

MACHINE LEARNING TOOL: A NOVEL COMPLEMENTARY METHOD FOR EARLY DETECTION AND BETTER PROGNOSIS OF BIPOLAR DISORDER

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Dear editor,

Bipolar disorder (BD) also known as manic depression illness (MDI) is one of the leading mood disorders in the world. It involves frequent episodes of shifts in mood, energy and activity level during manic phase, that not only hinders a person's productivity, relationships and physical health but also consistently increasing anxiety during depression phase can lead to overwhelming life situations such as self destructive thoughts and ultimately suicide amongst the patients (Librenza-Garcia et al. 2017). It has been estimated that around 46 millions of individuals were diagnosed with this psychiatric condition in 2017 (Saloni Dattani 2021), and since then the graph is predicted to increase by approximately two times in the up coming years. More importantly, the recent unprecedented Coronavirus disease 2019 (COVID-19) pandemic time has shown an acceleration of psychological and psychiatric consequences such as anxiety and stress related problems. Identifying generalized anxiety disorder, post traumatic stress disorder, depression, paranoia and environmental stressful conditions as precursors of BD, COVID-19 pandemic can be an intimidating response in increasing susceptibility of mood disorders such Bipolar disease is expected in the future. Consequently, the need for an early diagnostic tool for Bipolar disorder is of utmost importance in not only developed countries but also third world countries.

Many researches on BD diagnosis evaluated that it takes approximately 6 year from first onset of symptoms to make it permissible, but a recently discovered machine learning tool (MLT) reveals that it is no longer a concern. A supervised MLT uses algorithms that identify informative patterns such as multimodal neuroimaging, blood biomarkers, lifestyle data, generalized mental health quiz and medical history as features or attributes of BD patients to differentiate them from healthy individuals and analyze their data accordingly (Jakub Tomasik and 2021). Multiple cross-sectional, observational studies and reviews are conducted in order to evaluate the sensitivity of this tool and has reported accuracy level most ranging in 70%-90%, indicating a copacetic approach.

In the recent study of Sonkurt et al. (2021), to differentiate between bipolar patients and healthy controls using a broader neurocognitive evaluation and a novel machine-learning

algorithm they evaluated a data of 17 participants with diagnosed bipolar disorder type 1 and 19 healthy controls and found out that parameters separating bipolar disorder and healthy controls were in the areas of visual memory, executive functions and strategy determination with high accuracy of 78%. A similar study by Achalia et al. (2020), examined the performance of support vector machines (SVM) by analyzing 30 patients with BD type 1 by obtaining their structural, functional and diffusion tensor images of brain and neurocognitive measures. And found significant abnormalities that differ the BD patients from healthy individuals with an accuracy of 87.60%. Thus proving MLT as a significant diagnostic tool for bipolar disorder. In spite of being an efficacious resource of assessment, MLT has not gained a considerable attention globally. A study by Sharma M (2021), observed that MLT techniques for neuropsychiatric disorders have majorly been identified and studied by developed countries such as UK, USA and China, while neglected by other regions. Thus emphasizing and highlighting the need of further research in this field amongst the developing countries.

MLT is useful due to its ease of use, sensitivity, and specificity. It is an important diagnostic tool especially useful in resource-depleting times such as the COVID-19 pandemic. Widespread use of MLT will allow for earlier detection as well as a better prognosis for those diagnosed with bipolar disorder.

Acknowledgments: None.

Conflict of interest: None to declare.

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