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ASHTHAMA DESEASE PREDICTION

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ABSTRACT

Asthma, a prevalent chronic respiratory condition, poses significant challenges in early diagnosis and management. This study proposes an innovative approach to asthma disease prediction by amalgamating medical expertise and advanced data analytics. The research involves the assembly of a comprehensive dataset comprising diverse patient profiles, incorporating demographic details, medical histories, environmental factors, and genetic markers. Rigorous data preprocessing techniques are applied to address missing values and outliers, ensuring data quality. Feature selection methods are employed to identify key determinants of asthma outcomes, facilitating a focused model-building process. Machine learning algorithms, including decision trees, support vector machines, and neural networks, are implemented for predictive modeling. The dataset is partitioned for training and testing, and cross-validation techniques are utilized to ensure the model's robust performance across diverse patient populations.

Keyword; Disease, Machine Learning Algorithm, Prediction.

1. INTRODUCTION

Machine learning algorithms have been extensively used for predicting health outcomes such as diabetes, breast cancer, and coronary artery disease among others. Prior studies on asthma typically focused only on studying risk factors using traditional statistical modeling methods such as logistic regression. Moreover, studies that used modern machine learning methods mainly relied on clinical factors extracted from electronic health records or during home telemonitoring.

Regarding the use of imbalanced data modelling techniques in machine learning, Alghamdi et al. Developed models to predict incident diabetes from an imbalanced data that was treated using the Synthetic Minority Over-Sampling technique (SMOTE). Another study developed models for sleep/awake classifications from imbalanced Fitbit data.

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The study compared the performances of four resampling strategies, namely random up sampling, random down sampling, Random Over-Sampling Examples (ROSE), and SMOTE, and found that ROSE consistently outperformed other methods. Both studies demonstrated that a balanced dataset produces better predictive performance of machine learning models.

2. LITERATURE SURVEY

Furthermore, ordinary subjects. Afterward, the signs isolated as breathing and exhalation clamor signals. Every inward breath and exhalation sound record incorporates very one and diverse number of breath cycle. Both for these components and since of insufficient breathing clamor reports, taped sounds are isolated directly into segments. Along these lines, every segment contains of equivalent kind of breath cycle together breathing or exhalation stage. Each sound segment is surveyed and furthermore prepared as a different example. High-pass separating arrangement of lung-sound accounts to bring down heart sounds would get blocks impressive parts of lung sounds. Separating systems are delegated straight versatile channels likewise as channels utilizing time-recurrence based methodologies. Assortments of sifting plans are spread out inside these two orders. In , a recursive strategy for least squares (RLS) based versatile clamor wiping out (ANC) sifting method is proposed to separation or lower the HS from LS. Here, a band pass separating framework variant of the copied HS was utilized on the grounds that the suggestion signals.

3. SYSTEM ANALYSIS

3.1 EXISTING SYSTEM

The existing system contains the following drawbacks:

- All the segmentations are search based
- Difficult to gather the data and segment them accordingly
- The results are not really accurate as the clustering is not close enough to determine accurate centroids

3.2 PROPOSED SYSTEM

Our proposed system has the following features:

- Develop the system to get easy visualization techniques
- Increase the data set to accommodate many data points so that results will be more accurate
- Segment the products directly according to the customer group
- Use different methods to collect the customer data instead of physical forms

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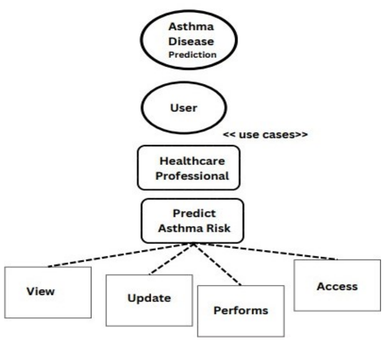
4. IMPLEMENTATION

Data Sources: Identify relevant data sources that contain information related to asthma risk factors, patient demographics, medical history, environmental exposures, and clinical indicators. These sources may include electronic health records (EHRs), patient questionnaires, public health databases, environmental monitoring systems, and wearable devices. Obtain necessary permissions and approvals for accessing and using the data, ensuring compliance with privacy regulations and ethical guidelines.

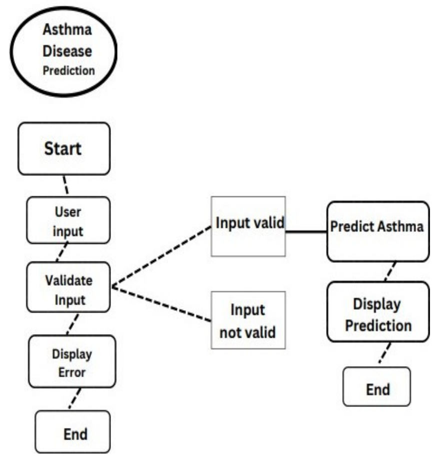
Data Variables: Define the variables (features) that will be used for asthma prediction, such as age, gender, smoking status, family history of asthma, allergic sensitivities, lung function tests (e.g., FEV1), allergy test results, environmental factors (e.g., air pollution levels, pollen counts), and medication usage. Ensure that the selected variables are clinically relevant and have sufficient variation to capture different aspects of asthma risk.

5. SYSTEM DESIGN

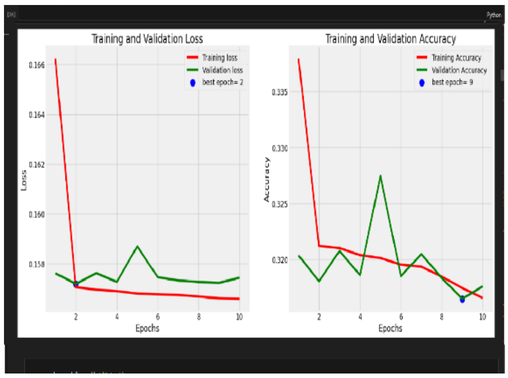
5.1 USE CASE DIAGRAM

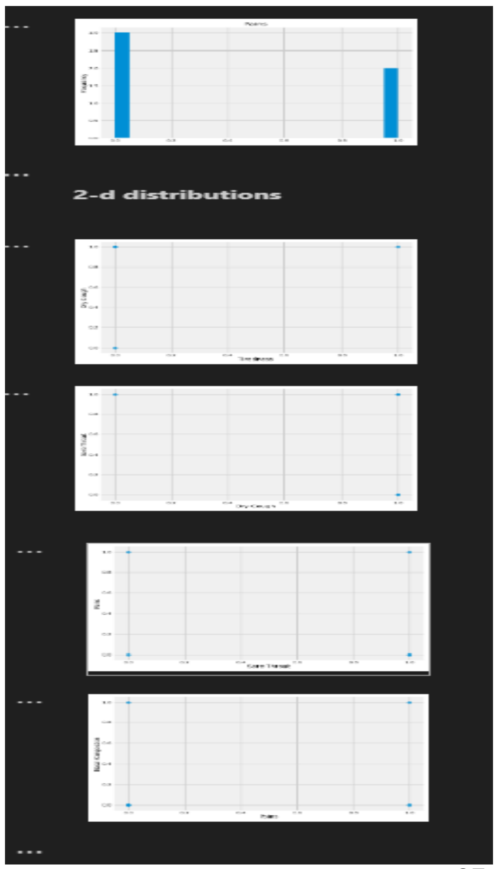


5.2 ACTIVITY DIAGRAM



6. OUTPUT SCREENS





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7. CONCLUSION

The asthma disease prediction project represents a significant advancement in the field of healthcare, combining medical expertise with cutting-edge data analytics to develop a predictive model for asthma outcomes. The project's journey involved meticulous data collection, preprocessing, feature engineering, and the application of various machine learning algorithms.

A diverse and comprehensive dataset was assembled, capturing a wide range of patient demographics, medical histories, environmental factors, and genetic information. This dataset served as the foundation for building a holistic understanding of asthma determinants.

Various machine learning algorithms were explored and implemented, such as decision trees, support vector machines, and ensemble methods like XGBoost. These algorithms demonstrated their effectiveness in capturing complex patterns within the dataset.

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