How do Fitbit metrics correlate with anxiety and depression levels during COVID?

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Background

A systemic review of 21 observational studies with a total sample of 42,293 suggests that people who performed physical activity (PA)on a regular basis with higher volume and frequency showed less symptoms of depression and anxiety. Those reporting a higher total time spent in moderate to vigorous PA had 12–32% lower chances of presenting depressive symptoms and 15–34% of presenting anxiety.
It was found that anxiety rates decreased across waves during the COVID 19 pandemic whereas rates of depression did not change significantly.

AIMS: To investigate how activity levels correlated with anxiety and depression levels over time

Methods

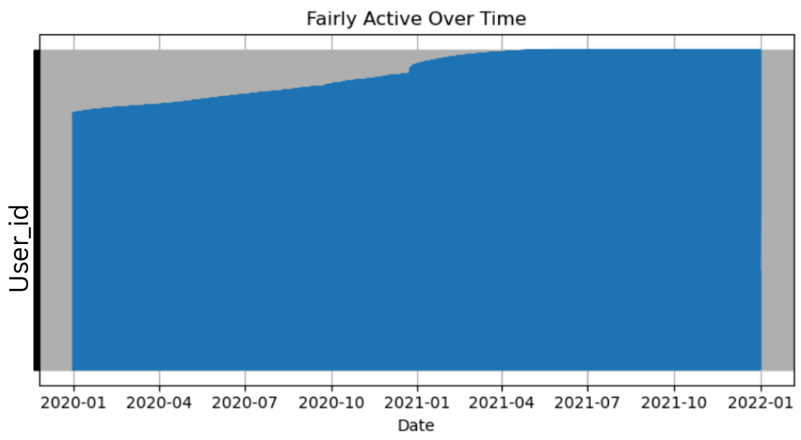
Prior to the internship: COVID Collab Study

Tele-health data collected from Fitbits, health apps(e.g. heart rate, sleep duration, step count, activity levels) and self reports(GAD-7, PHQ-8) from over 17,000 participants; varying in sociodemographic backgrounds.
Used python data engineering and analysis (pandas, numpy, matplolib,seaborn, missingno)
Extracted Fitbits metrics from Covid Collab Dataset
Investigated missing numerical values and conducted KNN and mean Imputation , merged Fitbit data according to user ID , filtered out implausible values. Also merged sociodemographic and self-report data
Normalise time intervals (e.g., daily, weekly) to align health metrics with mental health scores.
Time Series Plots: Overlay health metrics and mental health scores to spot trends and anomalies.

COVID COLLAB

(Estimated) Findings

- Gradual increase in physical activity levels between wave 1 and 2 , and from wave 2 to wave 3 shown by figure below
- Decreased anxiety levels from wave 1 to 2 people adapt to changes in their environment, but still overall elevated compared to pre-Covid anxiety and depression scores
- Overall higher depression levels compared to pre-pandemic scores but no significant differences between waves.



Discussions

Reasons for decreased anxiety between waves 1 and 2 could be due to adaptation to changes, also could be due to hidden benefits(e.g. not having to worry about costs of travel and childcare)or increase in physical activity levels
Higher levels of depression possibly be due to less movement during lockdowns
Limitations: Lots of missing data
Use of questionnaires means potential self-report bias
Implications: Potential for use in early intervention
Selection bias? Unlike RADAR that selects people who already have anxiety or depression, Covid Collab only had participants who had access to telehealth devices
People are unlikely to report when levels are high - imputation can skew data

Takeaways

I developed an in-depth understanding of python in the context of health data research,(used for feature engineering machine learning and prediction modelling
Further developed my resilience and problem solving skills
Gained more insight to the technical side of research

References

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