IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 12, Issue 4, April 2024

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.379

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | Monthly Peer Reviewed & Referred Journal |

|| Volume 12, Issue 4, April 2024 ||

| DOI: 10.15680/IJIRCCE.2024.1204275 |

Cervical Cancer Prediction and Remdiation UI Using CNN and RNN Techniques

D Chandana, I Muyeenudeen, A Deepika, K R Vamsi, Dr K Logesh

UG Student, Dept. of CSE, Kuppam Engineering College (KEC), Chittoor, India

Associate professor, Dept. of CSE, Kuppam Engineering College (KEC), Chittoor, India

ABSTRACT: Cervical cancer is so common and can be deadly, it poses a serious threat to public health. Nonetheless, improving prognosis and treatment results depends heavily on early identification. This paper presents a novel approach to the prediction of cervical cancer using Convolutional Neural Networks (CNN) in conjunction with an intuitive user interface (UI) created with Streamlit. By training on an extensive collection of pictures of cervical cells, the CNN model is able to classify cells into normal and pathological categories, which helps to identify possibly malignant cells early on. With the help of Streamlit, the user interface (UI) provides a smooth and simple way for users to enter photos of cervical cells and get predictions about whether or not those cells are malignant. This user-friendly interface improves accessibility and encourages healthcare providers and anyone looking to test for cervical cancer to use the CNN model. The method also includes the identification of several cell abnormalities—dyskeratotic, kilocytotic, metaplastic, parabasal, and superficial-intermediate cells—that are linked to cervical cancer.

KEYWORDS: Cervical cancer, Convolutional Neural Networks (CNN), early detection, user-friendly interface (UI), Streamlit, healthcare professionals, cervical cancer screening, cell abnormalities, Dyskeratotic, Koilocytotic, Metaplastic, Parabasal, Superficial-Intermediate

I.INTRODUCTION

The urgent need to combat cervical cancer, a disease that continues to pose a serious worldwide public health concern, is what drives this study. Cervical cancer remains a danger to women's health despite scientific advances, particularly in areas where access to screening programs and healthcare resources is restricted. The high death rates linked to cervical cancer highlight the need for more accessible screening equipment and better early detection techniques. Furthermore, the emotional and financial strain that cervical cancer places on patients and their families emphasizes the need for creative solutions that might improve detection and treatment results.

Cervical cancer is viewed in society as a social and economic problem in addition to a medical one. Cervical cancer patients frequently experience psychological and physical suffering, which negatively affects their general health and quality of life. The difficulties that people and their families confront are further made worse by the financial burden brought on by medical bills and lost wages. Additionally, differential results are a result of differences in healthcare understanding and access, which disproportionately affect vulnerable people. Holistic strategies that put an emphasis on early identification, education, and fair access to healthcare are needed to address these social issues

II.SYSTEM MODEL AND ASSUMPTIONS

A family of deep learning models called Convolutional Neural Networks (CNNs) is especially made for processing and evaluating visual input, such pictures and movies. CNNs are widely used and have become the dominant solution for a wide range of computer vision applications because of their automated learning of hierarchical representations of visual characteristics from raw input data. The convolutional layer, which applies a collection of learnable filters, or kernels, to the input picture, is one of the essential parts of CNNs. These filters extract local characteristics like edges, textures, and patterns by convolving over the picture.

Additionally, CNNs usually include pooling layers to down-sample the feature maps that are produced from the convolutional layers, such as average or max pooling. By retaining the most important information while lowering the spatial dimensionality of the feature maps, pooling layers improve the network's computational efficiency and resilience to changes in the input data. Furthermore, fully connected layers are frequently seen at the conclusion of CNN designs. These layers use the high-level feature representations that the convolutional layers have taught them to carry out tasks like regression or classification. In classification tasks, these fully connected layers are usually followed

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | Monthly Peer Reviewed & Referred Journal |

|| Volume 12, Issue 4, April 2024 ||

| DOI: 10.15680/IJIRCCE.2024.1204275 |

by softmax activation functions to provide probability distributions over output classes. Stochastic gradient descent (SGD) and its variants are optimization algorithms used in CNN training that iteratively modify the network's parameters (like filter weights and biases) in order to minimize a predefined loss function, like categorical cross-entropy loss in classification tasks. Through the process of backpropagation, in which gradients are produced and transmitted backward through the network to change the parameters, CNNs are trained to automatically extract discriminative features from the input data and generalize to unseen cases.

III.EXISYTING SYSTEM

The current system's primary means of detecting cervical cancer is through traditional screening techniques like Pap smears and HPV testing, which have drawbacks in terms of scalability, accuracy, and accessibility. Subjective interpretation of Pap smear results may result in missed diagnosis or needless treatments. Furthermore, these approaches frequently call for skilled staff and specialized healthcare infrastructure, which presents difficulties, especially in environments with limited resources.

There are several issues with the current cervical cancer detection method. First of all, findings from traditional screening techniques, such as Pap smears and HPV testing, might be falsely positive or negative, missing diagnosis and requiring needless patient concern or actions. Second, these techniques can be difficult to use, especially in remote or underdeveloped locations, because they frequently need both specific tools and qualified medical personnel. Furthermore, the dependence on clinic-based screening programs could discourage people from getting frequent tests because of practical difficulties, social shame, or ignorance. Furthermore, subjectivity and variability can be introduced into the diagnostic process by the subjective interpretation of Pap smear data, which may have an effect on detection accuracy.

IV.PROPOSED SYSTEM

The suggested system uses Convolutional Neural Networks (CNN) in conjunction with an intuitive Streamlit interface to present a unique method of cervical cancer screening. This cutting-edge technology promises to provide a more precise, easily accessible, and scalable answer to the drawbacks of current screening techniques. The CNN algorithm can distinguish between normal and pathological cell types by using a large dataset of cervical cell pictures during training. This allows for more accurate early detection of potentially malignant cells.

Comparing the suggested methodology to the current cervical cancer screening techniques reveals a number of benefits. First off, the technology improves cervical cancer screening accuracy and dependability by utilizing Convolutional Neural Networks (CNN). CNNs can accurately distinguish between normal and diseased cells thanks to their ability to recognize complex patterns and characteristics in cervical cell pictures. This sophisticated degree of analysis lowers the possibility of false-positive and false-negative outcomes, increasing diagnostic precision and decreasing the possibility of missed diagnoses or needless patient treatments. With the help of Streamlit's user-friendly platform, individuals can quickly submit photos of their cervical cells and receive real-time predictions about whether or not they are malignant. This interactive interface removes obstacles related to complicated technology or specialized training, which promotes involvement and proactive participation in cervical cancer screening initiatives.

V. RESULT AND DISCUSSION

In the fig 1, The user is currently seeing the web application's home page.

Fig. 1 Home Page

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | Monthly Peer Reviewed & Referred Journal |

|| Volume 12, Issue 4, April 2024 ||

| DOI: 10.15680/IJIRCCE.2024.1204275 |

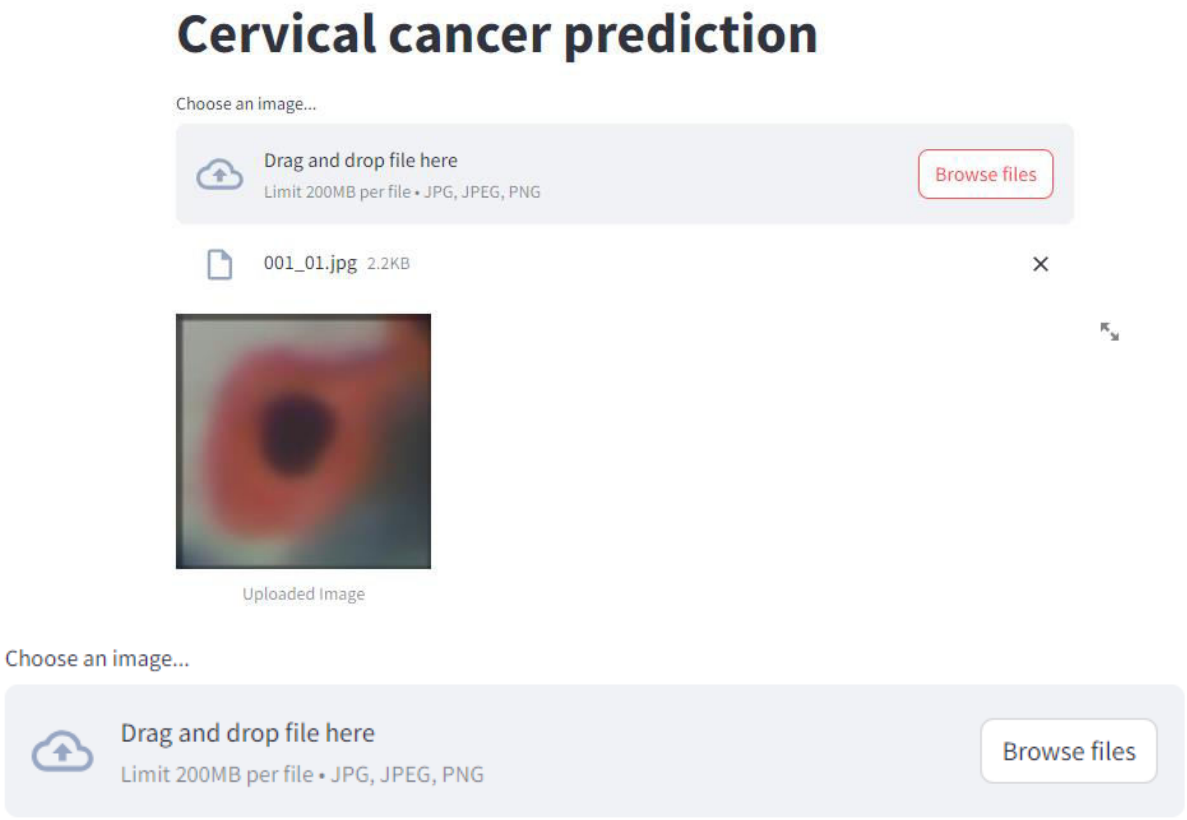

Fig. 2 Prediction Page

In the fig 2, The user can now upload the cell images

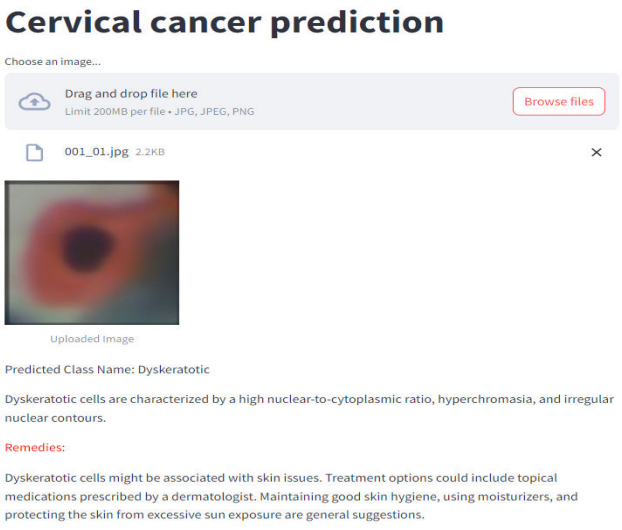

Fig .3 Prediction

In Fig 3, The user can see prediction outputs.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | Monthly Peer Reviewed & Referred Journal |

|| Volume 12, Issue 4, April 2024 ||

| DOI: 10.15680/IJIRCCE.2024.1204275 |

VI. CONCLUSION

In conclusion, the utilization of Convolutional Neural Networks (CNN) for cervical cancer detection represents a significant advancement in leveraging artificial intelligence for healthcare. With its ability to analyze cervical cell images and accurately classify abnormalities, the CNN model offers a promising approach to early detection and diagnosis, ultimately enhancing patient outcomes.

REFERENCES

1) Sompawong, Nitiwat, et al. "Automated pap smear cervical cancer screening using deep learning." 2019 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC). IEEE, 2019.
2) Gorantla, Rohan, et al. "Cervical cancer diagnosis using cervixnet-a deep learning approach." 2019 IEEE 19th international conference on bioinformatics and bioengineering (BIBE). IEEE, 2019.
3) Alyafeai, Zaid, and Lahouari Ghouti. "A fully-automated deep learning pipeline for cervical cancer classification." Expert Systems with Applications 141 (2020): 112951.
4) Cheng, Shenghua, et al. "Robust whole slide image analysis for cervical cancer screening using deep learning." Nature communications 12.1 (2021): 5639.
5) Chen, Hua, et al. "CytoBrain: cervical cancer screening system based on deep learning technology." Journal of Computer Science and Technology 36 (2021): 347-360.
6) Arora, Aditya, Anurag Tripathi, and Anupama Bhan. "Classification of cervical cancer detection using machine learning algorithms." 2021 6th International conference on inventive computation technologies (ICICT). IEEE, 2021.
7) Sellamuthu Palanisamy, Vijayanand, Rajiv Kannan Athiappan, and Thirugnanasambandan Nagalingam. "Pap smear based cervical cancer detection using residual neural networks deep learning architecture." Concurrency and Computation: Practice and Experience 34.4 (2022): e6608.
8) Tripathi, Anurag, Aditya Arora, and Anupama Bhan. "Classification of cervical cancer using Deep Learning Algorithm." 2021 5th International Conference on Intelligent Computing and Control Systems (ICICCS). IEEE, 2021.

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INNO SPACE SJIF Scientific Journal Impact Factor

doi crossref

निस्केयर NISCAIR

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

www.ijircce.com

Scan to save the contact details