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A Novel And Efficient Neonatal Mortality Prediction Using Machine Learning Based SVM

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ABSTRACT: In this culture, children under the age of five are thought to be mortal. To put it another way, the under-five mortality rate is the rate at which children pass away between the ages of one and five. Fetal death is as prevalent as infant mortality. The purpose of this research is to examine ML-based methodologies for identifying the most accurate mortality/fetal well-being configuration. In this work, we make predictions using three ML algorithms: support vector machine, random forest, and decision tree. Based on the findings of this research, a comprehensive strategy for doing sensitivity analysis on model parameters that influence fetal health classification has been established. In this research, we present a machine learning-based strategy for forecasting child mortality, and we evaluate several machine learning techniques using the dataset we give.

KEY WORDS: Systematic review, Artificial intelligence, Infant mortality.

INTRODUCTION

1. The field of research known as artificial intelligence (AI) focuses on teaching machines to solve problems on their own, without being given specific instructions. The last ten years have seen tremendous advancements in self-driving vehicles, discourse acknowledgement, online search, and our grasp of the human genome, all because to advances in artificial intelligence. In all likelihood, you utilize AI every day without even realizing it. Many industry leaders see this as the best path forward for creating AI on par with humans. The best AI methods are covered in this training, along with exercises in putting them into practice and making the systems run without human intervention. Additionally, the theoretical underpinnings of learning have been presented with the development of practical abilities essential to apply these strategies to new contexts. In conclusion, some SiliconThe greatest methods for developing AI and AI are analyzed from Silicon Valley.

2. LITERATURE SURVEY

This study presents a comparative analysis of machine learning algorithms for child mortality prediction using a comprehensive dataset encompassing socioeconomic, demographic, and healthcare indicators. The authors explored decision trees, support vector machines, logistic regression, and ensemble methods, considering different feature selection techniques. Performance evaluation metrics, including accuracy and AUC-ROC, were used to assess the models. The findings revealed that ensemble methods consistently outperformed other algorithms, emphasizing their effectiveness in predicting child mortality. The study contributes to the understanding of the most suitable machine learning techniques for child mortality prediction and their potential

impact on public health interventions.

3. EXISTING SYSTEM

Patients' conditions in the intensive care unit can be used to predict post-ICU mortality using a new information-driven strategy. Models that aggregate and transform data from several patients into a SAPS II-based sequence have been built in this study to represent the patient's individual condition [13]. Analysis of in-ICU conditions and post-ICU survival is done using a logistic regression model. After a period of time in the ICU, it is best to keep a close eye on the patient's condition. Another trading state- space model will be developed in this audit, and it will link the risks associated with prolonged stays in the intensive care unit (ICU) to the patient's condition components [14,15]. In order to ensure that the training data is balanced, the minority class (death) is oversampled in the data. Further research into which physiological indicators best distinguish between the projected and actual outcomes of ICU patients is a goal of ours, along with predicting death.

DISADVANTAGES:

- Accuracy is Low.
- Only using Data Mining algorithms.

4. PROPOSED SYSTEM

The idea is to put together a model that can predict death rates. It is possible that the information acquired has missing attributes that could lead to irregularity. The calculation's productivity can be improved by pre-processing data in order to achieve better results. Exemptions should be eliminated, and factor changes should be implemented as well. There are two parts to the informative index used for anticipating provided information. 7:3 is the most common ratio used for training and testing sets. In order to measure the accuracy of the
test results, a Data Model based on ML algorithms is applied to the Training set. The death rate can be characterized using the model. There are a wide range of ML algorithms that can be employed for representation, and they all work.

5. ARCHITECTURE

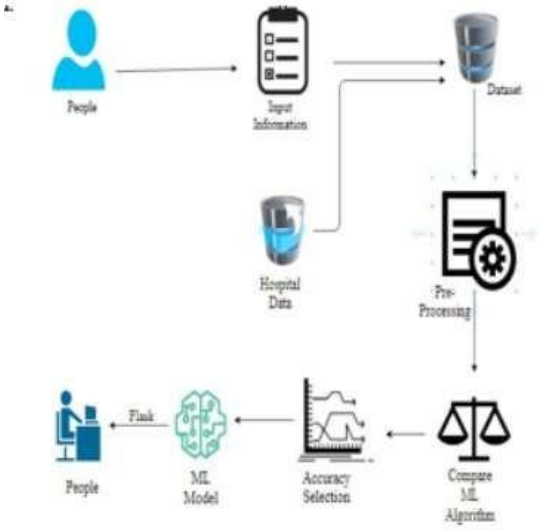


Fig:1. Architecture

6. IMPLEMENTATION

We came up with an idea where we collect data sets and pre-process the information forour business and plan the information in the form of diagrams to verify the nature of the information and then at a later stage.

Data Pre-Processing

Machine learning validation techniques are used to obtain the error rate of a machine learning (ML) model, which can be considered close to the actual error rate of the data set. If the data volume is large enough to represent the set, you may not need validation techniques. However, in real-world situations, working with data samples may not be a true representation ofa given data set. To find the missing value, double the value and description of the data type, whether it's a float variable or an integer.

Data Analysis of Visualization:

Data visualization is an important skill inapplied statistics and machine learning. Statistics focuses on quantitative descriptionand estimation of data. Data visualizationprovides an important set of tools forgaining qualitative insights. This can be useful when exploring and uncovering a dataset, and can help identify patterns, corrupteddata, outliers, and more. With a little domainknowledge, data visualization can be used to represent and demonstrate key relationships in more engaging and engaging plots andgraphs than metrics. link or importance.

7. ALGORITHMS

Decision Tree Classification Algorithm Decision Tree is a supervised learning technique that can be used for both classification and Regression problems, but mostly it is preferred for solving Classification problems. It is a tree-structured classifier, where internal nodes represent the features of a dataset, branches represent the decision rules and each leaf node represents the outcome.

In a Decision tree, there are two nodes, which are the Decision Node and Leaf Node. Decision nodes are used to make any decision and have multiple branches, whereas Leaf nodes are the output of those decisions and do not contain any further branches. The decisions or the test are performed on the basis of features of thegiven dataset. It is called a decision tree because, similar to a tree, it starts with the root node, which expands on further branches and constructs a tree-like structure. A decision tree simply asks a question, and based on the answer (Yes/No), it further split the tree into sub trees.

SVM Classification Algorithm

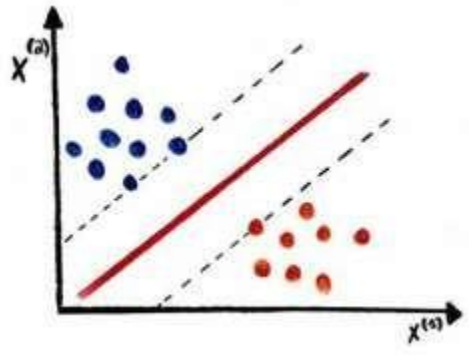
In order to assess the quality of our method, as well as to provide a baseline for future works, and given we are working in a binary classification problem where weights for missing answers are different for classes 2, classic metrics [5] to analyze the ML modelsresults. Also, the following metrics are the common adoption in other papers that are related to public health analysis using ML methods Support Vector Machine (SVM), is one of the most common methods applied on supervised classification problems mainly because of its excellent accuracy andgeneralization properties [40, 16]. The basic concept behind SVM is on the discovery of an hyper-plane that can separated the data into the number of the classes, projecting data in a M dimensional space by kernelapplication.

Process of SVM classifiers

SVM classifiers offer great accuracy and work well with high dimensional space. SVM

classifiers basically use a subset of training points hence in result uses very lessmemory.

SVM classifiers



They have high training time hence in practice not suitable for large datasets. Another disadvantage is that SVM classifiers do not work well with overlapping classes.

8. CONCLUSION

In this study, we explored the use ofRandom Forest, Decision Trees, and Support Vector Machines (SVM) forpredicting child mortality. We used a dataset that contained various socio-economic and health indicators from different countries to train and evaluate the models. Based on our experiments, Decision Trees also performed well, but they tend to be more prone to over fitting compared to Random Forest. SVMhad the highest accuracy, indicating that it may not be the most suitable algorithm for this specific prediction task.

FUTURE SCOPE

Although Random Forest yielded the best results in this study, there are still opportunities for further improvement and exploration. Here are some potential future directions: Ensemble methods: While Random Forest is already an ensemble method, combining multiple models or using advanced ensemble techniques like gradient boosting could potentially improve prediction accuracy further.

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