There is a popular saying, “Stress kills.” This statement can be true with repeated exposures to psychological mood dysregulation, which can lead to or worsen stress related conditions such as heart disease and cancer. Therefore, mobile ambulatory assessment systems are actively being developed for various psychological studies. However, to the best of our knowledge, there are very few being used for the detection of mood dysregulation with a continuous measurement collected in the natural environment. This research presents a new automatic machine learning pipeline, called Analysis of Mood Dysregulation (AMD), which is used to assess mood or emotional dysregulation caused by underlying psychological disorders, environmental factors, and daily activities. The data is collected by unobtrusive wearable sensors, without pre-calibration, worn by subjects in their natural environments.

In this research, we propose, build, train, and test multiple machine learning models for continuous prediction on rapidly varying and sporadic mood data. As a result, each model will predict whether changes in the physiological data represent mood dysregulation for each subject in the study. All models were trained using two weeks of physiological and self-initiated mood data collected from 22 subjects during their everyday lives. We found that creating time categories for each day improves the accuracy of AMD by more than 10%. Additionally, mood dysregulation during the afternoon and evening categories happens 60.54% more than the morning and night categories. We then analyze the relationship between time, physiological measurements, and mood dysregulation to develop a model that can predict mood dysregulation episodes with 93.31% accuracy. Moreover, to train and test the model yields an average total execution time of 35.66 seconds consisting of approximately 386,000 records for each user.