

Leukemia Detection Using Deep Learning (Django)

Abstract

Leukemia, a type of cancer affecting the blood and bone marrow, poses significant challenges in diagnosis and treatment, necessitating accurate and timely detection for improved patient outcomes. In this study, we propose a comprehensive approach to leukemia detection leveraging deep learning techniques integrated within a web-based platform developed using Django. The dataset utilized in this research comprises a diverse collection of medical imaging data, including blood smears and other relevant information, facilitating robust model training and validation.

The methodology adopted in this study encompasses several key stages. Initially, the dataset undergoes thorough preprocessing to standardize image resolutions, enhance data consistency, and ensure compatibility with deep learning models. Subsequently, data augmentation techniques are applied to augment the dataset, thereby improving model generalization and robustness. The deep learning model utilized for leukemia detection is tailored for medical image analysis, utilizing advanced architectures such as Convolutional Neural Networks (CNNs) or Recurrent Neural Networks (RNNs).

The trained model is seamlessly integrated into a web-based platform powered by Django, providing users with a user-friendly interface to upload medical imaging data and receive real-time diagnostic predictions. The platform offers features such as seamless image uploads, instantaneous prediction results, and visualization of diagnostic outcomes, enhancing usability for both medical professionals and patients. Performance evaluation metrics, including accuracy, sensitivity, specificity, and area under the receiver operating characteristic curve (AUC-ROC), validate the model's efficacy in accurately detecting and classifying leukemia cases, distinguishing between different subtypes with high precision.

This research contributes significantly to the field of medical imaging and healthcare technology by providing a practical solution for early detection and diagnosis of leukemia. By leveraging state-of-the-art deep learning techniques and a user-friendly web interface, this approach aims to enhance diagnostic accuracy and accessibility, ultimately leading to improved patient outcomes and prognosis for individuals affected by leukemia.

In conclusion, the integration of deep learning models within web-based platforms represents a significant advancement in utilizing technology for medical diagnosis and treatment. This system holds promise for facilitating early detection and intervention for leukemia, thereby contributing to efforts to combat this complex disease and improve patient care in hematology practice.