The Science of Stress: Identifying and Predicting Pattern

Sumit Kumar Yadav, Gaurav Kumar, Dr. Sharik Ahmad

School of Engineering and Technology (Department of Computer Science and Application)

Sharda university, Greater Noida, UP, India

Abstract: *Stress has emerged as a leading disease of the 21st century that impacts the mind and body. Chronic exposure to stress has been linked with a host of diseases, including anxiety disorders, depression, heart disease, and impaired immunity. As life is getting busier and more complicated day by day, it is now more important than ever to learn and control stress in advance. As more electronic trail is being created by people—via phones, wearables, and digital diaries—there is an unprecedented possibility of monitoring stress levels and behavior patterns more systematically and in data form. In this article, an integrated strategy to the science of stress with both the physiological (e.g., heart rate, cortisol) and psychological (e.g., mood, cognition) measures is discussed. It presents recent findings and technologies used in stress detection and limitations of traditional methods relying on only subjective ratings. Our system capitalizes on user input such as daily stress ratings, mood journaling, activity journaling, and free-text notes to build a multi-dimensional representation of the user's mental condition over time. By applying machine learning algorithms such as Random Forest and LSTMs, we are able to detect patterns, anomalies, and patterns of routine and stress variation. Our prediction system does not only look in the past in time at stress, but also looks ahead to future cases of stress occurrence so that predictions can be made so that users can respond reactively. The main contribution of this work is putting together behavioral psychology, data science, and user experience design in a single platform that promotes mental wellbeing. uitive visualizations and system warnings provide actionable feedback in a manner that enables individuals to detect early warning signs and adjust their habits in response. It also provides new avenues for integrating such tools into workplace wellness initiatives, clinical monitoring systems, and personal mental wellbeing applications. By filling the gap between subjective stress perception and objective data analysis, this paper provides insight into the role of technology in shaping our perception and handling of stress in everyday life..*

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