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(57) Abstract :
The present invention introduces a machine learning–driven method and system for evaluating skin cancer risk through the combined analysis of environmental pollution exposure and skin-related data. The invention aims to provide a non-invasive, automated, and early diagnostic support solution that improves the identification of potential skin cancer conditions. In the proposed system, environmental parameters such as air quality levels, particulate matter, ultraviolet radiation intensity, and atmospheric conditions are collected along with digital images of skin regions and individual-specific information. The acquired data is processed and examined using advanced machine learning and deep learning algorithms to discover meaningful relationships between sustained environmental exposure and abnormal skin features. The system computes a risk score indicating the probability and severity of skin cancer and categorizes individuals into multiple risk levels. Based on the evaluated risk, the invention generates informative alerts, analytical reports, and preventive guidance to assist users and healthcare professionals in timely decision-making. The disclosed method and system are applicable to smart healthcare systems, mobile diagnostic applications, and pollution-affected regions, enabling continuous monitoring and personalized preventive care. By integrating environmental exposure assessment with machine learning–based skin analysis, the invention enhances early detection capability, minimizes dependence on invasive diagnostic methods, and supports improved healthcare outcomes. FIG.1

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