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Multimodal Sentiment Analysis for social networks with Risk Factor for Detecting Maternal Health Issues using ML and DL Classifications - A Comparative Study

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Abstract:- Postnatal care includes the care given to a woman after giving birth, whereas prenatal care is the care provided to a mother throughout pregnancy. Routine checks, testing, and medical guidance are all part of prenatal care. Exams, immunizations, and assistance for the mother and child in the initial weeks following birth are all included in postnatal care. Frequent check-ups can lower the chance of consequences by identifying any possible issues early on. Pregnancy could lead to potential issues, so it's essential to be informed of the risks and implications that could arise. Sentiment analysis (SA) has gained much attraction in the field of artificial intelligence (AI) and natural language processing (NLP). MSA utilizes latest advancements in machine learning and deep learning at various stages including for multimodal feature extraction and fusion and sentiment polarity detection, with aims to minimize error rate and improve performance. Latest advancements in machine learning and deep learning with various stages of processing tends to improve the performance and minimize error rate. Different ML and DL techniques classifies risk level of prenatal and postnatal pregnancy. In this paper, it addresses the problem of sentiment classification on the maternal health risk data to perform deep learning and machine learning approach. Prenatal and postnatal pregnancy state indicates whether the patient is in normal or abnormal condition. Real-time modalities of real-time maternal risk are exploited to analyze the structure of emotions implied by multimodal analysis. Different techniques such as LR, RF, SVM, Naïve Bayes, Decision Tree are analyzed in ML and in DL use Keras with TensorFlow backend XGBoost, CNN, LSTM and multi-layer perception with multimodal sentiment analysis are implemented. According to the outcomes, MLP (Multi-layer Perceptron) with multimodal sentiment analysis (MSA) enhances the maternal risk sentiment analysis's 89% accuracy and overall precision.

Keywords*:* Sentiment analysis, Multimodal Sentiment analysis, Social Networks, ML, DL, Maternal health, Postnatal care, Prenatal care

1. Introduction

Emotion recognition and sentiment analysis have advanced with the progressive development and rapid rise of social media and the large amount of data that is being uploaded in video format rather than text. From those emotion analyses in CSV file format, based on different activities of the pregnant women, the data are compared efficiently. Prenatal and postnatal depression, anxiety can be determined from the sentiment analysis. It might be simpler to identify possible problems that may occur during prenatal and postnatal treatment by comprehending the emotions and observations of pregnant women and their new-borns. Significant physical, psychological, and mental changes occur throughout pregnancy. For several women, it can be a challenging and stressful event that causes emotional illness. Pregnancy-related mental instability can occur in several forms, including anxiety, sadness, and postpartum haemorrhage. Both the mother and the unborn child could be significantly impacted by

emotional problems during childbirth. It's crucial to recognize the warning symptoms and indications of psychological instability throughout pregnancy and to get assistance if necessary.

Sentiment analysis determines the emotional stability of a piece of text. Multimodal learning combines multiple forms of data, which improves the accuracy of sentiment analysis. Text is detected with sentiment with the contained words where the images and images detect the emotions and expressions of the patient with their emotional stability. Both the text and images provide accurate representations of the sentiment implicit within the text. To minimize pregnancy-related emotional illness or to get treatment when it occurs, it's critical to be informed of its possible causes. Changes in appetite, impaired concentration, and a sense of inadequacy or inferiority are additional warning indications and symptoms. In order to get treatment, if necessary, it's critical to be aware of the warning signs and indications of mental instability during pregnancy. Several medicinal and non-medical techniques can be used to treat emotional illness during pregnancy. Medications, including antidepressants and anti-anxiety drugs, can be used in medical procedures. Using supportive communities, counselling, and dietary changes are examples of non-medical therapies. A balanced meal, physical activity, obtaining adequate sleep, and asking for help when necessary are a few possibilities. Furthermore, it's critical to recognize the warning symptoms that indicate mental instability throughout pregnancy and to get assistance if necessary. Contextual data detects the sentiment analysis with the context of text, which provides the necessary emotion analysis, which includes anxiety, depression, and normal. Combination of data from multiple modalities that identify and interpret those emotions. Table 1 indicates complications which occur in prepartum in pregnancy period. The extraction of characteristics from different datasets, including texts, images, videos, and audio, is a phase in the multimodal sentiment analysis phase. The sentiment of the data is then obtained by evaluating these aspects. In order to properly forecast the sentiment of a particular data point, a machine learning or deep learning model is trained using the retrieved characteristics.

Table 1: Complications in Prenatal Pregnancy Condition

Signs	***Symptoms***
Miscarriage	The miscarriage of a pregnancy at 20 weeks gestation is referred to as a "miscarriage" or spontaneous abortion. It is predicted that 10–20% of pregnancies may experience it, which may be brought on by a variety of causes, such as birth mutations, hormonal disorders, or infection. Vaginal bleeding, cramps, and the passage of tissues from the vagina are indications of a miscarriage. An operation or medicine may be used as therapy, depending on the underlying reason.
Preterm Labor	Preterm labor is characterized as labor that starts before 37 weeks of pregnancy. It is thought to affect 8–10% of pregnancies, which may be brought on by a variety of conditions, such as stress, infections, or uterine anomalies. Constant contractions, leg cramps, and vaginal discharge are indicators of premature labor.
Placenta Previa	Placenta previa is a disorder when the placenta conceals the cervix entirely or partially. It is thought to affect 0.5-2.0% of conceptions, which may result in major health repercussions for the mother and the unborn child. Vaginal bleeding, cramps, and back pain are all indications of placenta previa.
Preeclampsia	Preeclampsia is a disorder that occurs when a pregnant woman develops high blood pressure and protein in her urine. It is thought to affect 2-8% of pregnancies, which may have major health repercussions for the mother and the unborn child. Preeclampsia symptoms include increased swelling, migraines, and abnormalities in eyesight.
Gestational Diabetes	Gestational diabetes occurs during pregnancy period. It is thought to happen in 2-10% of pregnancies with major health repercussions for the mother and the unborn child. Symptoms of gestational diabetes includes increased thirst, frequent urination, and exhaustion.

Healthcare providers may generate more supportive and delightful pregnancies by knowing the positive experiences of pregnant women. To ensure consistency and dependability, sentiment evaluation has to occur in a thorough manner. This ability to employ sentiment analysis in various situations, including postpartum care, is another advantage of technological advancements that will help health professionals comprehend pregnant women's experiences on a deeper level. The mother's body will start to get ready for labor as the pregnancy goes on. During this period, there may be mental and physical symptoms that indicate the baby is almost ready to be born. The mother's body will gradually begin to return to its pre-pregnancy condition when the pregnancy finishes and the baby is delivered. Both mentally and physically, it can be a challenging process, but it's critical to remain alert to the body's changing signals. Addressing postpartum depression with a healthcare professional is a significant issue that may impact new mothers. Preterm birth, gestational diabetes, postnatal depression, and eclampsia are the issues that can occur during pregnancy and afterward.

2. Literature Review

(Hou 2022) initiated with the development of AI to give another avenue for pregnant women to receive the best healthcare. Pregnancy information is gathered from different sources during COVID-19 based upon the study explored over the information seeking about pregnant women based upon the textual analysis and data mining techniques. Different extracted features are correlated to analyze the results of sentiment analysis based upon the emotionally positive posts in proportion to understand pregnant women's behavior. (Gandhi 2022) analyze the sentiment analysis with a combination of AI and NLP to automate the analysis of user sentiment on different products and services. Based on the opinions expressed in various forms of video rather than text. Multimodal sentiment analysis with machine learning and deep learning at different stages. MSA aims to minimize those error rates, which improves overall performance. In this survey paper, it examines MSA with different architectures.

A comparative analysis of categories analyzed the strengths and limitations of each. (Peri 2022) analyses about the lupus, which can affect the reproductive age of the pregnancies with a high state of complications. Even the sentiment analysis of the pregnancy care for lupus has to be analyzed through proper educational awareness and concern through an AI approach. (Wanriko 2021) develops the predictive model of the risk assessment for pregnancy-induced hypertension. This hypertension has to be detected early, which reduces its severity in the public dataset. Different pregnancy datasets are analyzed to attain the imbalanced classification with over many classes using the SMOTE technique.

(Stavroula 2021) prefers sentiment analysis, which is emotion. AI to analyze those texts, biometrics, and even compute that linguistics, mainly to identify the emotions. Even the clinical researchers can predict the analysis based upon different performances. (Marcilio 2020) Emotions that occur in different humans based on their behavior Depression has a greater impact where the primary approach is context-aware, which uses text mining. Using NLP, text mining analyses the documents, which consist of gestational depression. The model is evaluated based on performances based upon metrics and a confusion matrix. The health professional uses the results to obtain better performance in high-risk pregnancy cases. (Rabia 2020) denotes the biomedical information retrieval, which develops the sentiment analysis over the biomedical text classified. A series of transformations are proposed based on NLP and SVM-based classification. Even the biomedical texts are analyzed, where the results obtained from precision, the F1 score, and accuracy are evaluated.

Recent studies in multimodal sentiment analysis for social networks have leveraged machine learning (ML) and deep learning (DL) to identify maternal health issues by integrating textual, visual, and audio data. These approaches highlight the potential of combining multiple data sources to improve the accuracy and reliability of sentiment detection and risk factor assessment. Comparative analyses reveal that DL models, particularly those using advanced neural networks, generally outperform traditional ML classifiers in terms of predictive performance and nuanced understanding of sentiment.

Multilingual, multimodal sentiment analysis needs to be studied as an additional area of study (R.Geethanjali 2022). To merge audio-visual categories, existing textual sentiment analysis methods should be taken into consideration. When performing multi-label classification tasks, ABSA (Aspect Based Sentiment Analysis)

techniques such as aspect term discrimination, aspect category detection, and its sentiment classification combine RNN and CNN. Using MaLSTM to create a real-time hybrid deep learning model for sentiment analysis that will be built on recurrent neural networks and support vector machines.

3. Methodology

3.1 Maternal Health Risk Dataset

Numerous women throughout the world are quite sensitive about maternal health. Women are vulnerable to an array of health issues throughout both phases of pregnancy, including premature labour and postnatal depression figure 1. Several of these health complications may be addressed with the right treatment and knowledge. Numerous factors, such as poor nutrition, lack of availability of quality medical treatment, and socio-economic circumstances, might put mothers at risk for poor health. In order to achieve the greatest consequences for both mother and child, it is essential to identify the risks involved with pregnancy and delivery. Threats to the mother's well-being during pregnancy can be fatal for both mother and child. Low birth weight, premature labour, and a higher risk of premature births are all consequences of poor maternal health. With the right diet and medical treatment, maternity care risks can be reduced.

	Age	SystolicBP	DiastolicBP	BS	BodyTemp	HeartRate	RiskLevel	Sentiment	Prenatal	Postnatal
0	25	130	80	15.0	98.0	86	high risk	Depression	0	1
1	35	140	90	13.0	98.0	70	high risk	Depression	0	1
2	29	90	70	8.0	100.0	80	high risk	Depression	0	1
3	30	140	85	7.0	98.0	70	high risk	Anxiety	1	0
4	35	120	60	6.1	98.0	76	low risk	Normal	0	0

Figure 1: Maternity Health risk Dataset

To decrease the likelihood of health disorders, it's crucial to practice healthy dietary habits and attend frequent prenatal appointments. In order to achieve optimal consequences for mother and child, it is also crucial to be knowledgeable about the risks related to pregnancy and delivery. Risk factors for maternity care might include poverty, a lack of accessibility to healthcare, and an insufficient diet. To guarantee the greatest results for both mother and baby, it is essential to deal with these variables. Developing a healthier and more just community begins with protecting maternal health. With decreasing likelihood of health disorders, proper diet and medical care are vital. Recognizing both social and economic issues that may lead to poor maternity care is also crucial. It is vital to be knowledgeable of the potential hazards and how to mitigate them since pregnancy and labour may be times of happiness and risk. Mothers can lower the risks of labour and delivery by being proactive about maintaining their health and getting the appropriate medical treatment.

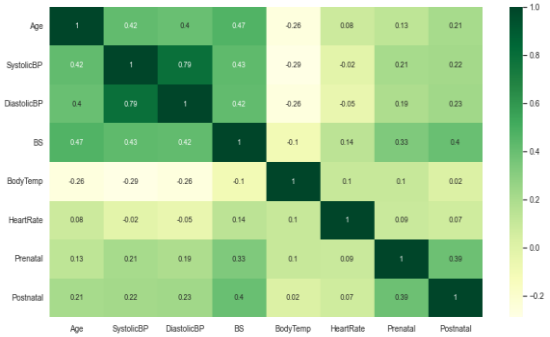

Figure 2: Correlation Map Structure

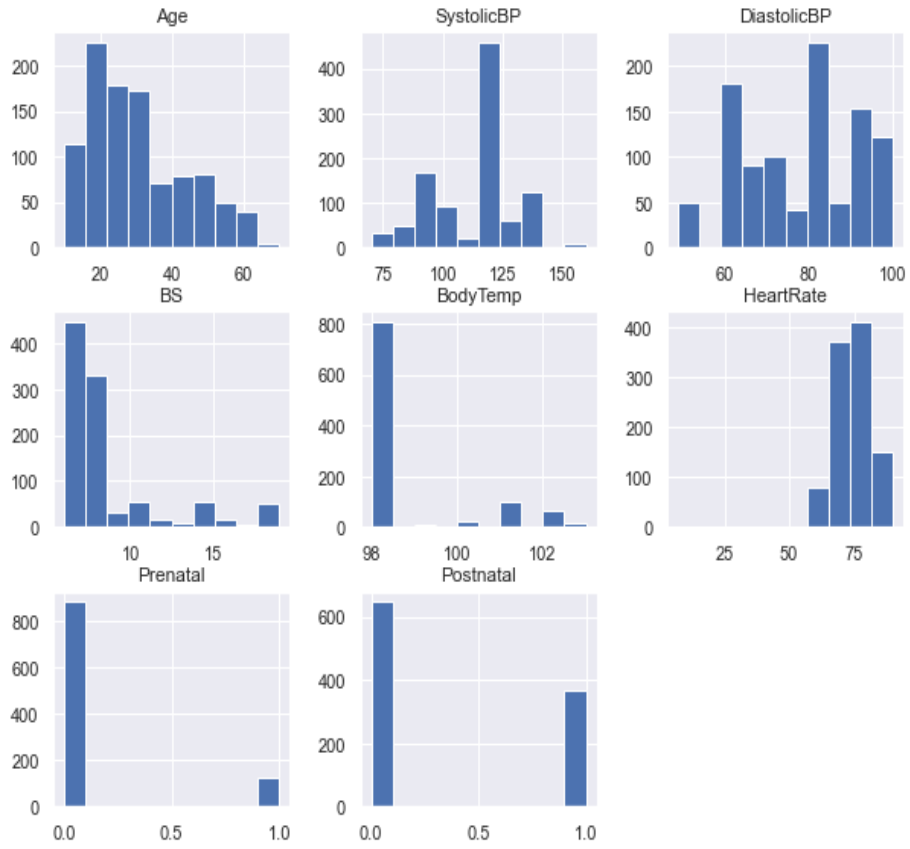

Figure 3: Different Attribute Parameters

3.2 Data Processing in Prenatal and Postnatal Care

In both prenatal (Figure 4) and postnatal (Figure 5) treatment, data processing is vital. It aids in keeping track of the mother's and child's health in order to identify any possible problems. In order to ensure that the mother and child receive the highest quality care, data processing generally aids in providing individualized care. Significant criteria, including the baby's weight, heartbeat, and mother's blood pressure, may be monitored through data processing. Moreover, it may be used to keep tabs on the mother's diet, lifestyle, and mental wellness. This information may be employed to recognize any potential issues and provide the required assistance to guarantee the best outcomes for both mother and child. Gathering and analyzing data might provide important information about the mother and baby's health. These details may be utilized to spot any potential issues and provide the necessary assistance to guarantee the best prognosis for both mother and baby. In addition, data analysis may be utilized to spot any patterns or trends that would indicate a possible issue.

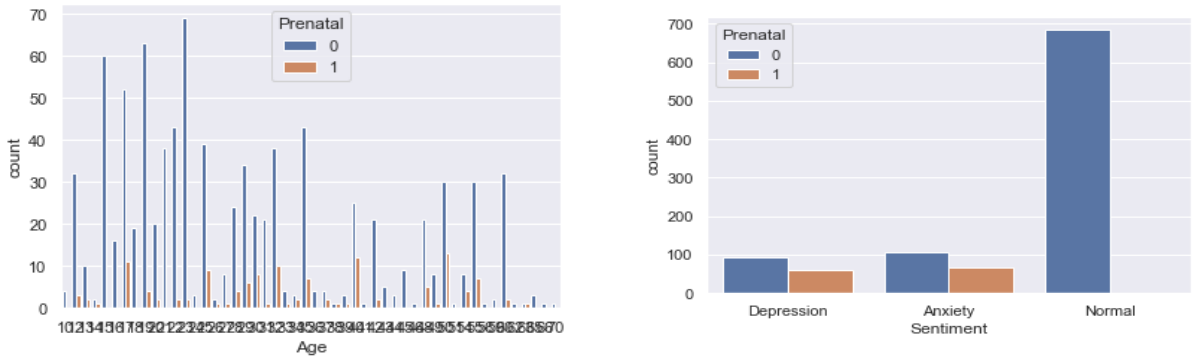

Figure 4: Prenatal Sentiment Condition

The identification of possible interventions or therapies that might be required may also be accomplished through data analysis. The most effective action may be decided using this information, ensuring that the mother and child receive the highest quality care. In order to prevent data loss or corruption, it is also essential to keep sensitive data and perform frequent backups. Furthermore, all data has to remain private and should only be disclosed with proper authorization. This guarantees the privacy and security of the mother's and the child's data. It is possible to display data to see any possible issues or patterns. Statistics that offer a detailed assessment of the condition of the mother and child can also be produced. To guarantee that the mother and child are given the best possible treatment, data needs to be connected with other platforms. In both prenatal and postnatal treatment, data management is crucial. To guarantee that the information is precise and relevant, proper data management is required. Data must be handled securely in order to prevent unauthorized access to it. To guarantee that mother and infant are given optimal treatment, data management must be done effectively. The most effective approach may be decided using this information, ensuring that the mother and child receive the optimum care possible.

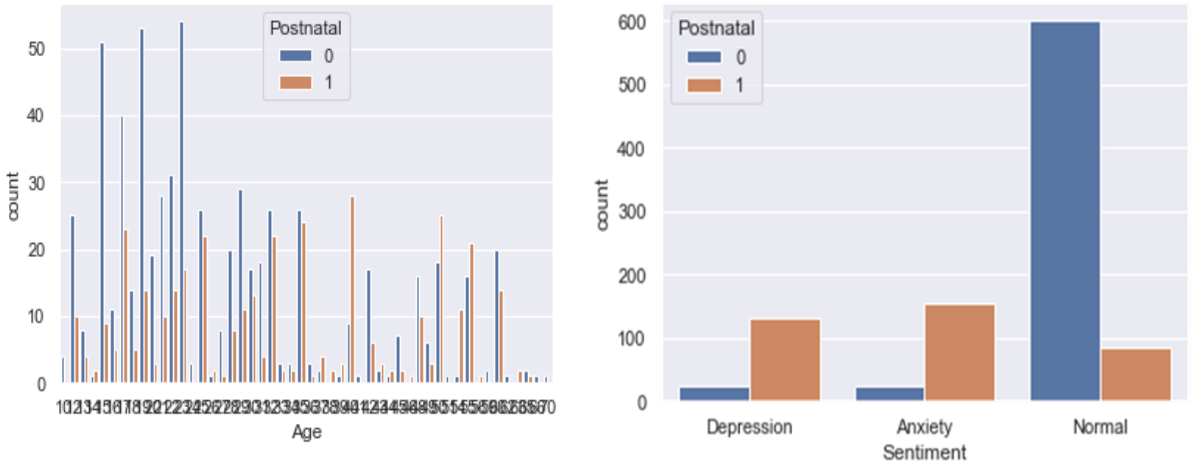

Figure 5: Postnatal Sentiment Condition

3.3 Sentiment Analysis

Prenatal care is the proper medical treatment a pregnant woman undergoes. It entails routine check-ups, medical evaluations, and guidance from a healthcare professional. The postpartum period is the period of after-delivery attention provided to a woman and her new baby. It entails counselling, aid with breastfeeding, and other aspects of new born care, as well as mental and physical support. Pregnant women's and new born moms' emotions can be understood through the sentiment classification of both prenatal and postnatal (Figure 6) care. It can aid in identifying areas in need of enhancement, such as giving women increasingly thorough knowledge and more effectively supporting new moms. Understanding how pregnancy and delivery affect women's mental health may also be beneficial. Women might go through prepartum and postpartum depression during the pregnancy period. Moreover, sentiment analysis can offer insightful data on the observations of expectant mothers and maternity care, enabling more individualized and efficient treatment. The identification of potential problems that could emerge throughout prenatal and postnatal care is additionally aided by sentiment classification. It can help make sure that pregnant moms and new mothers get the finest care and assistance possible. Moreover, sentiment analysis can be employed to evaluate how prenatal and postnatal care affect maternal health. It might be easier to spot possible issues that could arise throughout pregnancy and after treatment by understanding the emotions and encounters of expectant moms and new mothers.

3.4 Machine Learning Classification

Establishing an algorithm that can precisely forecast a pregnancy's outcome using the information obtained is the aim of machine learning categorization for pregnancy. Better care may be given to expectant mothers and their unborn children using this paradigm. It employs machine learning algorithms to identify data patterns that can be

used to forecast the outcome of a pregnancy. Improved care for expectant mothers and their unborn children may result from this ML approach. The pregnancy-classified dataset with prenatal and postnatal care is gathered. This information could include health records, information about a particular behavior, and other things that could affect how the pregnancy turns out. The result of a pregnancy can be precisely predicted using the data utilized to construct the framework. The information gathered is used to develop a model that can precisely predict the outcome of a pregnancy. There are numerous different algorithms that may be utilized in machine learning categorization of pregnancy. These approaches are able to be utilized to provide quality treatment for pregnant mothers and their unborn children. Decision trees, support vector machines, and neural networks are a few characteristics of these techniques. Evaluation of a model's effectiveness after development is crucial. This may be accomplished by putting the model to the test on various datasets and contrasting the outcomes with the meaningful data. A machine-learning categorization model for pregnancy can be evaluated to see if it performs well enough to be employed in a medical environment. Forecasting the likelihood of stillbirth, pregnancy complications, and premature birth are a few instances of what this process might entail. Developing a model that can precisely forecast a pregnancy's outcome based on the data gathered is the aim of machine learning categorization for pregnancy.

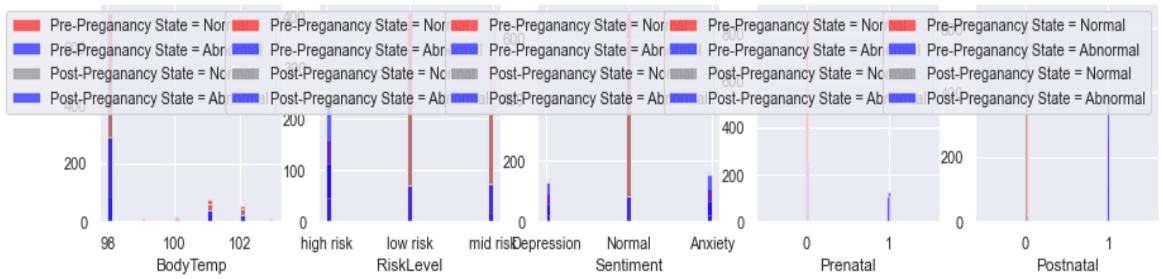

Figure 6: Pre-Pregnancy and Post-Pregnancy Parameter Condition

Premature birth, infant weight loss, and mortality rates are just a few examples of risk variables that can be predicted using this method for both prenatal and postnatal pregnancies. Models that accurately identify risk variables related to prenatal and postnatal pregnancies can be created using supervised learning techniques such as support vector machines, decision trees, and neural networks. A supervised machine learning approach, support vector machines (SVM), Random Forest (RF), Logistic Regression (LR), Naïve Bayes Classifier, Decision Tree and XGBoost is useful to find risk variables (Figure 7) related to prenatal and postnatal pregnancies. Because algorithms are effective at forecasting the likelihood of preterm birth, infant weight loss, and perinatal mortality, they can be used to improve the care and assistance provided to expectant mothers.

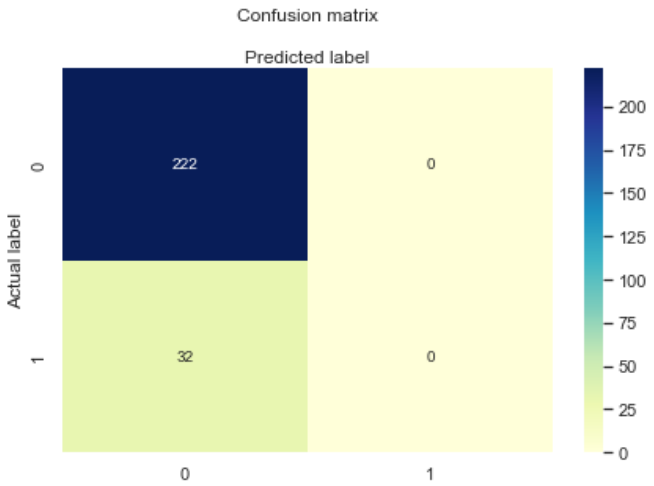

Figure 7: Confusion Matrix for ML Technique

3.5 Deep Learning Classification

Deep learning enables machines to acquire knowledge through massive volumes of data. It is employed to build predictive models with the capacity to spot data trends and forecast the future. Deep learning can be utilized in the healthcare industry to better understand illnesses, forecast outcomes, and provide enhanced treatment for patients. It can be utilized in the area of pregnancy to forecast how pregnancies will turn out, spot any possible difficulties, and offer individualized treatment to each patient. Furthermore, it can detect possible issues early, giving medical professionals the opportunity to take action and administer more efficient therapies. Healthcare professionals can discover prospective therapies and medications that might be effective for managing particular ailments by examining data from a number of resources. Medical practitioners may use this technology to improve overall pregnancy outcomes and provide more individualized care for each patient with appropriate information and procedures. This enables medical professionals to promptly evaluate and keep track of expectant patients' health. It may be employed to identify fetal malformations or to identify any possible pregnancy hazards.

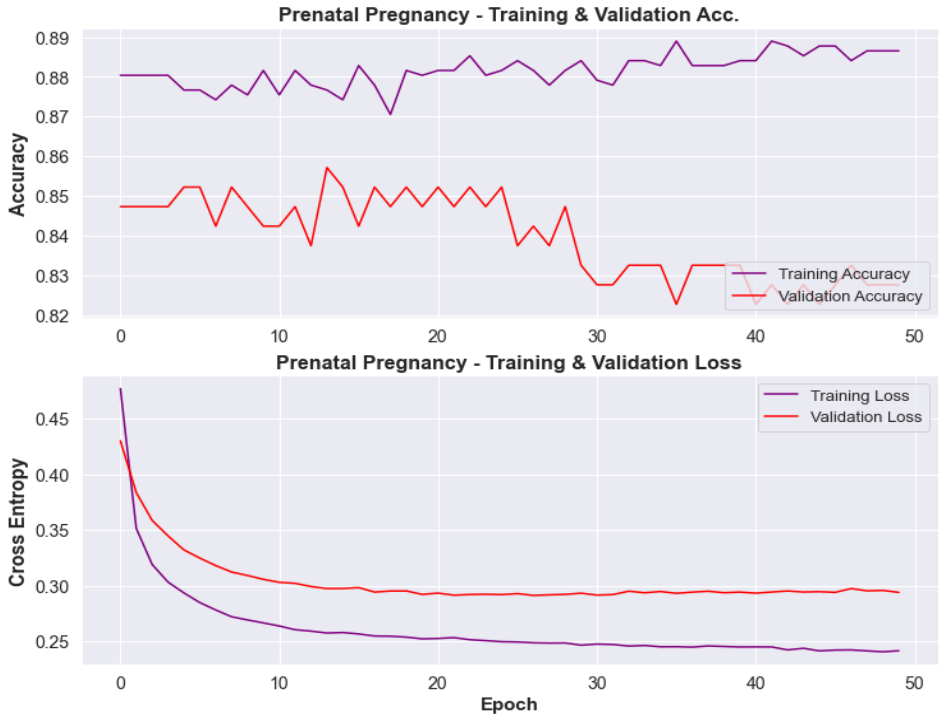

Figure 8: Prenatal Stage - Training & Validation Accuracy and Loss

A convolutional neural network (CNN) is trained using a dataset of three-dimensional images taken during pregnancy to detect anomalies in the foetus. A CNN can be performed to identify foetal malformations or to identify any possible pregnancy hazards. By employing this technology, prenatal diagnoses may be established more accurately, and pregnant women could receive better treatment. With the use of this technology, prenatal diagnoses (Figure 8 & 9) may be made more accurately, and pregnant women can receive better treatment. This can also be employed to check on the mother's and the foetus's wellbeing throughout the pregnancy. By decreasing the number of medical issues throughout pregnancy and labor, this technique can improve the well-being of both mother and baby. Figure 10 indicates low and high abnormality state of prenatal and postnatal pregnancy condition. RNNs are efficient in forecasting the likelihood of preterm delivery, a low birth weight, and maternal death as they utilize historical data points to make predictions about future incidents and results. RNNs can also be employed to create personalized treatment plans for expectant moms, enabling efficient and individualized care. Recurrent neural networks (RNNs) with long short-term memory (LSTM) are capable of acquiring knowledge from data sequences and generating predictions according to the input. Memory cells that can process numerous inputs simultaneously and recall values across extended periods of time make up LSTM networks. A

multilayer perceptron is a technique that makes high-precision predictions for a preferred outcome using a collection of inputs and outputs.

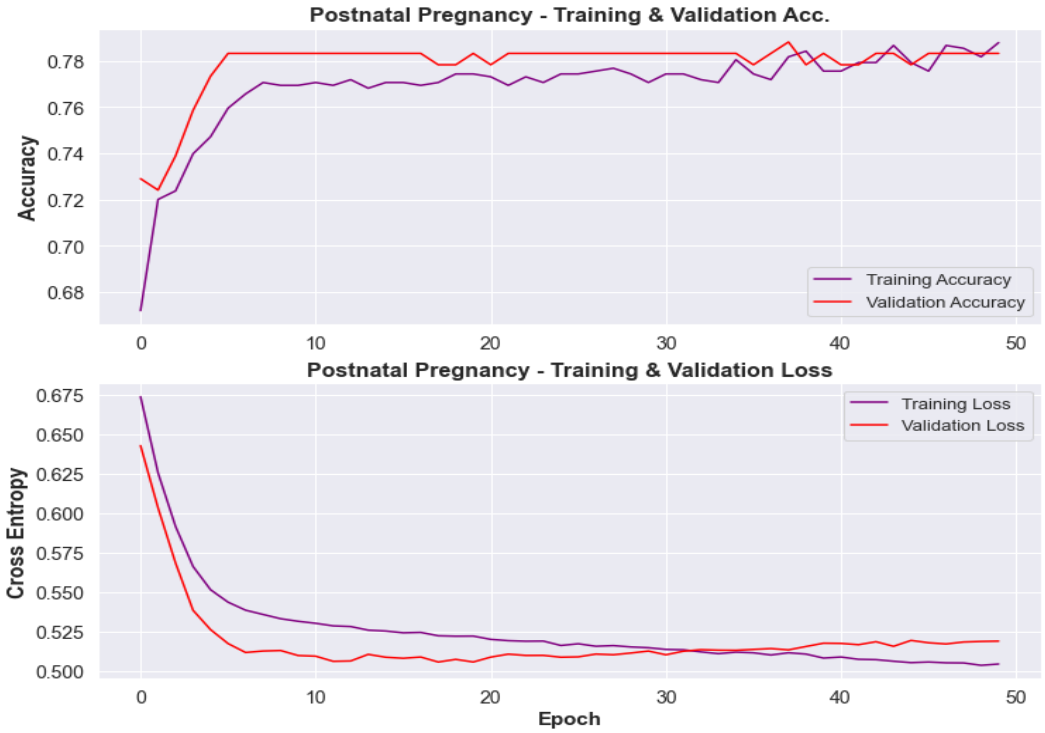

Figure 9: Postnatal Stage - Training & Validation Accuracy and Loss

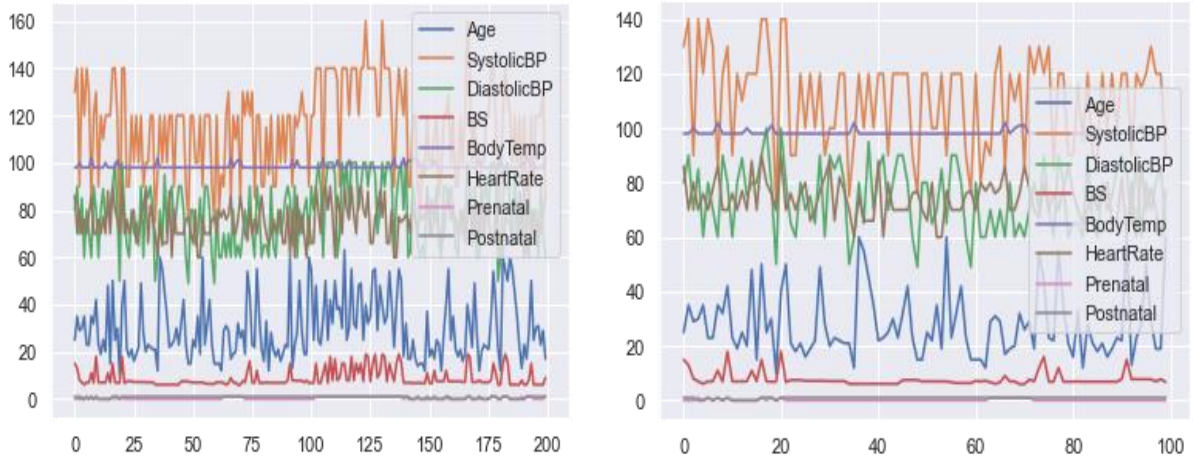

Figure 10: Attributes at Low and High Pregnancy Abnormality

3.6 Multimodal Sentiment Analysis

Multimodal learning, essentially incorporates utilizes the strengths of several modalities, can provide highly precise and subtle views on emotions. This method can be employed to distinguish and assess facial features, body posture, voice tone, and other communication-related components. Comparing multimodal learning to traditional emotion analysis methods reveals a number of benefits. It can give a more thorough and accurate knowledge of emotions by fusing several data sources. Moreover, it can spot small emotional shifts that single-modality techniques can overlook. Lastly, it may be utilised to spot emotional trends across time, enabling better

judgements. Applications for multimodal learning range from customer care to healthcare system. It also entails ensuring reliability and dependability by verifying data and using appropriate methods. Along with protecting privacy and security, it also entails incorporating multimodal learning into existing location systems. Multimodal learning, which makes use of the strengths of several modalities, can provide more precise and subtle insights into emotions. Organizations may utilize this strategy to obtain deeper insights on their consumers and clients with the correct tools and approaches, which allows them to make smart decisions and provides a superior experience. *Sentiment Analysis: {Anxiety, Depression, Normal}* are analyzed based on the risk level with MLP (Multilayer Perceptron), which is trained and evaluated on a relevant prenatal and postnatal classification.

Multimodal sentiment analysis takes several data sources into consideration, which include images, videos, and text. Texts are mapped into a high-dimensional space that represents different emotions based upon the embedded vectors, which are fed into a recurrent network where they preserve the word, which captures some of the semantics of human language. Based upon the high-dimensional dataset, which includes text and video that play on the emotion-based behavior based on the physiological analysis of the human being, NLP identifies expressed emotions, which produce the mapping in which words are projected into high dimensions, which preserves semantic relationships. Based upon the different attribute conditions, the sequences of words are analyzed to identify the emotion of the pregnant women, both in prenatal and postnatal care. Multimodal analysis gives a comprehensive view of the development of the foetus and mother during the prenatal and postnatal stages. Ultrasound images, fetal pulse rate, mother's blood circulation, and hormone production are just a few instances of the data that may be examined using multimodal analysis. Moreover, it can be utilized to assess the success of therapies, spot anomalies, and provide a precise diagnosis of any impending abnormalities.

4. Experimental Results

Both the prenatal and postnatal stages of pregnancy are two distinct stages of the mother's lifecycle. ML (Table 2) provides comparative analysis of different algorithms such as SVM, RF, LR, Naive Bayes, XGBoost and decision trees to attain precision and accuracy (Figure 11). Both the prenatal and postnatal states of motherhood are analyzed within the maternal risk factor dataset to efficiently predict with the best accuracy using machine learning and deep learning algorithms. Similarly, in the DL (Table 3) technique, CNN, LSTM, RNN and MLP with MSA (Multimodal Sentiment Analysis) are analyzed to attain the best performance within the (Figure 12) dataset. Machine learning-based sentiment analysis recognizes sentiment in text by using both supervised and unsupervised algorithms. In order to categorize text into classifications of positive, negative, or neutral sentiment, deep learning is used to develop a neural network that can learn.

Table 2: Comparative Analysis of Prenatal and Postnatal using ML Approach

Algorithms	***Precision***	***Recall***	***Accuracy***
Logistic regression	0.25	0.0935	0.850393
Random Forest	0.20	0.16	0.846456
Support Vector Machine	0.93	0.0	0.874015
KNN	0.93	0.0	0.874015
Naïve Bayes	0.39	0.375	0.850393
XGBoost	0.32	0.40	0.83
Decision Tree	0.09	0.0625	0.83858

Deep learning may be utilised for prenatal and postnatal stage sentiment classification. According to the technique and summarized data, the overall accuracy rate of sentiment analysis employing multimodal data can vary. Nevertheless, machine learning, natural language processing, and other cutting-edge methods may be employed to improve the precision of sentiment classification. It can be used to detect sadness or anxiety in expectant or

new mothers in particular, and with this knowledge, individuals in need can be helped and given assistance. Moreover, it may be used to spot possible emotional patterns that might help guide social policy options.

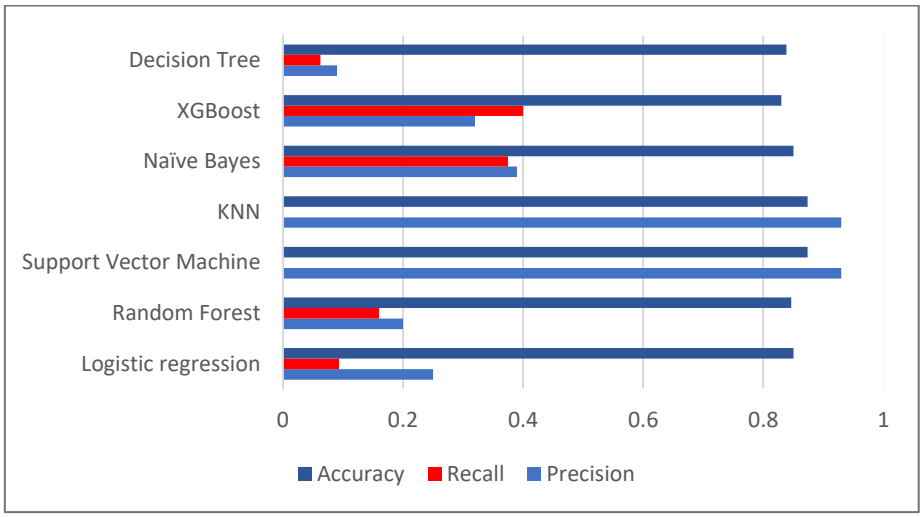

Figure 11: ML Comparative Results

Table 3: Comparative Analysis of Prenatal and Postnatal using DL Approach

Algorithms	***Precision***	***Recall***	***Accuracy***
CNN (Convolutional Neural Network)	0.81	0.59	0.78
RNN (Recurrent Neural Network)	0.88	0.0	0.80
Multimodal with MLP (Multi-Layer Perceptron)	0.93	0.0	0.89295

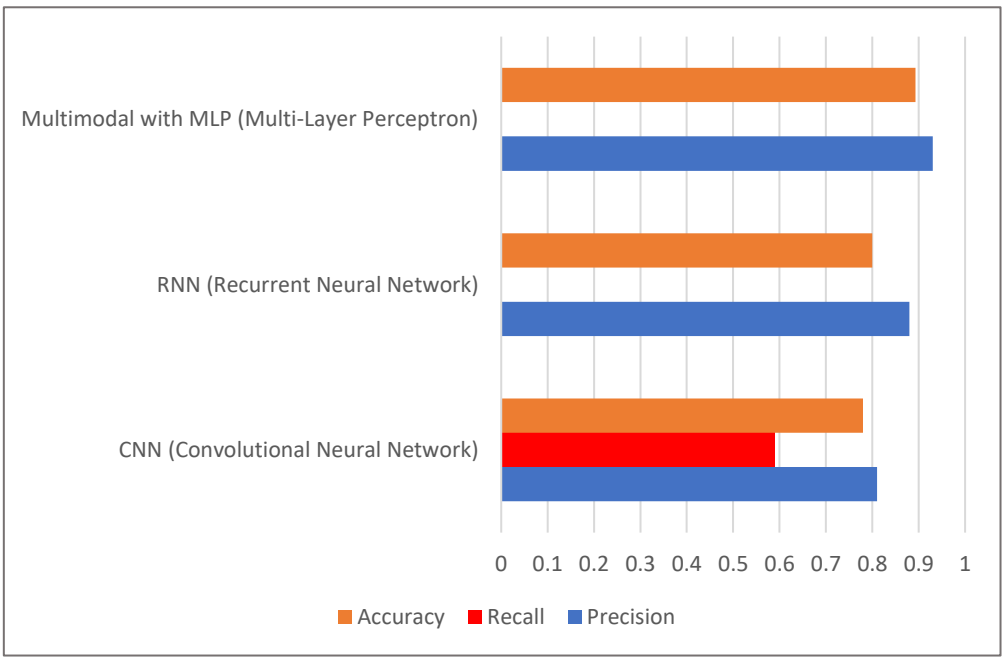

Figure 12: DL Comparative Results

5. Conclusion

Recent developments in deep learning and machine learning with multiple processing steps typically improve efficiency while decreasing the false-positive rate. The overall risk of prenatal and postnatal pregnancy is classified using several ML and DL approaches. This issue of sentiment categorization on the maternal health risk data is addressed in this research using a deep learning and machine learning technique. The patient's prenatal and postnatal status reveals if they have a normal or abnormal physiological condition. In machine learning, several methods including LR, RF, SVM, Naive Bayes, and decision trees are analyzed, while in deep learning (DL), XGBoost, CNN, LSTM, and multi-layer perception are performed using Keras and TensorFlow as the backend. Based upon the performance, MLP (Multi-layer Perceptron) with multimodal analysis improves the 89% of accuracy with overall precision in maternal risk sentiment analysis. In the futuristic approach, MLPs with multimodal analysis have the greater potential to improve performance in areas such as sentiment analysis, natural language processing, and object recognition. Advanced technology improves the advances in sentiment analysis both in prepartum and postpartum care, allowing the healthcare providers and patients to attain a comprehensive way of analyzing the emotions of pregnant women and risk factor mobility.

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