PREVENT FETAL HEALTH ISSUES USING MATERNAL CLINICAL HISTORY

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ABSTRACT:

Fetal health issues remain the major maternal health problem in India. It is important to address and educate all women about the fetal health issues and the maternal clinic treatments. All birth defects cannot be cured but here are some preventions: consult a healthcare professional regularly, avoid alcohol during pregnancy, avoid smoking, consult a maternal clinic for any medication, take proper vaccinations. This objective is to prevent fetal health issues caused by maternal clinical history using Decision Tree algorithm. The Decision Tree algorithm is used to categorize or make predictions based on how a preceding set of questions are answered. Algorithm is used to measure the accuracy rate of the affected mothers and death as an output.

Keywords: Fetal health issues, Decision tree algorithm, Maternal clinical history.

I.INTRODUCTION

Fetal health is a topic related to maternal treatments. Fetal conditions occur when a unborn baby develops, and there may be complications during pregnancy. Fetal health involves both the mother and child's health. Currently more advanced treatments and clinical facilities are developed. From the past 20 years number of death related to pregnancy and childbirth issue has reduced to 38% from 90%. Fetal health may be affected by the maternal adaptive changes during this period such as existing health conditions, malnutrition, lifestyle factors etc,. Maintain a proper lifestyle like: practice yoga, take good food, get proper instruction on how and when to travel. A good prenatal care and support can help you minimize the complications. Government of India had taken many initiatives to improve fetal health issues and maternal health issues. As a part of the initiative an application was developed in which safety measures and a gentle care for the pregnant women are provided. Using the application as a tool, data related to the users are collected and analysis on fetal health issues is done using Decision Tree algorithm.

Objectives:

1. To prevent fetal health issues using maternal clinical history.
2. To predict the accuracy rate of the fetal health issues.

II.RELATED WORKS

Agrawal, Kanika & Mohan, Harshit has designed a health care application on Fetus problems and the major reasons in gynecology for pregnant women's. If the conditions for the fetus inside womb are not appropriate, then there are major chances of health deterioration of the fetus. Cardiotocography (CTG) technique is used to record the fetal heart rate (FHR) and uterine contractions (UC) simultaneously. This paper uses commonly used algorithms for machine learning, such as Decision Tree (DT), Support Vector Machine (SVM) and R - Studio algorithms for Naïve Bayes [1]

Dooley S, Dillard J, McNeal K, Rask P, VanBuskirk K, has demographics of the population, including the pregnant ladies country of residence. The mean age of pregnant women at the time of stillbirth was 31. The proportion of pregnant women was lower in the cases compared to fetal health. The fetal median gestation at the time of the stillbirth was 37 weeks (range 28–41 weeks), and 52% of the babies were male. A greater proportion of population had a high-risk pregnancy than cases (p = 0.025).[2]

Garcia-Canadilla P, Sanchez-Martinez S, Crispi F, Bijnens B made a study on the prevalence of FASD varies considerably from 24 to 48 per 2000 children; however, if we consider particular sub-population, FASD rates might be considerably higher. FASD incidence is estimated to be 1–3:20000; in the US 2–7:1000 and 2–5% respectively for FAS and FASD [3].

Hamal, M., Dieleman, M., De Brouwere, V. et al. has an association based classification model has been proposed for accessing the fetal status referring to the Cardiotocographic data. The above said classifier is having four versions and from the experiment, it requires less time to build the model without degrading the quality of performance. After comparing with some classifier, it is found that random Forest are performing well for the required purpose. But as the used dataset is an imbalanced one so in future the dataset is to be balanced first with some revolutionary flavor to get better accuracy results.[4]

Heazell, A.E.P., Warland, J., Stacey, T. et al has designed Artificial neural network (ANN) is a technique inspired by the learning and generalization ability of the brain. ANN is used for many purposes, such as function convergence, pattern recognition, and classification in many fields of science such as healthcare. Congenital anomalies are seen at 1-3% of the population, About 60-70% of the anomalies can be diagnosed. The highest accuracy of risks of fetal anomalies was displayed as 90.5% during the development tests with Decision Forest model. [5]

In a paper by Harshit Mohan uses commonly used algorithms for machine learning, such as Decision Tree (DT), Support Vector Machine (SVM) and R - Studio algorithms for Naïve Bayes (NB). The data set is extracted from the UCI repository and classified into a fetal state by means of a normal, suspicious and pathological class that is tested using algorithms and compared on the basis of different performance measures. In this research R-Studio tool have been used to classify, analyze and predict the accuracy of algorithms. [6]

Kranti S. Vora, Dileep V. Mavalankar, K.V. Ramani has to be finding the accuracy of the algorithms and find the best out of it from a given dataset. Comparison shows that decision tree has highest accuracy than the other algorithms. Fetal death can occur due to maternal, fetal or placental factors. Fetal distress is one of the main factors to c-section in obstetrics and gynecology. Clinical examination of CTG recordings, promising results in terms of predictability and classification capabilities is given.[7]

Onesimo, R., De Rose, C., Delogu, A.B. et al has designed a work which focuses on feature selection approach by applying machine learning classifiers in order to classify all birth cases. The present research is that the risk factors for PTB are limited in size and dataset is small, which could be increased to improve the performance.[8]

Rakesh Raja, Indrajit Mukherjee, Bikash Kanti Sarkar found the risk factors for fetal death include maternal age, obesity, smoking, prior fetal death, maternal diseases, and fetal growth. This study aimed to analyze intrauterine demise of late motherhood. The loss of a child is one of the experience for a mother especially for older women, where getting pregnant again can be difficult because of fertility decreases with age, In addition to proper medical treatment, it is extremely important to provide psychology support and to respect the privacy of the patient .[9]

III.METHADOLODY

WORK FLOW

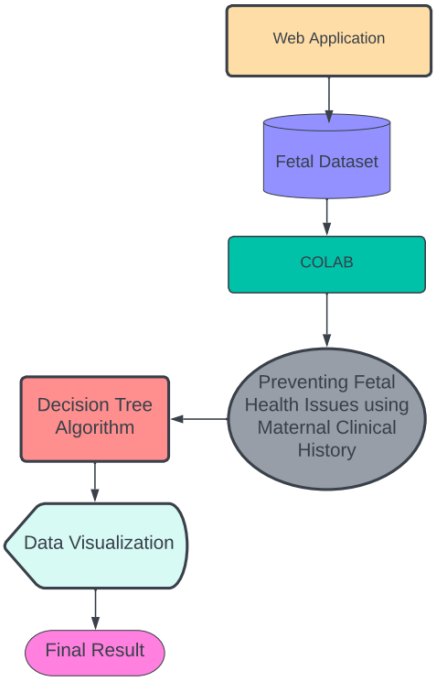

Fig. 3.1

DECISION TREE:

The decision tree algorithm makes use of a tree-like structure of choices to show their possible consequences.

STEP 1: The records of maternal clinical history which was obtained through fetal questionnaire and detailed evaluations are collected from the web application.

STEP 2: The attributes for the decision tree i.e. Age, miscarriage , congenital anomalies , low birth weight , nerve disorders and still birth is fitted inside the decision tree and then the decision tree is plotted.

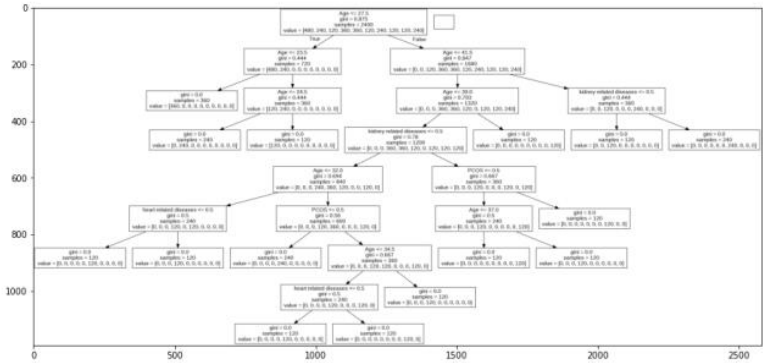

Fig.3.2

- The number of affected pregnant women and the number of mothers with smoking and drinking habits are gathered from the survey in web application.
- A Scatterplot is used to show the connection among two quantitative variables plotted along axes.
- In this review, each dot shows the name of the mother and the number of mothers with smoking and drinking habits.

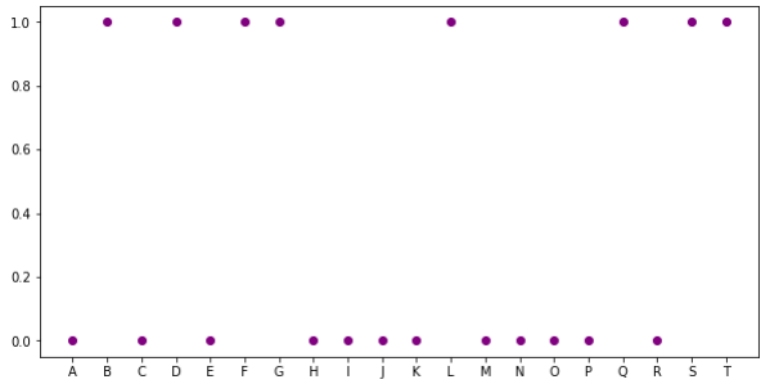

Fig. 3.3

- Bar graphs are perfect for evaluating one or more values over time. They deliver discrete values of an object within a category.
- In this evaluation, the bar graph displays the name of the mother and number of mother with two diseases i.e., heart and kidney diseases.

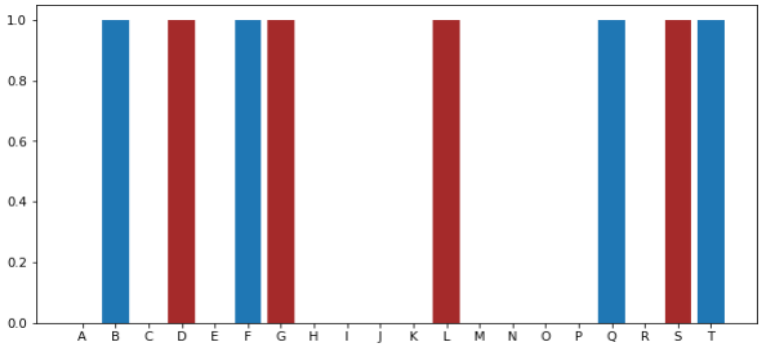

Fig. 3.4

IV.EVALUATION

- The prediction is performed that analyses the dataset of pregnant women along with their clinical history and statistics, and gives a end result based on the skilled dataset.
- For measuring the accuracy of our decision tree model, the dataset is split into training and test set. Based on the overall performance, the accuracy of the data is obtained.

```
# Measuring the accuracy of our model.
from sklearn.metrics import accuracy_score
print(accuracy_score(y_test, y_pred))

0.8866666666666667
```

Fig.4.1

- In this paper, the highest accuracy of prediction is displayed as 88.67% during the development tests with Decision tree algorithm.

V.CONCLUSION AND FURTHER WORKS

This work has confirmed the effect of fetal health issues occurring during pregnancy like heart disease, kidney diseases and PCOS with the accuracy of 88%. It additionally aims to provide assistance

regarding maternal health and fetal health issues through an online application together with a mobile aspect for the patient.

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