Machine Learning Approaches for Early Diagnosis and Prediction of Fetal Abnormalities

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Abstract— **Fetal Health denotes the health and growth of the fetal and frequent contacts in the uterus of the pregnant women during pregnancy. Maximum pregnancy period complexities leads fetal to a severe difficulty which limits right growth that causes deficiency or death. Harmless pregnancy period by predicting the risk levels before the occasion of difficulties boost right fetal growth. Forecasting the fetal health and growth state from a set of pre-classified patterns knowledge is vital in developing a predictive classifier model using Machine Learning Algorithms.**
Keywords: Fetal Health , Forecasting , Growth , Classifier ,Machine Learning

1. INTRODUCTION

Healthcare is a crucial industry affecting lives of people world-wide. In spite of recent advances in medicine which have resulted in a better quality of life and reduced the number of deaths for diseases such as cancer, heart related diseases etc., there is still a vast population which deprived of access to the best in medicine. There is growing evidence, documenting the effectiveness of routine check-ups and early treatment in preventing deaths or serious illnesses. However these aspects are neglected in health care especially in many low income countries because of inadequate medical services which frequently leads to several fatalities. Artificial Intelligence has made rapid strides in the previous decades and has been successfully applied in several important fields such as finance, governance etc. Machine learning techniques offer a lot of scope for application in the area of health care especially for detecting and preventing avoidable deaths.

There have been several forays of using machine learning in the area of medicine, including cancer detection, medical image analysis, computer vision and Fetal Growth and Abnormalities. This proposed research work paper deals with ultrasound fetal image for finding the abnormalities of fetal in first trimester period of pregnancy. A way to identify the abnormalities this research work proposes optimized machine learning based classification approaches for early diagnosis and prediction of fetal abnormalities.

Detection of abnormalities in the first trimester of pregnancy has been improved massively with improvement in machine learning approaches and imaging classification methods. As per the recent study the fetal abnormalities are seen in 3 to 5% of all pregnancies. In India, taking ultra sound scan during second trimester (between 18 to 22 weeks) is the standard of care for fetal anatomical assessment. Recent researches show a noteworthy improvement in diagnosis and prediction of fetal abnormalities in first trimester of pregnancy. Image Classification using Machine learning algorithms is used by the researchers for diagnosis and prediction of fetal abnormalities at earlier stage.

2. BACKGROUND

Ultrasonography (US) is performed in the first trimester for determining the number of fetus and assessment for complications of early pregnancy. The measurement of fetal nuchal translucency (NT) provides an effective result for chromosome abnormalities between 11 and 14 weeks of pregnancy. There are various ranges of fetal abnormalities and congenital anomalies are determined and diagnosed in the first trimester. This research analyzed nuchal and structural abnormalities in the first trimester. This work mainly identifies the abnormalities of fetal in the first trimester period of pregnancy. The main objective this paper is to explore the various machine learning approaches for effective diagnosis and prediction of fetal abnormalities and to reduce the percentage of occurrence. The explored machine learning models reduces human efforts and produces accurate results. Pregnancy is a period during which offspring develop inside a woman .Physiological and morphological changes in pregnant women are at serious risk of pregnancy that affect fetal growth and movement .