**Assignment 2: Scientific Writing**

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**Summary:**

**[Original]** Our project aims to see if emotional states can be predicted from wearable activity sensor data. Our classification model uses data collected from the Motivated Cognition and Aging Brain lab and includes measures of personality and behavior, demographic data, physical health metrics, activity tracking data, and functional brain connectivity

We determine a wearer’s emotional state along a two dimensional continuum: valence (positive-negative) and intensity (high-low).

**[Edited]** Our project is about determining if emotional states can be predicted from wearable activity sensor data. In order to achieve our goal, we seek to build a model which classifies emotion states using data collected from the Motivated Cognition and Aging Brain lab, which contains measures of personality and behavior, demographic data, physical health metrics, activity tracking data, and functional brain connectivity. We also projected a two dimensional continuum: valence and arousal, which represents the wearer’s positive-negative emotion and its intensity.

Desire for review: 5

**Paragraph from Draft:**

The Affect Valuation Index (AVI) is used to measure the difference between the ideal emotional state and the current one. According to Larsen’s (2000) model of mood regulation, the affective discrepancy of actual and desired affect is the central determinant of affect regulation [8]. For example, a larger discrepancy between actual and ideal low arousal positive emotions was associated with more physical health symptoms (Scheibe et al, 2013)[26]. We wanted to observe if there was any relation between the affective discrepancy reported before the experiment and the emotional states values reported during the same (Figure 6). We found that the discrepancy between an ideal state and the actual state before starting the experiment correlates with the average emotional state during the next 10 days for positive and low arousal positive emotions.

Desire for review: 5

**Paragraph from Draft**

**[Original]** ​Several studies have demonstrated the feasibility of stress detection from wearable biosensor data [11][12][13]. These previous stress detection systems have used physiological signals like heart rate variability, galvanic skin conductance, and respiration rate. One obvious limitation of previous work is that the biosensors used were designed for research purposes and are not practical. They are obstructive to daily activities, not easily wearable, and easily confounded by naturalistic environments. Bogomolov and colleagues[14] attempted to address the shortcomings of previous research by building a daily stress recognition system from mobile phone data, weather conditions, and individual traits. Using a multifactorial approach, they designed a person-independent statistical model with 72.28% accuracy. Bogomolov’s work is similar to our project in that they both use behavioral metrics (mobile phone data and fitness tracker data respectively) combined with data related to the transient environment and measurements regarding stable characteristics of individuals. Our work differs from Bogomolov and colleagues because we are not forgoing physiological measures all together and include heart rate measured unobtrusively. Our stress detection model also includes neurological data. Further, our measures of emotional state are self-reported measures of a person’s current feelings at the time of the survey, rather than a reflective subjective assessment of daily stress collected at the end of the day.

**[Edited]** ​Several studies have demonstrated the feasibility of stress detection from wearable biosensor data [11][12][13]. These previous stress detection systems have used physiological signals like heart rate variability, galvanic skin conductance, and respiration rate. One limitation of previous work is that the biosensors used were designed for research purposes and are not practical. These types of sensors are obstructive to daily activities, not easily wearable, and easily confounded by naturalistic environments.

Considering these constraints Bogomolov and colleagues[14] built a daily stress recognition system using mobile phone data, weather conditions, and individual traits. They develop a model, with a multifactorial approach, that reached a 72.28 % accuracy. Our work and Bolgomorov's are similar; both use behavioral metrics (mobile hone and fitness tracker data), stable characteristics of the individuals (personality surveys) and data related to the transient environment. Our work differs from Bogomolov and colleagues in the fact that we included heart rate measured unobtrusively and neuroimaging data. Further, Bolgomorov et al. used a reflective subjective assessment of daily stress collected at the end of the day; instead, we measure the emotional state of the subjects using a self-report of the person’s current feelings at the exact time of the survey.