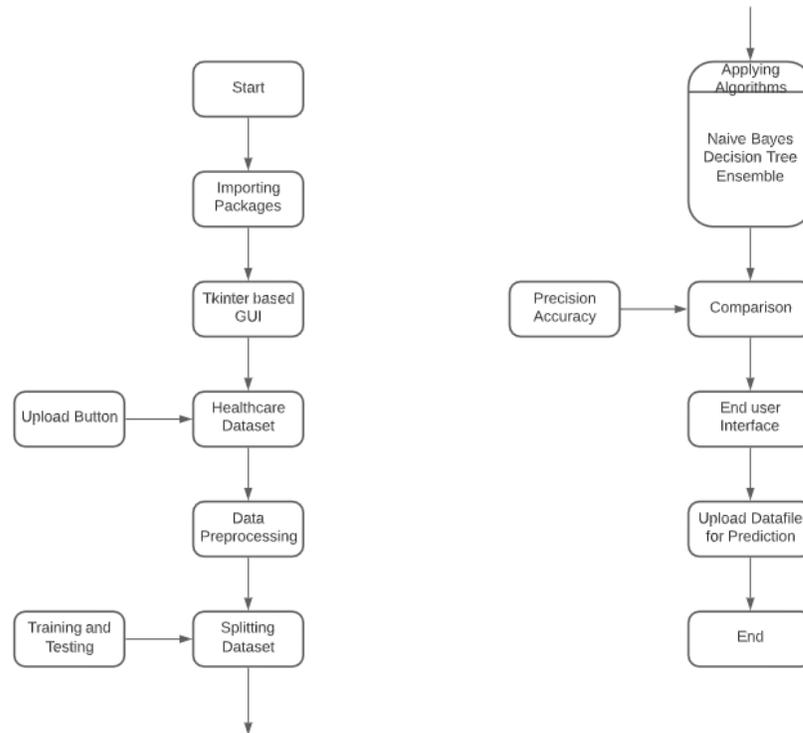The flowchart represents all the events that take place including the functionalities of the proposed system.


Fig: 2.1

III. RESULTS

The dataset is uploaded using the "Upload" button provided in the interface. The Healthcare dataset is then uploaded which contains the vital details of the patients. Then we run the respective algorithms of Naïve Bayes, Decision tree and Ensemble algorithm that combines our both algorithms to produce better results. The Precision Graph and Accuracy Graph are displayed by clicking on the specified buttons.
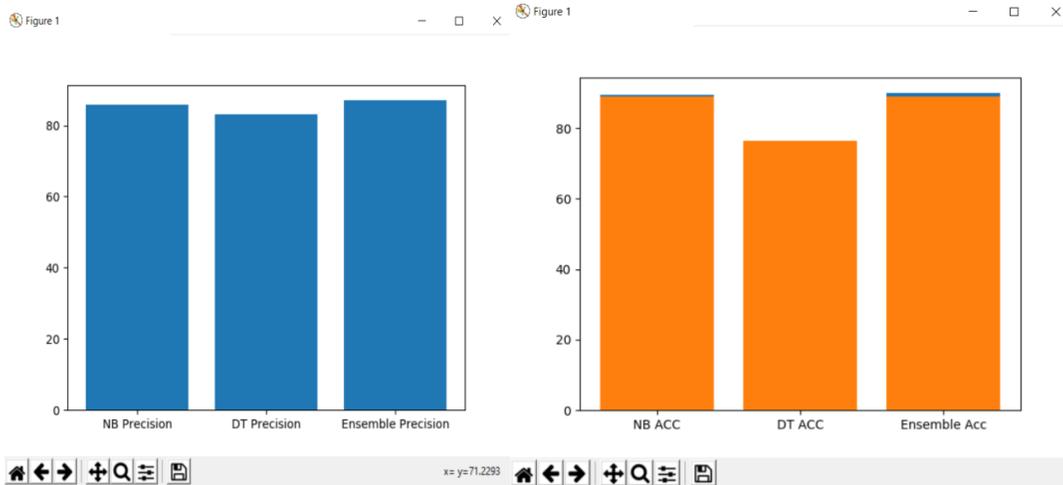
Then we upload the data file containing the patient's vital data for prediction of the health state of the patient.
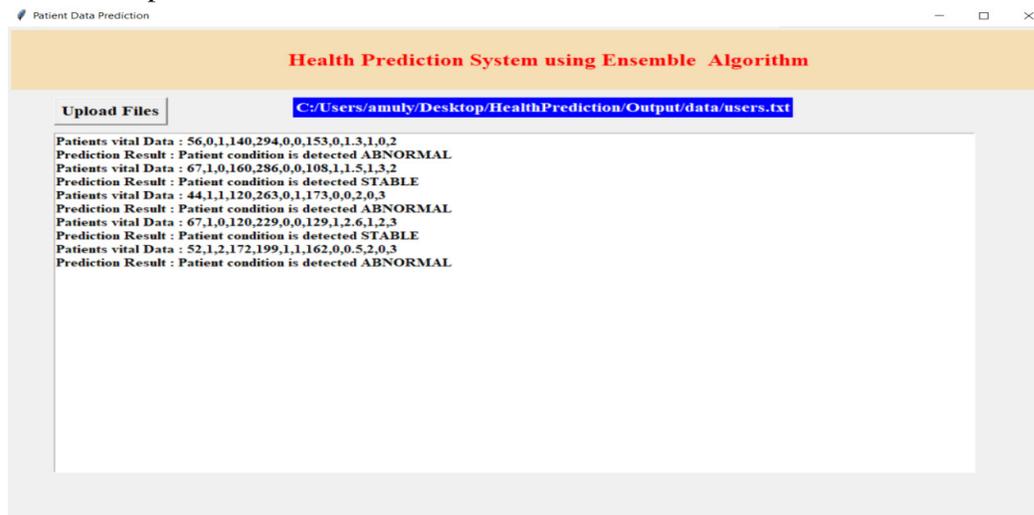
IV. CONCLUSION

To provide better treatment we require more advanced technologies at very low cost. We started this project in order to bring out a good result in the hospitals to serve the patients. We used some of the existing techniques and technologies to give a new shape in the hospital and nursing sector. Most of the Machine Learning models accuracy varied from 75% to 92%. The lowest accuracy obtained is 77%. An important finding of this project is the appropriate uses of Machine Learning models for medical patients and categorical data manipulations. With the help of this project, a virtual doctor can be established to serve the people better and monitor patients with appropriate care. This can also be uses as a decision-making assistant for the doctor in the field of smart health care system.

V.   REFERENCES

[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] 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

[3] 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.

[4] 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.

[5] 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.