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A Statistical Analysis of Smartphone Addiction Usage Patterns

金 慧英†	浜村 俊傑‡	米山 暁夫 §	本庄 勝 ¶
早稲田大学	† KDDI 総合研究所	[‡] KDDI 総合研究所	[§] KDDI 総合研究所 [¶]
	小林 七彩『	治徳 大介 **	内田 真人 ††
	東京医科歯科大学『	東京医科歯科大学 **	早稲田大学 ††

1 Introduction

In recent years, smartphone addiction has become a serious social concern, especially among younger generations. Noë et al. revealed that user interface interaction events such as tapping, scrolling, and typing can be used to identify indicators of smartphone addiction [1]. Although smartphone log data can be used for analyzing the characteristics of smartphone addiction, many existing studies only focused on the factors that were related to addictions and limited to non-clinical samples. Therefore, this study aims to investigate the statistical characteristics of smartphone addiction, including the number of daily unlocks, screen duration, screen touch interval, and the number of applications used per day. The analysis is based on data from the smartphone usage logs of outpatients who regularly visited the hospital for their internet addiction. Patients were followed for periods ranging from a minimum of four months to a maximum of one year and eight months, making it the first long-term follow-up study in this field of research. Understanding the patterns of smartphone addiction and identifying the common features will be helpful in the treatment and prevention of addiction. A key finding of this research is that statistical analysis of log data can effectively capture the overall trends of smartphone addiction and identify characteristic patients.

2 Analysis Result and Discussion

2.1 Number of daily unlocks

Figure 1 shows a semi-log plot of the Complementary Cumulative Distribution Function (CCDF) analysis for the number of daily unlocks. The plots for patients B, C, D, and E are linear, while the slope for patients A and F increases up to 70 times and then becomes constant. Patients A and F unlocked their smartphones less than 70 times for 40% of the total days. Patient B had the most frequently unlocked smartphones, as shown by a constant slope up to 130 times and some days reaching over 130 times.

2.2 Screen duration

Figure 2 shows the results of the CCDF analysis of screen duration, which demonstrate how long patients kept using their smartphones after they unlocked their smartphones. While each patient exhibits a different trend starting at 200

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[†] Huiying Jin, Waseda University

 $^{^{\}ddagger}$ Toshitaka Hamamura, KDDI Research, Inc.

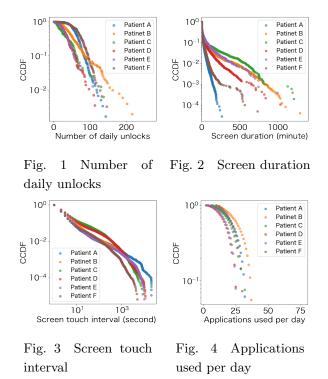
 $[\]S$ Akio Yoneyama, KDDI Research, Inc.

[¶] Masaru Honjo, KDDI Research, Inc.

Nanase Kobayashi, Tokyo Medical and Dental University Hospital

^{**} Daisuke Jitoku, Tokyo Medical and Dental University Hospital

^{††} Masato Uchida, Waseda University



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 loglog 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 Attentiondeficit/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

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