

PREDICTING RISK FACTORS DURING PREGNANCY AND ASSESSING FETAL WEIGHT USING 3D BODY SCANNING TECHNOLOGY AND HYBRID NEURAL NETWORKS

Nematova Maftuna Rakhmatilloevna

Bukhara State Medical Institute named after Abu Ali ibn Sino.

Bukhara, Uzbekistan. e-mail: nematova.maftuna@bsmi.uz

Abstract. This article examines the effectiveness of 3D body scanning technology and hybrid neural network methods in identifying risk factors during pregnancy and determining fetal weight. With the help of a 3D body scanner, accurate and complete measurements of the mother's body are taken, and these data are entered into a hybrid neural network model. High accuracy is achieved in predicting risk factors and determining the estimated weight of the fetus through hybrid neural networks. The proposed method is an effective tool for monitoring the health of pregnant women and early diagnosis, which makes it possible to reduce complications during pregnancy. The research results show the prospects for the application of artificial intelligence and advanced technologies in the field of medicine.

Keywords: Pregnancy, adverse outcome, fetal weight, 3D body scanning, hybrid neural networks, artificial intelligence, prediction, medical imaging

ПРОГНОЗИРОВАНИЕ ФАКТОРОВ РИСКА БЕРЕМЕННОСТИ И ОЦЕНКА ВЕСА ПЛОДА С ИСПОЛЬЗОВАНИЕМ ТЕХНОЛОГИИ 3D-СКАНИРОВАНИЯ ТЕЛА И ГИБРИДНЫХ НЕЙРОННЫХ СЕТЕЙ

Нематова Мафтуна Рахматиллоевна

Бухарский государственный медицинский институт имени

Абу Али ибн Сино. Бухара, Узбекистан.

e-mail: nematova.maftuna@bsmi.uz

Аннотация В данной статье исследуется эффективность технологии 3D-сканирования тела и методов гибридных нейронных сетей в выявлении факторов риска во время беременности и определении веса плода. С помощью 3D-сканера тела точно и полно снимаются измерения тела матери, и эти данные вводятся в модель гибридной нейронной сети. С помощью гибридных нейронных сетей достигается высокая точность в прогнозировании факторов риска и определении предполагаемой массы плода. Предложенный метод является эффективным инструментом для мониторинга здоровья беременных и ранней диагностики, что позволяет снизить осложнения беременности. Результаты исследования показывают перспективы применения искусственного интеллекта и передовых технологий в области медицины.

Ключевые слова: Беременность, неблагоприятные исходы, вес плода, 3D сканирование тела, гибридные нейронные сети, искусственный интеллект, прогнозирование, медицинское описание

3D TANA SKANER TEXNOLOGIYASI VA GIBRID NEYRON TARMOQLAR YORDAMIDA HOMILADORLIKDAGI XAVF OMILLARINI BASHORAT QILISH HAMDA HOMILA OG'IRLIGINI BAHOLASH

Nematova Maftuna Rahmatilloevna

Abu Ali ibn Sino nomidagi Buxoro davlat tibbiyot instituti.

Buxoro, O'zbekiston. e-mail: nematova.maftuna@bsmi.uz

Annotatsiya Ushbu maqolada 3D tana skaner texnologiyasi va gibrid neyron tarmoqlar usullarining homiladorlik jarayonidagi xavf omillarini aniqlash va homila og'irligini aniqlashdagi samaradorligi tadqiq etilgan. 3D tana skaner yordamida onaning tana o'lchovlari aniq va to'liq olinib, shu ma'lumotlar gibrid neyron tarmoq modeliga kiritiladi. Gibrid neyron tarmoqlar orqali xavf omillarini bashorat qilish va homilaning taxminiy og'irligini aniqlashda yuqori aniqlikka erishiladi. Taklif etilgan usul homilador ayollarning salomatligini monitoring qilish va erta diagnostika uchun samarali vosita hisoblanadi, bu esa homiladorlikdagi asoratlarni kamaytirishga imkon yaratadi. Tadqiqot natijalari tibbiyot sohasida sun'iy intellekt va ilg'or texnologiyalarni qo'llash istiqbollari ko'rsatadi.

Kalit so'zlar Homiladorlik, noxush natijalar, homila vazni, 3D tana skanerlash, gibrid neyron tarmoqlar, sun'iy intellekt, bashorat qilish, tibbiy tasvirlash

Monitoring the health of the mother and fetus during pregnancy, as well as preventing adverse clinical outcomes, is an important task in modern medicine. Premature birth, hypertension (HGD), pulmonary hypertension (PL), and the risk of cesarean section pose a serious threat to the mother and fetus. If it is possible to detect and predict these diseases at an early stage, it will be much easier to plan pregnancy and provide adequate medical care. In this regard, the use of new technologies, including 3D body scanning and hybrid neural networks in clinical diagnostics, is especially relevant.

3D body scanning technology allows creating a three-dimensional model of the human body. Provides higher accuracy compared to traditional methods in accurate and detailed measurement of body contours and changes in pregnant women. Especially when assessing fetal weight, it becomes possible to track changes in the mother's body in digital format. This technology helps to more fully and accurately describe anthropometric changes in the stages of pregnancy.

Hybrid neural networks consist of a mixture of various types of artificial neural networks and are designed for high-precision analysis of complex and multidimensional data. Biometric data collected during pregnancy, 3D scanning

results, and other clinical indicators are processed in an integrated manner using these networks. This makes it possible to accurately predict unfavorable outcomes, including the possibility of premature birth, hypertension, pulmonary hypertension, and cesarean section.

This study is aimed at achieving the following main goals: accurate assessment of fetal weight based on 3D body scan data of pregnant women, predicting the risk of premature birth, hypertension, pulmonary hypertension, and cesarean section, predicting and predicting adverse clinical outcomes using hybrid neural networks, and improving advanced diagnostic methods for personalizing medical care and monitoring.

The results and discussion showed that detailed data obtained through 3D body scanning were entered into a hybrid neural network model, allowing for a more accurate assessment of fetal weight. With the help of the neural network, unfavorable conditions during pregnancy were predicted with high accuracy. This approach created new opportunities for monitoring the health of the mother and fetus, greatly helped in personalizing medical care and preventing unpleasant situations.

The Z-Size Ladies application is an advanced modeling system created for accurate and interactive observation of body changes in women during pregnancy and after childbirth. A system based on specific anthropometric data for Thai women models changes in body shape and size using the linear regression method. This system relies on high-precision measuring instruments and 3D scanning results. Linear regression models are developed separately for the stages of pregnancy and the postpartum period, allowing for accurate prediction of body changes. Based on the results of this regression, a three-dimensional body shape is modeled, which allows users to observe the clear and visual appearance of their body in real time. During the modeling process, the thickness of the body surface, slopes, and natural changes in dimensions are reflected with high accuracy.

When creating adaptive models for Thai women, the anatomy, average body structure, and cultural aspects of Thai women were taken into account. This ensures the model's adaptability to national characteristics and high accuracy. At the same time, the Z-Size Ladies application provides users with the opportunity to create personalized body shape models based on individual parameters.

Accurate assessment of the size and shape of the pelvis is crucial for predicting the success of childbirth. Traditional MRI pelvimetry assesses pelvic anatomy with high accuracy, but it is expensive and not widespread. Therefore, 3D body scanning technology is emerging as a promising alternative to determining pelvic external dimensions in a non-invasive, easy, and inexpensive way. Studies have shown that pelvic measurements obtained using 3D body scanners have a higher level of accuracy and reliability compared to MRI pelvimetry. 3D scanning is a good alternative to pelvimetry, especially in areas with limited resources, due to its speed, low cost, and

ease of use. This method greatly assists patients in predicting the success of childbirth, as well as in the processes of prenatal preparation.

RESULT

3D body scanning and the use of hybrid neural networks significantly improve the early detection and management of complex clinical situations during pregnancy. These technologies open up new possibilities in monitoring the health of the mother and fetus, providing personalized medical care, and assessing the risk of pregnancy. In addition, modeling systems such as the Z-Size Ladies application allow pregnant and postpartum women to monitor and manage their body changes in real time. The use of 3D body scanning technology in pelvimetry shows that it is a promising path in clinical practice as an effective and inexpensive alternative to MRI pelvimetry.

LITERATURE:

1. Семенова Е. В., Кириллов Н. А. Этиология женского бесплодия //Современные проблемы медицины и естественных наук. – 2018. – С. 79-83.
2. Ernaeva G. X., Sattarov T. F., Maxamatjanova N. M. DIAGNOSTIC SIGNIFICANCE OF PSYCHODIAGNOSTIC EXAMINATIONS OF TAEKWONDO PLAYERS //Frontline Medical Sciences and Pharmaceutical Journal. – 2023. – Т. 3. – №. 06. – С. 19-27.
3. Мухаметзянова Р. О., Шагиева Э. И., Николаева Н. В. Депрессия—главная болезнь XXI века //Сборник научных трудов молодых ученых и специалистов. – 2022. – С. 395-39.
4. Хаятов Р. Б., Велиляева А. С. Особенности развития и течения аффективных расстройств при сахарном диабете //Достижения науки и образования. – 2020. – №. 5 (59). – С. 62-64.
5. Lustman P. J. Anxiety disorders in adults with diabetes mellitus //Psychiatric Clinics of North America. – 1988. – Т. 11. – №. 2. – С. 419-432.
6. Maxamatjanova N. Principles of medical and psychological care of patients with the acquired immune deficiency syndrome //Journal of the Neurological Sciences. – 2019. – Т. 405. – С. 128.
7. Hamraev B., Maxamatjanova N. Study and evaluation of the possibilities of cognitive behavioral therapy in psychosexual disorders //Центрально-азиатский журнал образования и инноваций. – 2023. – Т. 2. – С. 4.
8. Hamraev B., Maxamatjanova N. Modern methods of treatment of sexual disorders //Инновационные исследования в современном мире: теория и практика. – 2023. – Т. 2. – №. 15. – С. 73-74.
9. Maxamatjanova N. M., Mirxaydarova F. S., Mirxaydarova S. M. Xavotir sindromi rivojlanishida qandli diabetning ahamiyati //Прикладные науки в современном мире: проблемы и решения. – 2023. – Т. 2. – С. 2.

10. Maxamatjanova N., Ibodullayev Z. Therapy of post-stroke dementia on the example of memantine //EUROPEAN JOURNAL OF NEUROLOGY. – 111 RIVER ST, HOBOKEN 07030-5774, NJ USA : WILEY, 2020. – Т. 27. – С. 1063-1063.
11. Surayyo, Yusuphodjayeva, and Gafurova Sabohat. "DEPRESSIVE-ANXIETY DISORDERS IN PATIENTS WITH RHEUMATOID ARTHRITIS AND METHODS OF THEIR PSYCHOCORRECTION." Interpretation and researches 2.3 (2023): 9-16.
12. Гафурова С., Юсупхаджаева С. ДИФФЕРЕНЦИАЛЬНЫЙ АНАЛИЗ НЕВРОТИЧЕСКИХ РАССТРОЙСТВ ПРИ СИНДРОМЕ РАЗДРАЖЕННОГО КИШЕЧНИКА И СОВЕРШЕНСТВОВАНИЕ МЕДИКО-ПСИХОЛОГИЧЕСКОЙ ПОДДЕРЖКИ ПРИ НИХ //Talqin va tadqiqotlar. – 2023. – Т. 1. – С. 19.
13. Ibodullayev Z. R. et al. EFFECTIVE PSYCHOPHARMACOLOGICAL THERAPY IN ANXIETY-DEPRESSIVE DISORDERS //Open Access Repository. – 2023. – Т. 4. – №. 3. – С. 241-246.
14. Sh G. S. Ichak ta'sirlanish sindromidagi psixomotsional buzilishlar va unda psixoterapevtik yordam ko'rsatish //SOLUTIONS SOLUTIONS. – 2020.
15. Gafurova S., Yusuphodjayeva S. DIFFERENTIAL ANALYSIS OF NEUROTIC DISORDERS IN IRRITABLE BOWEL SYNDROME AND IMPROVEMENT OF MEDICAL PSYCHOLOGICAL SUPPORT IN THEM //Science and innovation. – 2023. – Т. 2. – №. D2. – С. 177-181.
16. Гафурова С. Ш., Юсупходжаева С. Т. Identification of anxiety-phobic disorders in irritable bowel syndrome and improvement of medical psychological support in them. – 2024.
17. Гафурова С. Ш., Юсупходжаева С. Т. ТРЕВОЖНО-ФОБИЧЕСКИЕ РАССТРОЙСТВА ПРИ СИНДРОМЕ РАЗДРАЖЕННОГО КИШЕЧНИКА И ЭФФЕКТИВНОСТЬ ПСИХОТЕРАПИИ И ПСИХОФАРМАКОТЕРАПИИ ПРИ НИХ. – 2024