

Fig. 1 Number of daily unlocks

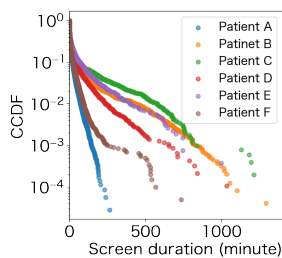


Fig. 2 Screen duration

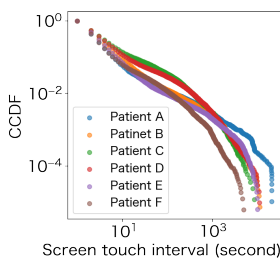


Fig. 3 Screen touch interval

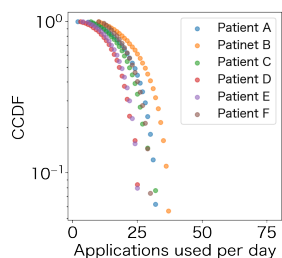


Fig. 4 Applications used per day

minutes, approximately 90% of the screen duration data is less than 200 minutes. Patients A and F show a trend toward the shorter duration of continuous use per unlock compared to other patients. When considered together with the results of 2.1, Patients A and F appear to have a tendency toward a higher number of daily unlocks for a shorter screen duration. Patients B, C, D, and E tend to use their smartphones for relatively long periods of time, and they all have one shared characteristic: problematic gaming. In comparison to these patients, Patient F, who has an Internet Addiction, rarely plays games. In addition, Patient A, who has problematic gaming, is a working adult and therefore never spends more than 5 hours continuously on smartphones due to the demands of his work.

2.3 Touch event interval

As shown in Figure 3, the CCDF of screen touch intervals exhibits a linear shape in the log-log plots. This indicates that the distribution of touch intervals can be modeled using a Pareto

Distribution, meaning that there is a large number of data with long intervals between touches.

2.4 Number of applications used per day

The results of the semi-log plots in Figure 4 show the CCDF analysis of the number of applications used per day. The slope increases for all patients as the number of applications increases. Patients A, B, C, and F also show a trend of using more applications per day, but all of these patients are suspected to have Attention-deficit/hyperactivity disorder (ADHD). It is typical for ADHD patients to be hyperactive and to quickly lose interest, which may account for their tendency to use more applications in a single day.

3 Conclusion

The main goal of this study was to show that statistical analysis of smartphone log data can successfully capture the overall characteristics and usage patterns of smartphone addiction. The results showed that this approach was effective in distinguishing between different types of addiction such as problematic gaming and Internet Addiction. Additionally, the log data revealed unique symptoms of developmental disorders such as ADHD. These findings suggest that smartphone log data could potentially be used for medical treatment and the automatic diagnosis of addictions and developmental disorders.

References

- [1] Beryl Noë et al. Identifying indicators of smartphone addiction through user-app interaction. *Computers in Human Behavior*, 99:56–65, 2019.