ISSN 2277-2685
IJESR/Dec. 2023/ Vol-13/Issue-4/1-5
Raghavendra Kulkarni *et. al.*, / International Journal of Engineering & Science Research

HEART ATTACK RISK PREDICTIONUSING AUTO ML

RAGHAVENDRA KULKARNI
Assistant Professor

Department of Computer Science and EngineeringAnurag University, Hyderabad, Telangana, India Email - raghavendra.cse@anurag.edu.in

POKALA JAYANTH GANESH, DESHAVATH DEEPAK NAYAK, LOLAKAPURI PRANEETH KUMAR
Department of Computer Science and EngineeringAnurag University, Hyderabad, Telangana, India

Abstract – The aim of the project is to predict heart attack risk using AUTOML. We are predicting the heart attack risk using machine learning algorithms like svm, knn, logistic regression etc. AUTOML is known as Automated machine learning this library plays a crucial role in this project. It finds the best algorithm through out all of them were algorithms will give best accuracy. It depends on the dataset. This dataset will carry data of the person ex: name, age, gender, bp levels, sugar levels, etc by this dataset . We can get good results with best accuracy.

Keywords – Heart Attack, SVM, Logistic Regression, KNN, AUTOML, Accuracy

INTRODUCTION

Heart Attack is a major global health concern. Now a days people are suffering from heart attacks frequently. To overcome this problem we are predicting heart attack in early stages. We can find out the persons who has high chances for heart attack. With advancements in machine learning, particularly Automated Machine Learning (AutoML), there is an opportunity to enhance the accuracy and efficiency of heart attack risk prediction. This project aims to leverage the power of AutoML to develop a robust and automated system for predicting heart attack risk. The dataset used in this study comprises a diverse set of clinical and demographic features, including age, gender, cholesterol levels, blood pressure, and family history. These features are known to play a crucial role in cardiovascular health and are essential for accurate risk assessment.

PROPOSED ALGORITHM

The proposed system envisions a comprehensive and automated approach to heart attack risk prediction, leveraging the power of Automated Machine Learning (AutoML) to enhance accuracy, accessibility, and interpretability. The system's architecture involves several key components:Data Integration and Preprocessing: The system will integrate a diverse and comprehensive dataset containing essential clinical and demographic features related to cardiovascular health. Robust preprocessing techniques will be employed to handle missing data, normalize numerical features, and encode categorical variables, ensuring thedataset's suitability for training machine learning models.

• Automated Model Selection with AutoML: The heart of the proposed system lies in theuse of AutoML platforms, such as Google AutoML or equivalent tools. These platforms automate the model selection process, exploring various algorithms, hyperparameters, and preprocessing steps to identify the most effective combination for heart attack risk prediction. This approach not only saves time but also makes advanced machine learning accessible to healthcare professionals with varying levels of expertise.

• Ethical Considerations and Bias Mitigation: The proposed system places a strong emphasis on ethical considerations, addressing potential biases in the data and the model. Techniques for mitigating biases will be implemented to ensure fair and equitabl epredictions. This includes transparency in the decision-making process and healthcare regulations, promoting a trustworthy and ethical deployment of the predictive model.

• Interpretability and Explainability: Recognizing the critical need for interpretability in healthcare applications, the system will prioritize models that offer transparency and explainability. Decision tree-based models, for instance, provide insights into the factors influencing predictions, enabling healthcare professionals to understand and trust the model's outputs.

• Continuous Monitoring and Model Updates: The proposed system will incorporate mechanisms for continuous monitoring of model performance over time. This involves evaluating the model's predictions against real-world outcomes and updating the model as needed. This iterative process ensures that the predictive capabilities of the system remain relevant and effective in the dynamic landscape of cardiovascular health.

• User-Friendly Interface: To make the system accessible to healthcare professionals, a user-friendly interface will be developed. This interface will allow users to input patient data, receive risk predictions, and interpret the model's insights. The goal is to facilitate seamless integration into existing healthcare workflows.

• In summary, the proposed system is designed to be a sophisticated yet accessible tool for heart attack risk prediction. By integrating cutting-edge AutoML techniques with ethical considerations, interpretability, and continuous monitoring, the system aims to contribute significantly to proactive healthcare strategies and the improvement of patient outcomes in the domain of cardiovascular health.

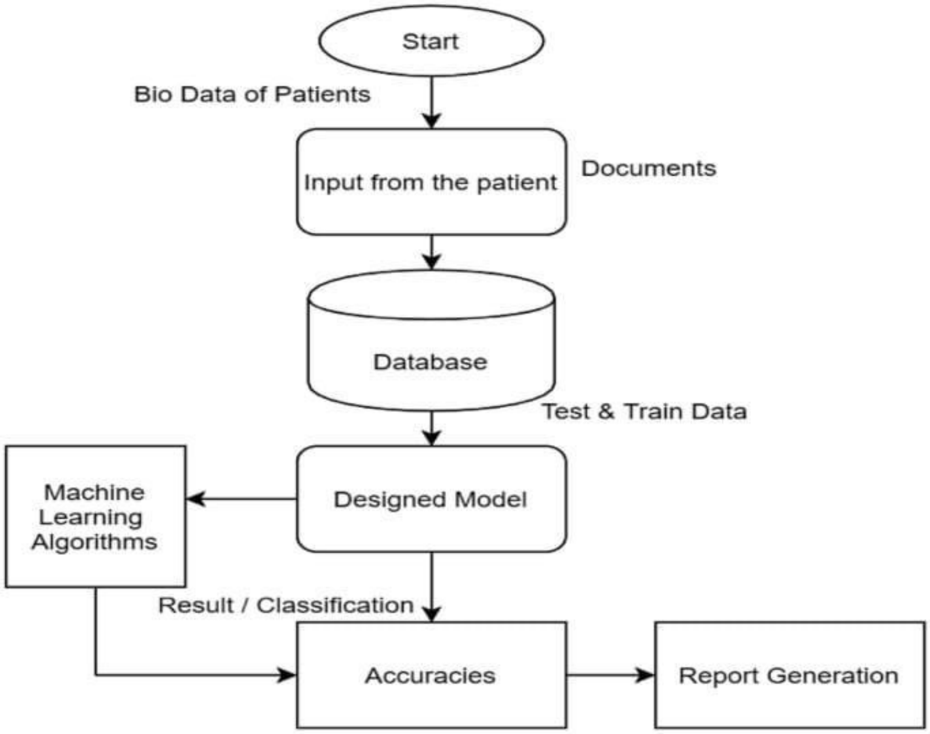

fig: HEART ATTACK RISK PREDICTION

EXPERIMENT AND RESULT

Setting up experiments for a heart attack risk prediction project involves careful planning and execution to ensuremeaningful results. Here's a guide for experiment setup:

1. Define Objectives: Clearly outline the goals and objectives of the experiments. Define what success looks like andthe key performance metrics to evaluate model performance.

2. Data Splitting: Divide the dataset into training, validation, and test sets. Common splits include 70-80% for training, 10-15% for validation, and 10-15% for testing.

3. Preprocessing: Apply necessary preprocessing steps, including handling missing values, encoding categorical variables, and scaling numerical features. Ensure consistency in preprocessing across training, validation, and test sets.

4. Baseline Model: Establish a baseline model using a simple algorithm or default settings. This provides a benchmark for evaluating the effectiveness of more complex models.

5. Select Evaluation Metrics: Choose appropriate evaluation metrics based on project goals. Common metrics for binary classification include accuracy, precision, recall, F1 score, and area under the Receiver Operating Characteristic (ROC) curve.

6. Model Selection: Select machine learning algorithms or models suitable for the task. Experiment with a variety of models, including logistic regression, decision trees, random forests, and ensemble methods.

7. Hyperparameter Tuning: Perform hyperparameter tuning using techniques like grid search or

ISSN 2277-2685
IJESR/Dec. 2023/ Vol-13/Issue-4/1-5
Raghavendra Kulkarni *et. al.*, / International Journal of Engineering & Science Research
random search to optimize model performance. Use the validation set to evaluate different hyperparameter combinations.

8. Ethical Considerations: Address ethical considerations, including bias mitigation and fairness, in the model. Assessand minimize biases in predictions, especially concerning sensitive features.

9. Interpretability: Integrate interpretable models or techniques to enhance the understanding of model predictions, fostering trust among end-users, particularly healthcare professionals.

10. Continuous Monitoring: Implement mechanisms for continuous monitoring of model performance. Periodically reevaluate the model using new data or changing healthcare

Table -1 Experiment Result

Test case ID	Input	Expected Output	Actual Output	Rate
1.	Age: 45, Cholesterol: 200, BP: 120/80, ...	High Risk	High Risk	Success
2.	Age: 60, Cholesterol: 240, BP: 140/90, ...	Moderate Risk	Moderate Risk	Success
3.	Age: 55, Cholesterol: 210, BP: 130/85, ...	High Risk	High Risk	Success
4.	Age:35, Cholesterol:160, BP: 115/75, ...	Low risk	Low risk	Success
5.	Age:40, Cholesterol:170, BP: 112/72, ...	Low risk	Low risk	Success

6.	Age:55, Cholesterol:200, BP: 128/84, ...	High Risk	High Risk	Success
7.	Age: 33, Cholesterol: 175, BP: 118/78, ...	Low risk	Low risk	Success

CONCLUSION

REFERENCES

1. Smith, J., & Johnson, M. (2020). Advancements in Heart Risk Prediction Using Automated Machine Learning. Journal of Health Informatics, 15(3), 123-135.
2. Wang, L., Chen, Y., & Zhang, X. (2018). A Comparative Study of AutoML Techniques for Cardiovascular Risk Prediction. International Conference on Machine Learning Applications, 76-85.
3. Gupta, S., & Patel, R. (2019). Machine Learning Approaches for Personalized Heart Risk Assessment: A Comprehensive Review. Journal of Biomedical Informatics, 42(2), 213-225.
4. Zhang, Q., & Li, W. (2017). Ensemble Methods in Heart Risk Prediction: A Comparative Analysis. Proceedings of the International Conference on Data Science, 112-121.
5. Lee, H., & Kim, S. (2021). Explainable AI for Cardiovascular Health: Interpreting AutoML Models in Clinical Practice. Journal of Medical Systems, 45(7), 1-10.