Burns being one of the leading causes of clinically significant morbidity can lead to a dramatic physiological reaction with prolonged repercussions, metabolic disturbance, severe scarring, catastrophic organ failure, and death if not properly treated. In order to validate the efficacy of the suggested strategy, the study also applies a traditional solution to mitigate this multi-class categorization problem, incorporating rigorous digital image processing steps with several conventional machine learning classifiers and then conducts a comparative performance assessment. Thus, through the use of intelligent technologies, the proposed DCNN-based technique can aid healthcare practitioners in evaluating the burn damage condition and providing appropriate treatments in the shortest feasible time, remarkably reducing the unfavorable consequences of burns.