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Comparative Investigation of Machine Learning Algorithms for Anxiety and Depression Prediction among College Students in Vidarbha Region

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ABSTRACT

College student mental health has been a critical concern over the past decade. Nowadays, a large number of youths suffer from mental health issues such as anxiety and depression. Major causes of these issues are academic pressure, financial constraints, career uncertainty, social expectations, and lifestyle changes, which contribute substantially to psychological distress during the college years. Anxiety and Depression can cause severe problems in case of failing to detect it at an early stage in a depressed person. It is one of the major reasons for increased suicidal cases. Also, if these conditions remain undetected, they may adversely affect academic performance, emotional well-being, interpersonal relationships, and overall quality of life. Recent advances in machine learning provide an opportunity to develop intelligent decision-support systems capable of identifying students at risk of anxiety and depression.

The present study developed predictive models to identify college students in the Vidharbha region at heightened risk of diagnosable anxiety and depressive disorders, showing a comparative investigation of multiple machine learning algorithms using demographic and psychological features. The proposed system integrates standardized mental health assessment tools, namely the Generalized Anxiety Disorder-7 (GAD-7) and Patient Health Questionnaire-9 (PHQ-9). The proposed comparative system contributes to the growing field of artificial intelligence in healthcare by providing a systematic evaluation of machine learning algorithms for early anxiety and depression prediction among college students.

KEYWORDS Anxiety Prediction, Depression Prediction, Machine Learning, Comparative Investigation, College Students, PHQ-9, GAD-7.