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CANCER DETECTION USING DEEP LEARNING AND RESNET ARCHITECTURE

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ABSTRACT

Cancer is one of the most critical diseases that has caused several deaths in today's world. In most cases, doctors and practitioners are only able to diagnose cancer in its later stages. In the later stages, planning cancer treatment and increasing the patient's survival rate becomes a very challenging task. Therefore, it becomes the need of the hour to detect cancer in the early stages for appropriate treatment and surgery planning. Analysis and interpretation of medical images such as MRI and CT scans help doctors and practitioners diagnose many diseases, including cancer disease. However, manual interpretation of medical images is costly, time-consuming, and biased. Nowadays, Deep Learning, a subset of artificial intelligence, is gaining increasing attention from practitioners in automatically analyzing and interpreting medical images without their intervention. Deep learning methods have reported extraordinary results in deferent fields due to their ability to automatically extract intrinsic features from images without any dependence on manually extracted features. This study provides a comprehensive review of deep learning methods in cancer detection and diagnosis. This study describes various deep learning models and steps for applying deep learning models in detecting cancer. Recent developments in cancer detection based on deep learning methods have been critically analyzed and summarized to identify critical challenges in applying them for detecting cancer accurately in the early stages. Based on the identified challenges, we provide a few promising future research directions for fellow researchers in the field. The outcome of this study provides many clues for developing practical and accurate cancer detection systems for its early diagnosis and treatment planning.

Keywords: cancer detection; convolutional neural networks (CNNs); deep learning.

1. INTRODUCTION

Over the past decades, a continuous evolution related to cancer research has been performed. Scientists applied different methods, such as screening in early stage, to find types of cancer before they cause symptoms. Moreover, they have developed new strategies for the early prediction of cancer treatment outcome. With the advent of new technologies in the field of medicine, large amounts of cancer data have been collected and are available to the medical research community. However, the accurate prediction of a disease outcome is one of the most interesting and challenging tasks for physicians. As a result, ML methods have become a popular tool for medical researchers. These techniques can discover and identify patterns and relationships between them, from complex datasets, while they are able to effectively predict future outcomes of a cancer type.

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Keras is a high-level deep learning library that can be used with either Tensor Flow or Theano backend. It provides a user-friendly interface for building and training neural networks and is widely used in biomedical research for cancer detection.

Deep learning algorithms can analyze blood samples to identify patterns that are associated with cancer. This can help doctors to detect cancer early and develop personalized treatment plans.

1.1 Software Requirements

• Python

• HTMLl

• CSS

• Java Script

•Framework

LIBRARIES USED

• torch.vision

• Numpy

• Matplotlib

• Pandas

• Sckit learn

• Cv2 software

• Keras

II. LITERATURE SURVEY

[1] Ahmed Ibrahim, Hoda. K. Mohamed, Ali Maher and Baochang Zhang proposed "A Survey on Human Cancer Categorization Based on Deep Learning" (2022). This paper comprises the usage of deep learning for object detection, classification, and human cancer categorization. In addition, the most popular cancer types have also been introduced. This article discusses the Vision-Based Deep Learning System among the dissimilar sorts of data mining techniques and networks. It then introduces the most extensively used DL network category, which is convolutional neural networks (CNNs) and investigates how CNN architectures have evolved. Starting with Alex Net and progressing with the Google and VGG networks, finally, a discussion of the revealed challenges and trends for upcoming research is held.

[2] Ahsan Bin Tufail, Yong-Kui Ma, Mohammed K. A. Kaabar, Francisco Martínez,A. R. Junejo, Inam Ullah and Rahim Khan proposed "Deep learning in Cancer diagnosis and prognosis prediction"(2021). This paper presents a Survey Of a summary of current works where DL has helped to determine the best models for the

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cancer diagnosis and prognosis prediction tasks. DL is a generic model requiring minimal data manipulation and achieves better results while working with enormous volumes of data. Aims are to scrutinize the influence of DL systems using histopathology images, present a summary of state-of-the-art DL methods, and give directions to future researchers to refine the existing methods.

[3] Tanzila Saba Proposed "Recent advancement in cancer detection using machine learning"(2020). The study highlights how cancer diagnosis and cure process is assisted using machine learning with supervised, unsupervised, and deep learning techniques. Several state of art techniques are categorized under the same cluster and results are compared on benchmark datasets from accuracy, sensitivity, specificity, false-positive metrics. Finally, challenges are also highlighted for possible future work.

[4] Konstantinakourou, Themis P.Exacrchos, Konstantinos P.Exarchos, Michalis V.Karamouzis, Di mitriosI. Fotiadis Proposed “Machine learning applications in cancer prognosis and prediction"(2015). This paper presents how Machine Learning techniques and applications are used in Cancer prognosis and prediction. The ability of ML tools to detect key features from complex datasets reveals their importance.

[5] Md Roman Bhuiyan and Junaidi Abdullah Proposed “Detection on Cell Cancer Using the Deep Transfer Learning and Histogram Based Image Focus Quality Assessment” (2022). This Paper propose a metric for evaluating the quality of digital pathology images that uses a sum of even-derivative filter bases to generate a human visual-system-like kernel, which is described as the inverse of the lens’ point spread function. This kernel is then used for a digital pathology image to change high-frequency image data degraded by the scanner’s optics and assess the patch-level focus quality. Through several studies, it has demonstrated that our technique correlates with ground-truth z-level data better than previous methods and is computationally efficient. Using deep learning techniques, our suggested system can identify positive and negative cancer cells in images. further expand this technique to create a local slide-level focus quality heatmap, which can be utilized for automated slide quality control, and illustrate this method’s value in clinical scan quality control by comparing it to subjective slide quality ratings.

[6] Ganta Sruthi, Chokkakula Likitha Ram, Malegam Koushik Sai, Bhanu Pratap Singh, Nikhil Majhotra, Neha sharma proposed “Cancer Prediction using Machine Learning”(2022). This Paper Proposes Cancer Prediction by testing different types of algorithms for different types of cancers. This Paper making a cancer prediction using machine learning

III. OPERATING PROCEDURE

- Data collection
- Annotation making
- Training
- Validation

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• Inferences running

• Output

Advantages

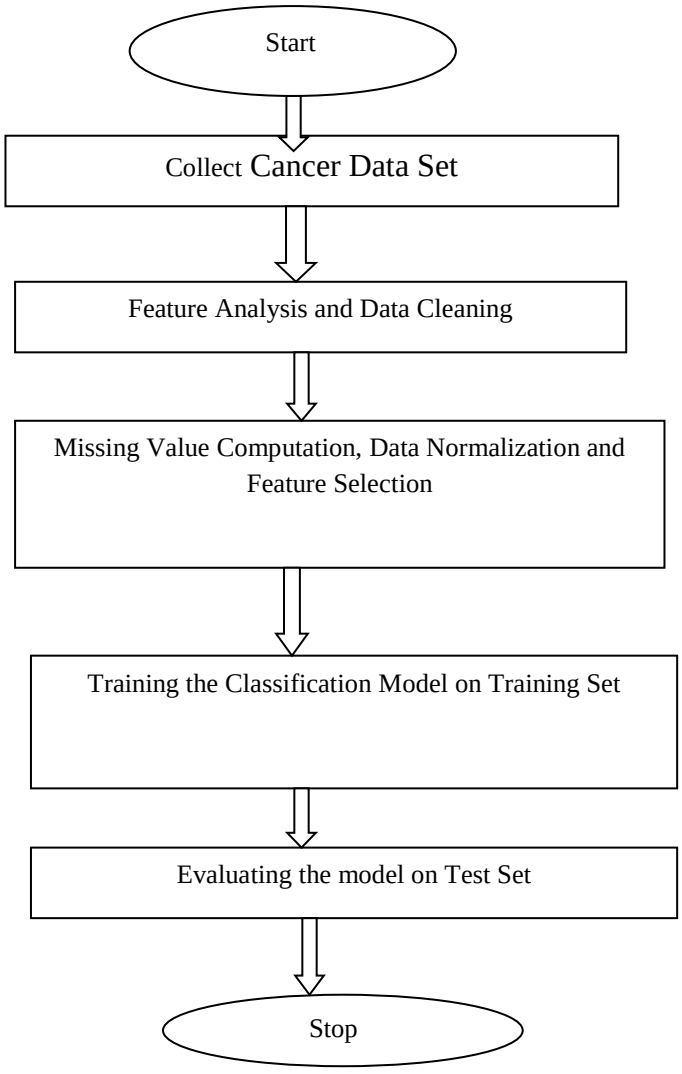
• Easy decision making for Pathologist.

• Doctors can be able to understand easily for future diagnosis.

Disadvantages/Limitations

Output may be not clinically proved.

Flow chart



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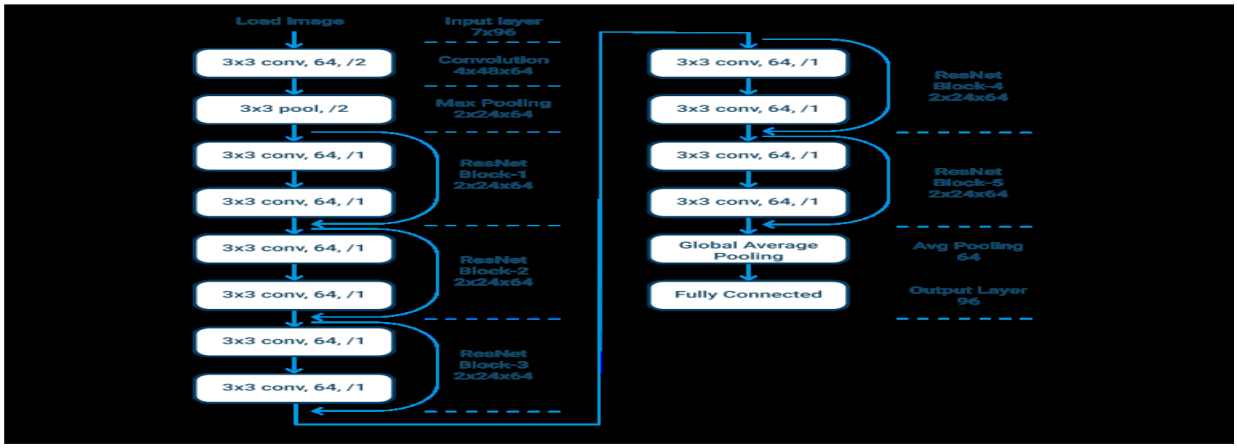

ResNet Architecture

IV. IMPLEMENTATION DETAILS

This section presents the details of implementation based on the proposed system.

• Web page created by using HTML code.

• After clicking on the "Click Here" button, it will be redirected to the next page, i.e., Cancer Prediction, showing Figure Below.

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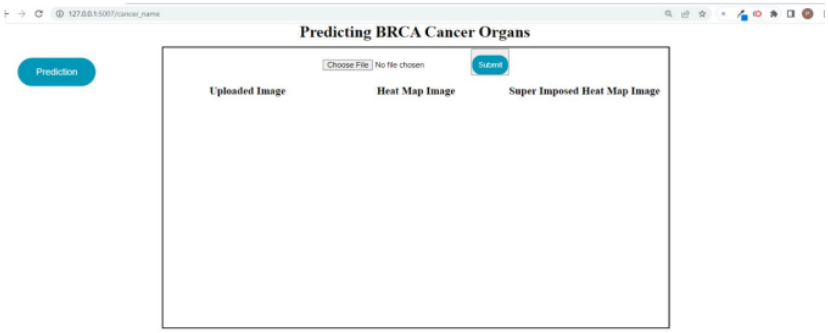
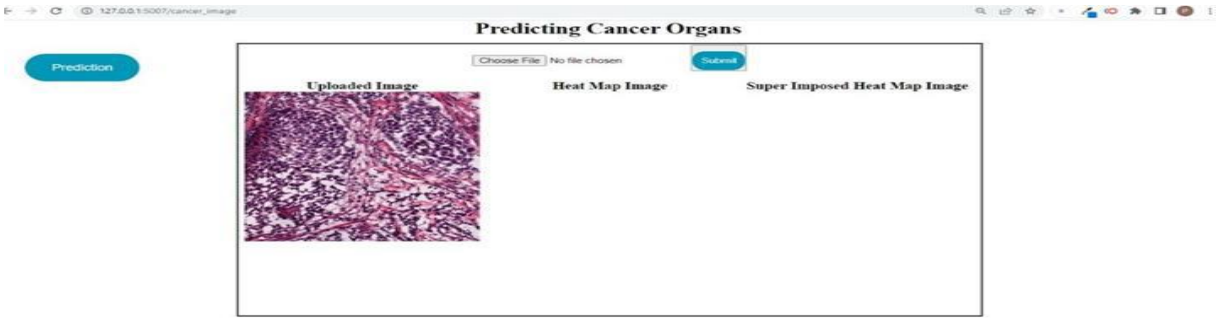
• By clicking on the specific blood cell button, it will be redirected to another page, i.e., the prediction of cancer organ shown in the figure below.

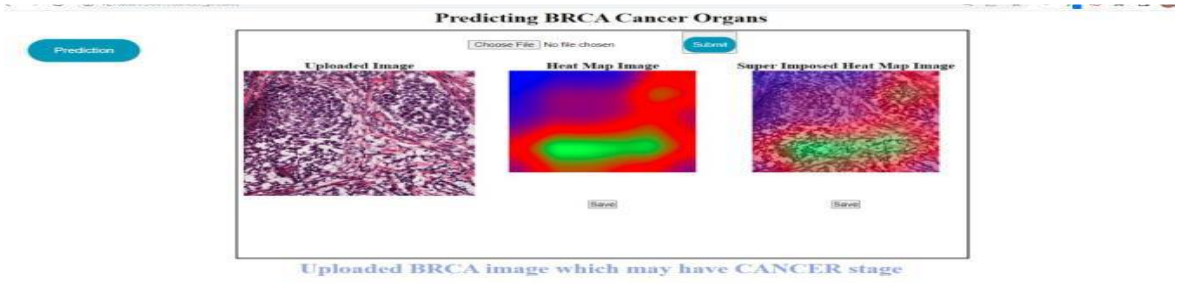


• On this page, click on the "choose file" button, and you will be redirected to a file where different types of blood cell images are there. In that, click on one type of cell, and then click on the submit button.

• It will upload the image shown below.



• If you click on the "prediction" button, you will be redirected to another page showing whether cancer is there or not



A Web Page displaying Cancer

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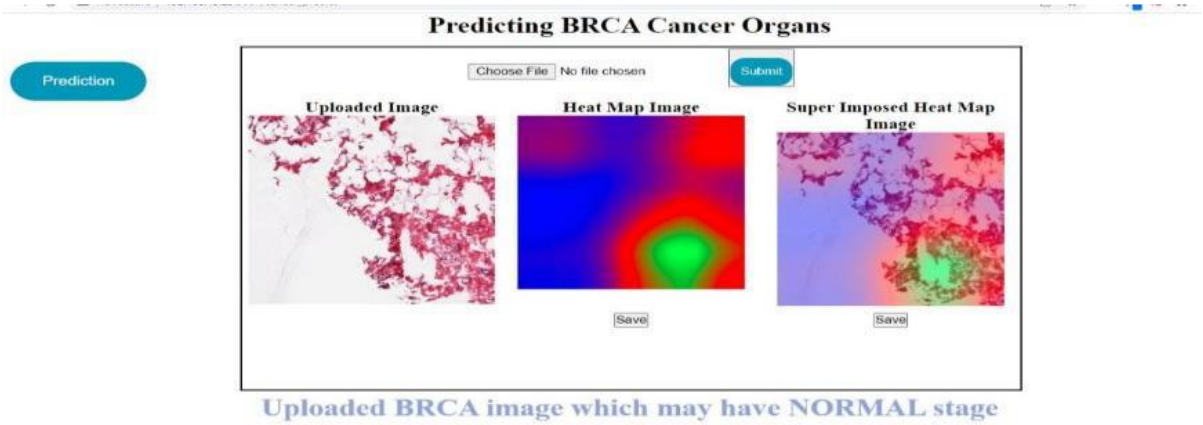

A Web Page displaying Normal

V. CONCLUSION

This work aims to identify the presence or absence of cancer. doctors can rapidly detect whether cancer is present through the use of deep learning and the ResNet 18 architecture. So, by collecting blood samples from a patient, we can determine whether or not cancer is present. In order to find patterns linked to cancer, deep learning algorithms can analyse blood samples. Doctors can use this to identify cancer early and create individualised treatment regimens. Through the use of deep learning software, the necessary libraries are installed and employing various algorithm techniques. As a result, the intended output has been tested and this has been run successfully.

REFERENCES

[1] P. S. Roy and B. J. Saikia, “Cancer and cure: a critical analysis,” Indian Journal of Cancer, vol. 53, no. 3, pp. 441-442, 2016.

[2]. L. A. Torre, R. L. Siegel, E. M. Ward, and A. Jemal, “Global cancer incidence and mortality rates and trends--an update,” Cancer Epidemiology Biomarkers & Prevention, vol. 25, no. 1, pp. 16–27, 2016.

[3]. F. Abbas-Aghababazadeh, Q. Mo, and B. L. Fridley, “Statistical genomics in rare cancer,” Seminars in Cancer Biology, vol. 61, pp. 1–10, 2020.

[4]. J. M. Baust, Y. Rabin, T. J. Polascik et al., “Defeating cancers' adaptive defensive strategies using thermal therapies: examining cancer's therapeutic resistance, ablative, and computational modeling strategies as a means for improving therapeutic outcome,” Technology in Cancer Research & Treatment, vol. 17, 2018.

[5]. R. Seelige, S. Searles, and J. D. Bui, “Innate sensing of cancer's non-immunologic hallmarks,” Current Opinion in Immunology, vol. 50, pp. 1–8, 2018.

[6]. V. Lichtenstein, “Genetic mosaicism and cancer: cause and effect,” Cancer Research, vol. 78, no. 6, pp. 1375–1378, 2018.