

## REVIEWER'S REPORT

**Manuscript No.: JNHST-050**

**Title: Predicting Digital Addiction Patterns with Machine Learning for Personalized Mental Health Support**

### Recommendation:

Accept as it is .....

Accept after minor revision .....

Accept after major revision .....

Do not accept (*Reasons below*) .....

Reviewer's ID: JNJST-06

### Detailed Reviewer's Report

The paper, "*Predicting Digital Addiction Patterns with Machine Learning for Personalized Mental Health Support*," explores the growing problem of digital addiction and examines how machine learning techniques can be used to predict problematic digital behaviors and support personalized mental health interventions. The study is timely and relevant, given the increasing prevalence of internet, smartphone, social media, and gaming addiction, particularly among adolescents and young adults. By synthesizing findings from recent empirical studies, the paper aims to identify effective predictive models, important risk factors, and pathways for translating prediction into intervention. One of the major strengths of the paper is its comprehensive theoretical foundation. The author effectively integrates established frameworks such as the I-PACE model and reinforcement learning theory to explain the psychological and cognitive mechanisms underlying digital addiction. The discussion demonstrates how personality traits, emotional regulation, executive functioning, and reward-learning processes contribute to problematic digital behaviors. This interdisciplinary approach strengthens the paper by connecting machine learning applications with contemporary theories in psychology and behavioral science.

The review of machine learning methodologies is another notable contribution. The paper provides a detailed comparison of supervised learning algorithms such as CatBoost, Random Forest, and Support Vector Machines, highlighting their predictive performance across different studies. The discussion demonstrates that ensemble learning approaches generally outperform traditional methods, with CatBoost and Random Forest showing particularly strong predictive accuracy. The inclusion of feature engineering, class imbalance handling, and explainable AI techniques further enhances the technical depth of the review.

A significant strength lies in the identification of key predictors of digital addiction. The paper consistently highlights screen time, sleep disruption, social media usage frequency, depression, anxiety, stress, and behavioral inhibition as important predictive factors. The discussion effectively demonstrates that digital addiction is a multifaceted phenomenon influenced by behavioral, psychological, demographic, and computational variables. This comprehensive perspective provides valuable guidance for future predictive model development.

The section on personalized mental health support is particularly valuable because it moves beyond prediction to practical application. The author discusses clustering-based risk profiling, Just-in-Time Adaptive Interventions (JITAI), and integration with digital mental health platforms. These sections illustrate how predictive analytics can be translated into individualized interventions, thereby making the research more relevant for clinicians, educators, and digital health developers. The paper also demonstrates commendable awareness of ethical concerns. The discussion of privacy protection, algorithmic bias, fairness, and the risk of pathologizing normal digital behavior reflects a balanced and responsible approach to technological innovation in mental health. By acknowledging these challenges, the author avoids an overly optimistic portrayal of machine learning and highlights the safeguards necessary for real-world implementation.

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Despite its strengths, the paper has some limitations. It is primarily a narrative review and conceptual synthesis rather than an original empirical investigation. No new dataset is analyzed, and no machine learning model is developed or validated by the author. Consequently, many conclusions depend on findings from previously published studies. Furthermore, some sections are descriptive and repetitive, which occasionally reduces analytical depth. A more systematic review methodology and critical evaluation of study quality would have strengthened the scholarly rigor of the work.

Overall, the paper provides a thorough and informative overview of the application of machine learning in predicting digital addiction and supporting personalized mental health interventions. Its interdisciplinary perspective, strong theoretical grounding, detailed discussion of predictive algorithms, and consideration of ethical issues make it a valuable contribution to the emerging field of digital mental health. While future work would benefit from empirical validation and more systematic research methods, the paper successfully outlines a promising framework for integrating predictive analytics with mental health support systems.