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Personalised Health Care Using AI & ML

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ABSTRACT

Nowadays, in our busy schedule life, taking care about ourselves has become difficult, eating unhealthy food that too at different times make a person unhealthy, and if a person is already suffering from a disease, they can get their health updates and take an action according to it. However complete treatment from our living place may not be possible but precautions can be taken, so in this case AI (Artificial Intelligence) plays a crucial role by maintaining the user medical history and gives an alert at required time like a remainder. Personalized treatment pertains to healthcare strategies that are customized to match the distinct attributes, requirements, and inclinations of an individual. This encompasses utilizing data and understanding regarding an individual's genetics, way of life, medical background, and additional elements to personalize their medical attention and alerts according to the user requirements. The primary objective of this approach is to deliver treatments that are more adept, streamlined, and centered around the patient, ultimately resulting in enhanced outputs and helps in maintaining good health.

Keywords: Food, Disease, Health-updates, Precautions, Treatment, Remainder, Strategies, Personalized Treatment

INTRODUCTION

In personalized AI healthcare, the Naive Bayes algorithm is employed to tailor medical interventions based on individual patient data, thereby enhancing diagnostic precision and optimizing treatment plans. Playing a central role, Naïve Bayes assesses the likelihood of various medical conditions and predicts disease progression, facilitating proactive healthcare strategies.

The Naïve Bayes algorithm extends its application to risk prediction in healthcare, empowering individuals to proactively address potential health threats and prevent diseases. This approach holds the promise of delivering more accurate diagnoses, tailored treatments, and proactive disease prevention, potentially revolutionizing healthcare delivery for improved patient outcomes.

Despite its transformative potential, the use of the Naive Bayes algorithm in healthcare raises significant concerns. Challenges related to data privacy, ethical considerations, and the necessity for rigorous validation processes emerge as critical aspects requiring careful attention. Ensuring the safety and reliability of AI-driven healthcare solutions is paramount in navigating these challenges and realizing the full benefits of this groundbreaking approach..

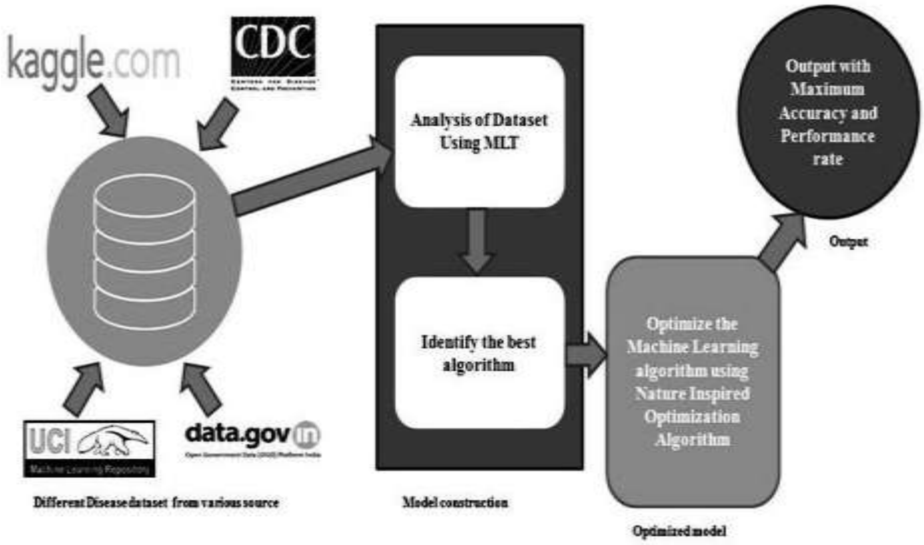
RESEARCH APPROACH

The research methodology delineated in the provided sources is centered on the application of machine learning algorithms to customize healthcare interventions and elevate patient outcomes. Key techniques such as Recursive Feature Elimination (RFE) and SelectFromModel were employed for variable selection, leveraging six distinct feature selection algorithms to identify pivotal variables in breast cancer and prostate cancer datasets. This meticulous approach ensures a nuanced understanding of the critical factors influencing medical conditions.

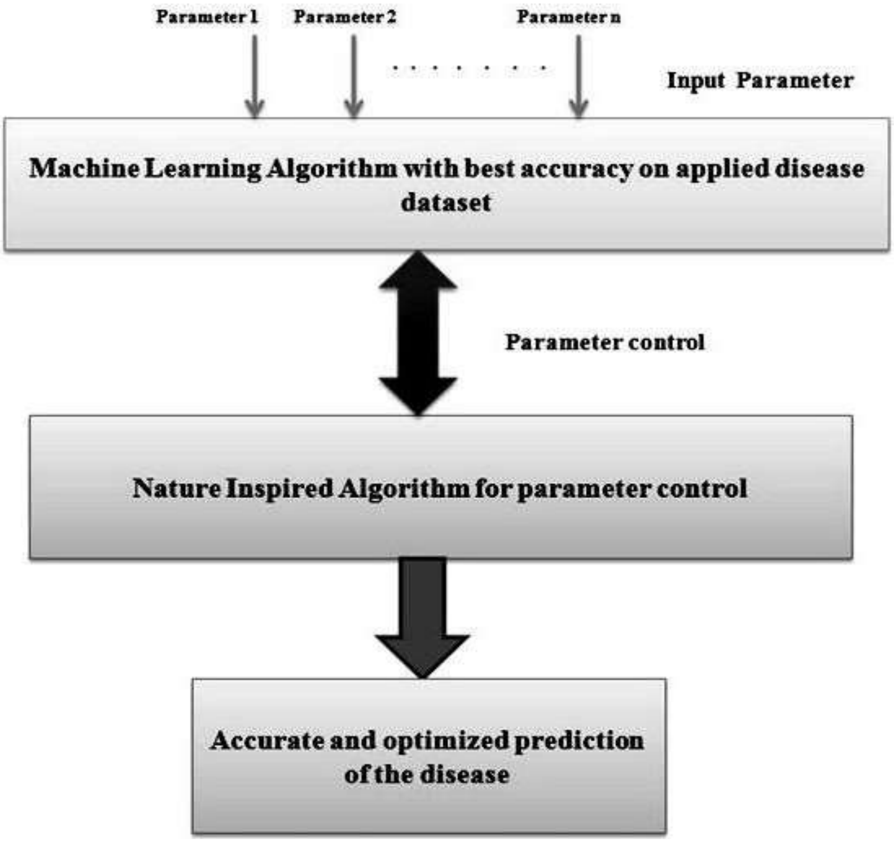
A comprehensive suite of machine learning approaches, including Naive Bayes, SVM, Decision Tree Classifier, Random Forest classifiers, and K-Nearest Neighbor, played an instrumental role in conducting classification analyses. This multifaceted utilization of diverse algorithms highlights the depth and breadth of the research strategy, aiming to capture the intricacies of healthcare scenarios.

The primary thrust of the research lies in evaluating the performance and effectiveness of these varied machine learning algorithms within healthcare settings. With a paramount goal to enhance service quality and provide personalized treatments, the anticipated outcomes encompass more precise diagnoses, tailored treatments, disease prevention, and ultimately, improved patient outcomes. The transformative potential of these applications alludes to a revolutionary shift in healthcare delivery, emphasizing the significant impact of machine learning in optimizing and personalizing patient care for a more effective and tailored healthcare experience..

METHODOLOGY:



The study conducted a thorough examination of various machine learning techniques, including Support Vector Machine (SVM), Artificial Neural Networks (ANN), logistic regression, and ensemble methods, with a primary focus on evaluating their accuracy and performance in disease diagnosis. To enhance the efficacy of these techniques, meta-heuristic optimization algorithms such as Endocrine-Based Particle Swarm Optimization (EPSO), Artificial Bee Colony (ABC), Genetic Algorithm (GA), and Fire-fly Optimization algorithm (FOA) were strategically applied for feature selection and optimization, introducing a layer of sophistication to the analytical approach.



The study conducted a thorough evaluation of algorithm performance, utilizing pivotal metrics such as accuracy, sensitivity, and specificity. The instrumental use of tools like MATLAB and LibSVM played a crucial role in modeling and implementing machine learning algorithms, establishing a robust and dependable analytical framework. Beyond providing insights into the relative performance of diverse machine learning and optimization algorithms within healthcare datasets, the research highlighted the critical role of efficient visualization and analysis in fostering sustainability within the healthcare domain. These findings contribute significantly to the broader field of sustainable and intelligent healthcare, emphasizing not only the importance of the algorithms themselves but also the tools and methodologies employed in their evaluation. This holistic perspective enhances our understanding of how technology-driven healthcare solutions can be optimized for long-term effectiveness and impact, advancing the quest for sustainable and intelligent healthcare solutions...

RESULTS

Publication	Method	Disease	Type of data	Accuracy(%)	Validation	Best Technique
[6] Zheng T., et al., 2017	NB, LR, SVM, KNN, DT-J48, RF	T2DM	EHR	99	4-fold cross-validation	LR
[8] Huang, G.M., et al., 2015	NB, SVM, RF, DT	T2DM	Clinical dataset	85.27	5-fold cross-validation	DT
[10] Dagliati, A., et al., 2017	SVM, LR, NB, RF	T2DM	EHR	83.8	LOO	LR
[11] Santillana, M., et al., 2015	SVM, SLR, AB-DT	ILI	Real-time and archival data	NA	NA	AB-DT
[14] Melillo, P., et al., 2015	NB, DT C4.5, RF, AB, SVM, MLPNN	Cardiovascular and cerebrovascular	Clinical dataset	85.7	10-fold cross-validation	RF
[16] Kang, S., et al., 2015	SVM, E^3-SVM	T2DM	Clinical dataset	80	10-fold cross-validation	E^3-SVM
[17]Jelinek, H. F., et al., 2016	GBLMS	Diabetic Neuropathy	ECG recording, clinical dataset	NA	NA	GBLMS
[18] Emanet, N., et al., 2014	RF, ABRF, MLPNN	Asthma	Audio dataset, signal dataset	92.5	LOO	AB-RF
[19] Kesron, K et al., 2015	SVM, SVM-RBF	DHF	Clinical dataset	96.296	10-fold cross-validation	SVM-RBF
[20] Zuccon, G., et al., 2015	NB, SVM, LR, DT, LMT, RF	ILI	Tweets	74.8	10-fold cross-validation	LMT
[21] Patidar S., et al., 2015	LS-SVM	CAD	ECG recording, clinical dataset	99.7	10-fold cross-validation	LS-SVM
[22] Bashir, S., et al., 2015	BagMOOV	Heart disease	Clinical dataset	84.78	10-fold cross-validation, ANOVA	BagMOOV
[23] Passos, I. C., et al., 2016	LASSO, SVM, RVM	Depression	Clinical survey dataset	72	LOO	RVM
[24] Rane, A.L., et al., 2015	DT, MLPNN, SMO, KNN, ANN	Acute illness	Clinical dataset	100	10-fold cross-validation	ANN
[25] Chen, M., et al., 2017	NB, DT, KNN, CNN-UDRP, CNN-MDRP	Chronic disease	Clinical dataset	94.8	10-fold cross-validation	CNN-MDRP
[15] Asri, H., et al., 2016	SVM, DT, NB, KNN	Breast cancer	Clinical dataset	97.13	10-fold cross-validation	SVM

Publications which use ML method on various disease dataset

Publication	Method	Disease	Type of data	Accuracy(%)	Validation	Best Technique
[12]Ch, Sudheer et al., 2017	SVM-FFA, ARMA, ANN, SVM	Malaria	Clinical dataset	NA	NA	SVM-FFA
[13] Lin, K.C., et al. 2015	EPSO_ABC-SVM	Various diseases	Clinical dataset	100	5-fold cross-validation	EPSO_ABC-SVM
[47] Long, N.C., et al. 2017	CFARS-AR, IT2FLS, SVM, NB, ANN	Heart disease	Clinical dataset	88.3, 87.2	NA	IT2FLS
[9] Santhanam, T. et al., 2015	SVM, GA	Diabetes	Clinical dataset	99.21	10-fold cross-validation	SVM
[7] Shen, L., et al., 2016	SVM-FOA, PSO-SVM, BFO-SVM, GA-SVM, Grid-SVM	Disease	Clinical dataset	96.9, 77.46, 77.46, 96.38	10-fold cross-validation	SVM-FOA

Publications which use ML method with Meta-Heuristic optimization technique on various disease dataset.

CONCLUSION

AI is spearheading a transformative shift in healthcare, reshaping the landscape through the effective management of user medical histories and the delivery of personalized treatments. The integration of a diverse array of machine learning algorithms—such as Decision Trees, k-Nearest Neighbors, Support Vector Machines (SVM), Logistic Regression, Naive Bayes, and Random Forest—exerts a significant influence on healthcare studies, playing a pivotal role in predicting patient survivability, enhancing service quality, and refining treatment planning. The intrinsic versatility, simplicity, and high precision of these algorithms prove especially beneficial when dealing with extensive datasets, underscoring their seamless integration in real-world scenarios for the assessment and enhancement of service quality within healthcare settings. These adaptable models and algorithms contribute meaningful insights, fostering the development of more efficient and patient-centric healthcare systems, with a particular emphasis on public healthcare settings. Fundamentally, the incorporation of AI and machine learning algorithms in healthcare enables the delivery of personalized treatments and alerts tailored to individual characteristics, showcasing practical utility and highlighting their ease of application in evaluating and raising service quality standards. These advancements hold immense potential in revolutionizing healthcare delivery, promoting responsiveness, efficiency, and customization to address the unique needs of each patient, especially within the domain of public healthcare settings..

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