

Prediction of CARDITOCOGRAPHY

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Abstract: The cardiotocography is a diagnostic method which is widely used in prenatal care. The CTG is indicated since 27 weeks of pregnancy and it measures heart activity, uterine contraction and fetal movement. Results of the CTG allow recognizing of three basic different fetal states (normal, suspect, pathologic) and an obstetrician can determine a diagnosis and evaluate situation which can lead to the fetus death. The main aim of this work is to suggest and to test algorithm for automatic recognition of above mentioned states. This task is especially used in prenatal care as a support decision system.

Keywords: Accuracy, Pathology, Histograms, Vegetation, fetal heart rate, Acceleration, Algorithm design and analysis

I.INTRODUCTION

Cardiotocography is a frequently used technique of fetal monitoring to evaluate the well being of the fetus during pregnancy and in labour. The surveillance technique depends on the analysis of characteristic fetal heart rate FHR patterns and uterine contractions. In CTG th Non-stress test(NST) is a wide spread and effective screening test to identify whether fetuses are in immediate jeopardy of hypoxia.NST measures the FHR reactivity, which reflects the interaction between the sympathetic and parasympathetic tone of the fetal autonomic nervous system. The NST is considered reactive if there are two or more

accelerations exceeding 15 beats per minute(bpm) amplitude and lasting 15seconds and more in a 20-minute window 32 gestational weeks and ten beats per minute amplitude and lasting 10 seconds or more before 32 gestational weeks. A reactive NST is greatly reassuring, with a negative predictive value of 99.8% for stillbirth occurring within one week, after excluding lethal congenital anomalies and unpredictable cause of fetal death, such sudden onset of placenta abruption, umbilical cord accidents.

II.DECISION TREE

Decision tree learning is a method commonly used in data mining. The goal is to create a model that predicts the value of a target variable based on several input variables. Decision tree is a graph to represent choices and their results in form of a tree. The nodes in the graph represent an event or choice and the edges of the graph represent the decision rules or conditions. It is mostly used in Machine Learning and Data Mining applications using R. This decision tree is used to predict health condition of the pregnancy women. This prediction may help in reducing the risk of the patient. If the patient is affected by any health condition like diabetes, blood pressure etc., this may increase the risk during delivery so predicting the women health condition and treatment is given according to the patient health condition. Decision tree learning is the construction of

a decision tree from class-labeled training tuples. A decision tree is a flow-chart-like structure, where each internal (non-leaf) node denotes a test on an attribute, each branch represents the outcome of a test, and each leaf (or terminal) node holds a class label. The topmost node in a tree is the root node.

There are many specific decision-tree algorithms. Notable ones include:

- [ID3](#) (Iterative Dichotomiser 3)
- [C4.5](#) (successor of ID3)
- [CART](#) (Classification And Regression Tree)
- [CHAID](#) (CHI-squared Automatic Interaction Detector). Performs multi-level splits when computing classification trees.^[11]
- [MARS](#): extends decision trees to handle numerical data better.
- [Conditional Inference Trees](#). Statistics-based approach that uses non-parametric tests as splitting criteria, corrected for multiple testing to avoid overfitting. This approach results in unbiased predictor selection and does not require pruning.

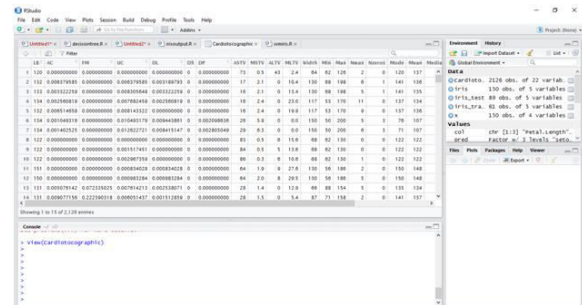
III.R PROGRAMMING

CTG data has 21 features in that the response variable is NSP-fetal class code(N-normal,S-suspect and P-pathologic)

Reading/preparing data from csv file

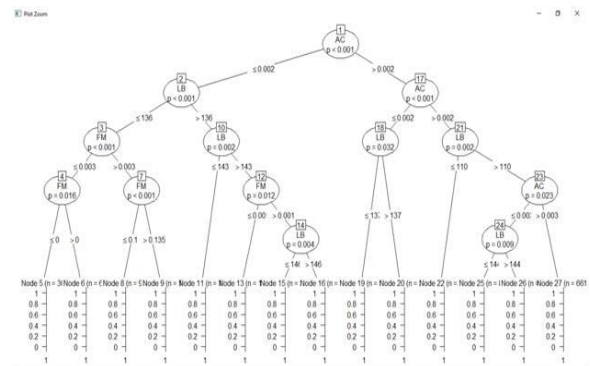
- First collect the dataset from website,
- Save it as .csv,
- Open r studio and import dataset from text file,
- Then the dataset will be displayed on your screen.

IV.DATASET



It consist of 2126 observation of 22 variables.

- library(party) should be installed first,
- `tree <- ctree(NSPF~LB+AC+FM, data = train)` used to construct tree in the console
- To plot in the picture `plot(tree)` is used to represent in the tree form.

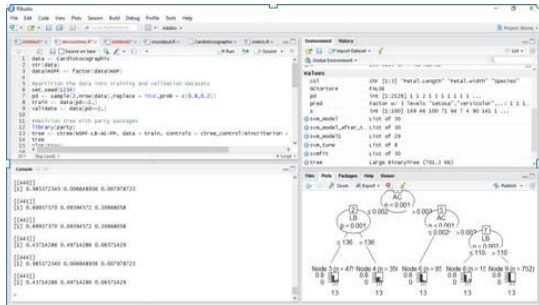


Decision tree is plotted generally and detaied tree is plotted with the help of

```
tree <- ctree(NSPF~LB+AC+FM,
data = train, controls =
ctree_control(mincriterion =
0.99,minsplit = 500))
```

Predict validation dataset

- `predict(tree,validate,type='prob')`

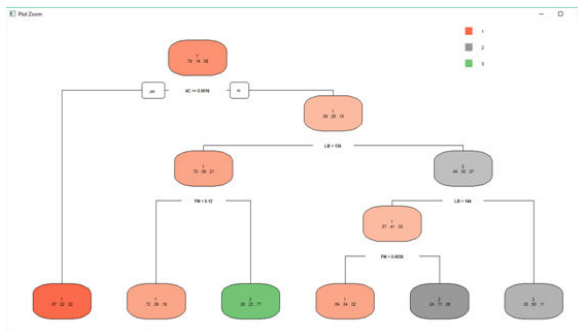
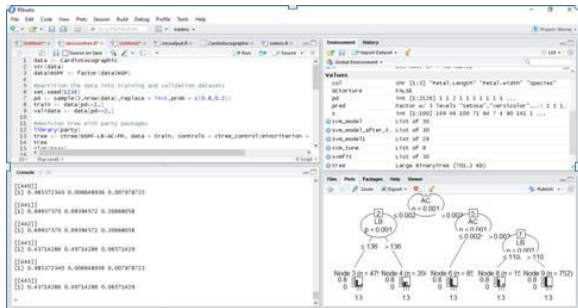


Decision tree with rpart package

```

library(rpart)- download
tree1
rpart(NSPF~LB+AC+FM,train)
library(rpart.plot)-download
rpart.plot(tree1,extra = 4)

```



V.CONCLUSION

There are 2126 observation and 22 variables this dataset helps to predict the

patients risk during pregnancy. This dataset helps finding the condition of the patient and do further treatment.

References

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