# Women Health Monitoring: A Survey

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**Abstract:** In medical area, various problem exist but gestation stage serious problem regarding women. Women undergo several physiological parameter changes which cause major problem. When we neglect such problem may result in complications or mortality of mother and fetus, so we need to protect pregnant women. In this paper we have discussed a few approaches for find risk during pregnancy and information regarding health care.

**Keywords**: Gestation, Health monitoring, Machine learning classification algorithm, Risk Prediction.

## I. INTRODUCTION

Machine learning is the subfield of computer science that gives computers the ability to learn without being explicitly programmed. Evolved from the study of pattern recognition and computational learning theory in artificial intelligence, machine learning explores the study and construction of algorithms that can learn from and make predictions on data. Machine learning is closely related to computational statistics, which also focuses in prediction-making through the use of computers. Machine learning tasks are typically classified into two broad categories:

A.  Supervised learning: Supervised learning is the machine learning task of inferring a function from labelled training data. The training data consist of a set of training examples. In supervised learning, each example is a pair consisting of an input object and a desired output value. A supervised learning algorithm analyses the training data and produces an inferred function, which can be used for mapping new examples. Supervised learning include Classification techniques.

B. Unsupervised learning: Unsupervised machine learning is the machine learning task of inferring a function to describe hidden structure from unlabelled data. Since the examples given to the learner are unlabelled, there is no error or reward signal to evaluate a potential solution. Unsupervised learning include Clustering techniques.

Pregnancy induces changes in women body both externally and internally. Some changes are so dangerous resulting in losing maternal and fetal lives. According to a few gynaecologists it is defined every trimester to be around 14 weeks, adding up to around 42 weeks of pregnancy.

The most common reasons for complications and deaths during period of pregnancy include maternal sepsis, maternal bleeding, abortion complications, high blood pressure in pregnancy. gestational diabetes and weight gain during period of pregnancy. Among these complications abnormalities in Blood Pressure (BP), Blood Glucose Levels and Weight Gain are considered the most dangerous and preventable complications.

Some women develop high blood pressure while they are pregnant called gestational hypertension. High blood pressure can harm the mother's kidneys and other organs, and it can cause low birth weight and early delivery. Mother develops preeclampsia of pregnancy which can threaten the lives of both the mother and the fetus with increased blood pressure and increased protein in the mother's urine. Gestational Diabetes Mellitus (GDM) affects only pregnant women and is an overlooked cause of maternal and infant death and serious complications during labour. Women with GDM often give birth to macrosomic or Large-for-Gestational Age (LGA) infants and can have devastating consequences. If blood sugar levels are too high, it can cause the baby to put on extra weight, particularly in the upper body called macrosomia. Delivery can sometimes result in a fractured bone or nerve damage, the baby may suffer brain damage from lack of oxygen during this process, need to deliver a broad-shouldered baby can lead to injuries to the vaginal area or require a large episiotomy for the mother and risk of new born jaundice is increased[4].

Insufficient or excessive weight gain during pregnancy compromises the health of both the mother and fetus. Women are at increased risk of several pregnancy complications, including gestational diabetes mellitus, hypertension, preeclampsia, caesarean delivery, and postpartum weight retention. Similarly, fetuses of pregnant women who are overweight or obese are at increased risk of prematurity, stillbirth, congenital anomalies, macrosomia with possible birth injury, and childhood obesity. Underweight pregnant women are more prone to oligohydramnios i.e. reduction in the amount of amniotic liquid and for their new born to be underweight. If women are underweight at the start of

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pregnancy, they have a greater risk of having a preterm birth or a small for gestational age (SGA) baby. There is increased possibility of restricted fetal growth and birth of an underweight baby, whatever the gestation at delivery. These underweight babies are at risk of several early life complications such as ashypothermia, low blood- sugar, feeding difficulties and viral infections. Aim of proposed system is analyse and predict risk during pregnancy physiological parameters like blood pressure, blood glucose level and weight whose changes during pregnancy can lead to complications can be identified and further complications induced from these changes can be prevented[6].

A.  Machine learning algorithm
* Decision Tree: Goal is to create a model that predict the value of a target variable based on several input variable. It is supervised learning algorithm, flowchart like tree structure, divide and conquer approach and top down recursive partitioning strategy for the tree algorithm [13].
* Naïve Bayes: It is a classification technique as well as statistical learning based on Bayes Theorem with an assumption of independence among predictors and probabilistic model.
* SVM: It is a Classification technique, Goal to decide which class a new data point will be in and also called as binary classifier. When data are not labelled, supervised learning is not possible, and an unsupervised learning approach is required, which attempts to find natural clustering of the data to groups, and then map new data to these formed groups. The clustering algorithm which provides an improvement to the support vector machines is called support vector clustering.

## II.  PROCESS OF RISK PREDICTION

The overall process for risk prediction contains the steps explains as follows:

A.  Dataset Collection:
A Dataset collect from pregnant women like blood pressure, heart rate, gestational diabetes, preeclampsia.  A dataset to train the classifier need to be prepared.

B.  Preprocessing:
The first step of pre-processing is all about correcting the problems in data before building a machine learning model using  data. Problems can be of many types like missing values, attributes with a different range.

C.  Training
Training is used for train dataset to reduces the complexity is accurate result for correct prediction.

D.  Testing
By representing report for testing it gives correct result or prediction.

E.  Risk Prediction
Machine learning algorithm is used to predict result. It apply on the dataset and give prediction in the form of risk (normal, high, very high).

## III. RELATED WORKS

Aparna Gorthi, et al[1] goal of routine antenatal consultations is to predict and detect early complications of pregnancy allowing better management and hence outcome for both the mother and fetus. Antenatal check-ups currently comprise: monthly clinical visits (from third month of pregnancy), laboratory tests and obstetric ultrasounds (one each trimester). High risk pregnancies include women with history of complicated pregnancies and deliveries, diseases such as diabetes, hypertension, immunologic disorders, and pregnancies presenting with anomalies like malnutrition, obesity, intrauterine growth restriction, etc. Such cases require more frequent monitoring and specialist care. Use the methods in machine learning classification algorithm is decision tree based learning most closely captures the domain experts process of evaluation of a clinical case and as result A training accuracy of 72.4% was achieved with the 200 cases. The classifier reported results on the test cases with an accuracy of 65.5%.

V.Srinivasan, et al[2] proposed the Fast Classification Algorithm (FCA), hybrid the advantages of ID3 and the SVM, for classification accuracy and to obtain fast result. The disadvantage of id3 not suited for the large database and performance is high in the form of small data base taking this into consideration and used this algorithm for small data where the complex problem lies between the upper and lower area where accurate classification is made based on analyzing the each attribute. Advantage of SVM of fast classification is taken into account and the SVM stand poor in

accuracy classification of selecting random members. Thus by taking their advantage into consideration and removing the draw backs form the both algorithm we framed the FCA with upper and lower approximation to show our algorithm solves the problem of fast and accurate classification.

Jostinah Lam, et al[3] High risk pregnancy can lead both mother and fetus to death. Proper antenatal care before and during pregnancy may decrease the risk of complications. Clinical decision support system (CDSS) is one of health information systems for assisting health providers in decision making that can improve the quality of prenatal care. Ontology include seven criteria risk factors, health issues, findings, pregnancy status, preventive measures, management, and health promotion.
Evaluation had been done by general Practitioners and specialists, through six criteria assessment: understandibility, completeness, correctness, flexibility, simplicity, and integrity. Overall, the quality of ontology developed is good, but not excellent enough. the ontology should be integrated into CDSS and tested out its usability and accuracy of the system.

Lakshmi.B.N, et al[4] Pregnancy is a delicate stage in women life monitoring during pregnancy period can control, manage maintain and prevent abnormalities induced in physiological parameters, In paper performance of the final rule-set generated from C4.5 provides great, precise, reliable and accurate prediction and an accuracy percentage of 98%. Hence, hybrid approach involving data transformation, C4.5 classifier application, rule extraction and range replacement gives better performance, accurate risk prediction, valid set of rules for further implementation and reliable solution to the complications faced by pregnant women during pregnancy.

Nandini Ravi, et al[5] Two classifiers C4.5 and Naive Bayes are considered for solving this problem due to their powerfulness, popularity and efficiency. The results of analysis on test dataset from that C4.5 decision tree classifier has greater potential in accuracy for predicting pregnancy risk levels.

Indumathi.T.S, et al[6] Reducing the mortalities or complications arising in period of gestation.use C4.5 decision tree classification method main goal of compare the results obtained from C4.5 classifier on both un-standardized and standardized dataset and analyse the performance of the C4.5 algorithm in terms of its prediction accuracy when applied on the created database from collected and standardized pregnancy data. As The accuracy percentage for un-standardized dataset and standardized dataset accounts to 66.087% and 71.3043% respectively and error percentages are 33.913% and 28.6957% respectively.

A. Vossl et al[8] Hypertensive pregnancy disorders are the major cause of maternal and fetus mortality. Pregnancy induced hypertension (PM) has a major impact on gestation. Cardiovascular regulation is affected by gestation and was already be quantified in normotensive pregnancies by means of heart rate and blood pressure analysis and baroreflex sensitivity. (The baroreflex means a rapid negative feedback loop in which an elevated blood pressure reflexively causes the heart rate to decrease and also causes blood pressure to decrease. Decreased blood pressure decreases baroreflex activation and causes heart rate to increase and to restore blood pressure levels.) Pregnancy induced hypertension leads to altered heart rate and blood pressure interactions. These alterations can be quantified using the sequence method as well as joint symbolic dynamics and this might lead to an improved risk stratification during pregnancy.

Boopathi K et al[12] Maternal mortality increase countries the socioeconomic and demographic factors and health behavior affecting maternal mortality are rarely known. The complications of pregnancies and the births are found to be the leading causes of deaths and disability among women of reproductive age. Poor infrastructure and ineffective public health services are also responsible for low inadequate obstetric care.

## III.CONCLUSION

Pregnant women undergo several problems like blood pressure, heart rate, temperature increase and decrease, gestational diabetes and hypertension during stage of pregnancy. It leads to complication in pregnancy which may result to mortality of mother and fetus so we need to protect pregnant women. From this survey, C4.5 classification algorithm has greatest potential in accuracy for predicting the risk levels during pregnancy,

## ACKNOWLEDGMENT

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