

Skin Disease Detection Using Ensemble Learning

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Abstract: Skin diseases pose significant diagnostic challenges due to their visual similarity and the need for expert interpretation. This research presents an advanced machine learning-based system for skin disease detection, leveraging ensemble learning to enhance diagnostic accuracy. The system integrates three deep learning models **DenseNet121**, **EfficientNetB3**, and **ResNet101** trained on the **HAM10000** dataset, which comprises **10,000** dermoscopic images across seven skin disease categories. By combining the predictive strengths of these models, the ensemble approach achieves robust classification performance, addressing the complexity of diverse medical image data. The system is supported by a **Flask-based** backend for real-time image processing and a React-based frontend for user-friendly interaction, incorporating secure **JWT** authentication and **MongoDB** for data management. Evaluation results demonstrate high accuracy and reliability, with the ensemble model outperforming individual models in classifying conditions such as **melanoma** and **basal cell carcinoma**. This work highlights the potential of ensemble learning in improving automated dermatological diagnostics, offering a scalable solution for clinical decision support.

Keywords: Skin diseases

