Harmony: A Remote AI-based Monitoring and Prediction System for Manic and Depression Episodes in Bipolar Disorders

Ahmed, Sahar (School: City Schools)

Bipolar disorder (BD) stigma arises from patients' actions during episodes resulting in feelings of guilt and shame, which delays seeking treatment due to societal pressure increasing the risk of suicidality. Leveraging remote measurements, Harmony aims to support BD patients towards early recognition of BD episodes. Harmony incorporates an Early Warning System monitoring and analyzing various physiological markers, sleep patterns, and social rhythms to predict manic and depressive episodes, enabling early intervention and support to manage and prevent escalation of symptoms. Relying on interpersonal and social rhythm therapy core principles, Harmony includes a social rhythm metric tool that passively tracks patients' routines and analyzes data providing social and circadian scores to help predict depression phases and identify triggers. Harmony includes a compassionate companion: a cognitive behavioral therapy-based mental health support Chabot using the Egyptian Arabic dialect. Harmony was experimented on 30 (BD) patients with type I and II. A significant variance in social rhythms was observed between Harmony users and the control group (p-value < 0.0001). A paired t-test indicated a significant variance (p value=0.0038) in social rhythms during the first week of experimentation without using the Chabot and the final week while using it. Subgroup analysis assessed gender-based differences in app usage using an unpaired t-test (p-value=0.0314). A clinical study involving five participants was conducted to assess the fitness tracker's data. Future analysis will be performed via a machine-learning model currently being developed. Utilizing technology and tailored interventions, Harmony enhances the overall well-being and quality of life for BD patients.

Awards Won:

Third Award of $1,000

American Psychological Association: Complimentary student affiliate memberships

American Psychological Association: First Award of $1,500

University of Arizona: Renewal Tuition Scholarship