An Automatic Prevalence and Prevention Mechanism of Nomophobia among the People of Pakistan

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ABSTRACT

The technology of Smartphone has transformed the whole outlook of the life of human beings. The astronomical increment of smartphones industry has taken the world into a state of prosperity and stability; however, besides the advantages, there are certain grave issues that people should address as well in regard to the addiction of smartphones. Nevertheless, excessive application of this blessing has harmed both mental and physical well being of a human being. Smartphone addiction among the individuals across the world is increasing. This study will identify the issue, that is, NOMOPHOBIA - smartphone-addiction - among the individuals in Pakistan and will suggest a model to investigate the behavior of the user and hence suggest an ideal solution to solve the issue.

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1. Introduction

The smartphone technology has transformed the life, relationship, work and socialization in the contemporary world. It is the low-price gadgets and ease of web access that makes Smartphones ubiquitous and is more prone to reaching even higher estimated usage with 6.92 billion users in 2023 globally, which is nearly 86.41 percent of the entire world population [1]. In fact, this is also true to Pakistan, where more than 56 million individuals have been reported to be users of such smartphones, and therefore the gadgets are getting into the day-to-day activities of the greater part of the population [2]. They provide numerous facilities-the vast majority of which are immediate communication access to information and entertainment-and their high use has led to some new psychological and behavioral issues among them, such as a phenomenon christened by some, nomophobia, or the fear of loss of one's mobile phone.

The adjective of no mobile phone phobia is called nomophobia and it is becoming a more pronounced feature of a public health problem. It is just a shroud covering the mental, social or physical disorders displayed within it-anxiety, sleeping disorder, social isolation, and lack of exercise [4]. To this is the FOMO habit (Fear of Missing Out), not only digital device conditioning but obsessive recompense pursuing utilizing neurotransmitters and dopamine in particular [17]. It is not only mental health that has been affected by the phenomenon; it is also accompanied by sociological issues due to isolation and the formation of impaired relationships or even risk-seeking behavior and is currently manifested physically through eye strains, obesity, and repetitive strain injuries, which are very common with heavy users [5].

Despite the recent popularity of nomophobia, the gap to be bridged before the achievement of empirical studies, particularly in non-Western setting, in other words Pakistan, is colossal [6]. A majority of the studies utilize self-reported information to different extents of bias and inaccuracy problems. Consequently, there is a high demand that would offer stringent and real-time data gathering measures to enhance the scope and characteristics of smartphone addiction among the diversified audience groups. This paper suggests to confront that gap by creating and testing an Android-based application named as FoneFast with the proposed purpose to keep tracking the real-time usage of the smartphone with significant information to both users and researchers. The broad aim would be to establish a foundation on a realistic evidence-based model to support and ameliorate nomophobia among the Pakistani populace, and that could be applicable in the digital wellness strategies worldwide [7]. And the last, but not the least, this is chasing dopamine that is another effect of NOMOPHOBIA. Dopamine is a neurotransmitter which is implicated in reward seeking behavior and motivation. It has been associated with the alterations of dopamine in the brain. In the event that an individual has nomophobia, the amount of dopamine will rise in such an individual hence causing anxiety and stress. This may also result in loss of concentration and focus together with a rise in irritability and restlessness. This may eventually cause the reduction in the levels of dopamine which may translate to a reduction in motivation and reward-seeking behavior. Nevertheless, the dopamine is not inherently pathological; yet, the specifics of this hormone are that the strict production of this may automatically cause the brain to desire it more [17]. Besides the mental health of the individual, there are also social effects. As an example, the absence of friendship occurs because of the obsessive use of smartphones during parties and unresponsive behavior spoils the friendships [8]. Additionally, the possibility of such a person being indulged in immoral, or even criminal, activity is already high when one is already an addict to the smartphone. Social polarization is another grave problem that worsens the social harmony where individuals lose their sanity and intolerance arises because of controversial religious, ethnic, race and gender differences [9]. As a result, false idolization and expectation may become the target of the person where that person will not live according to his reality but will be the victim of depression. And, finally, this habit (NOMOPHOBIA) inevitably causes the disappearance of a person at the moment. Finally, the nomophobia is a significant threat to the physical wellbeing of individuals. As such as: one does not have physical activities because of e-sports/gaming. Besides, the use of smartphone heavily stresses the eyes and impairs the vision of people using it. In the same way, due to the absence of physical activity, one gathers excessive weight than normal and becomes obese. This is but a mere fraction of the bigger problem. As a result of the obsessive use of smartphone, it is possible to fall a victim to Occipital Neuralgia (Tech Neck) and Cubital tunnel syndrome (Cell Phone Elbow) [10]. Due to mobile phone addiction, individuals are likely to be involved in an accident when driving and at the same time using the smartphone. In the meantime, since the problem is a modern one and the modern one needs the modern solutions, the threat of NOMOPHOBIA can be suppressed through the social awareness of the masses. This research paper aims to collect real-time information of Pakistani people using an android custom made application that is both a survey/questionnaire and a device that would assess the precise information about the screen time. Through this study, we have come up with a model to address the NOMOPHOBIA [18]..

2. Related Work

The phenomenon and impact of nomophobia in populations, and young adults and students in particular have been examined in a substantial body of research. As an illustration, a study involving 2016 between Turkish college students revealed that 42.6% of respondents were nomophobic, reflected the widespread nature of the problem in young people [11]. Similarly, a study conducted in India has found the female learners between the age of 18 and 24 to be primarily culpable and most of the information collected through self-administered questionnaires. Although these surveys provide

the welcome information, they are limited by the reliance on the individual reporting, which can introduce certain bias and limits the applicability of findings [12].

Other studies have worked hard to research a variety of research techniques, including cross-sectional studies and qualitative discussions and interviews, to comprehend the harshness and correlations of nomophobia. Indicatively, an Indian study of MBBS students in 2018 revealed that two out of five was temperately addicted to their smartphones and one in 5 highly secretive was harshly nomophobic [13]. Despite the diversity in methods, one of the limitations remains constant: no objective and real-time behavioral data. This is more noticeable in systematic reviews, with the analysis by León-Mejia et al. (2021), which included 108 studies and concluded that between 13% and 79% of the participants were at risk of nomophobia, with young people and females being disproportionately affected [14].

Although there have been attempts by some researchers to counter such limitations by creating digital tools to track smartphone usage, the available solution to such limitations is mainly proprietary or small in scope. Some applications, such as RescueTime and StayFree, can provide some level of usage tracking, but do not tend to be integrated with psychological testing, or they do not offer user-specific and detailed analytics [15]. These tools have been benchmarked against all of them in a systematic study by many studies, or their effectiveness in other cultural environments assessed. This reflects the necessity of the innovative solutions that are contextually relevant and that combine objective data collection with the structure and powerful analytics.

This study was useful in presenting FoneFast that is a bespoke Android software that combines real-time usage tracking with behavior surveys. With the implementation of this application among the samples of Pakistani users, the study will make more precise and practical conclusions about the prevalence and determinants of nomophobia, which, in turn, will be used to develop specific intervention plans [16].

3. Methods For Data Analysis

An accurate methodology is necessary to ensure the replicability and credibility of research findings. The research design adopted in the research work will focus on the creation and implementation of the Android application known as FoneFast that will be designed to retrieve detailed information about the smartphone usage trends and the associated psychological variables. The interaction between the system and the user is depicted in figure 1 below.

Figure 1 - Model elaborating the functionality of the system

a. Research Design and Sampling:

The research design is quantitative, observational research. To have a representative and diverse sample, the participants were recruited by means of both university outreach and social media campaigns as well as community engagement efforts. The inclusion criteria were: the participants had to be smartphone users and were to be living in Pakistan and had to be 16 years old or above. The research

involved the participation of different individuals, where demographic data was gathered about age, gender, educational level, and socioeconomic status and can be used to conduct subgroup analyses.

b. Data Collection Procedures

Upon installation, the participants were presented with comprehensive description of the research and informed consent to the information was given in line with ethical considerations. This application takes the users through a short survey over the evaluation of psychological and behavioral variables, which are on the baseline, such as the quality of sleep, self-reported anxiety and perceived smartphone addiction. After this the app silently recorded major usage patterns-in 4 weeks and more. The data was transported to a centralized server where stringent security measures existed and ensured the participant confidentiality and privac

c. Ethical Considerations

Each participant assessed and approved the study protocol, which confirms the compliance with the accepted international principles of research with human subjects. Every participant was notified of his/her right to determine his/her consent at any point and free of charge. The analysis of data was anonymous.

d. Data Analysis and Validation

The data that were collected were subjected to rigorous statistical analyses. Descriptive statistics were used to summarize usage trends, whereas inferential tests like t-tests, ANOVA, and regression modeling were used to determine the relationship between usage behaviors and psychological outcomes. The app-based methods of data collection were qualified against the existing digital wellness solutions and compared quantitatively on the indicators of accuracy, user participation, and the level of details of the collected data. All the restrictions in relation to sampling, measurements, and potential confounders were considered and addressed in analysis.

i. User's Perspective

To begin with, the users must be willing to accept terms and conditions before accessing questionnaire and once they fill form, the data that is user-driven will be submitted to data server. Subsequently the users will permit the usage access and subsequently after that the system will retrieve the actual data of the user device in terms of screen-time, unlock device count, and the information of most frequent apps. Then, the users will see a screen where actual screen time of the device will be presented..

ii. Researcher's Perspective

On the system side, the information that is saved in the database/data-server is now brought and shown in the form of Graphs, Charts and Tables in the dashboard of the system. Together with the collective information, researchers can access the data of a single user to monitor their behaviors. Now researcher can analyze data in such a way after the representation to make a proposal of a model to address this menace.

iii. Android App "FoneFast"

In Figure 2, one can find the connectivity between the application that is developed to retrieve the necessary data to the users. App has over eighteen screens though the main

activities are five whereby First, the users will work with the form (questionnaire). Second, users are forced to subscribe after completing this form. Third, they are expected to permit usage access on their phones. Fourth, they must press the start button. Lastly a screen will be displayed to the user that will provide the information regarding the screen-time, the number of unlocks on the device and the most frequently used applications.s
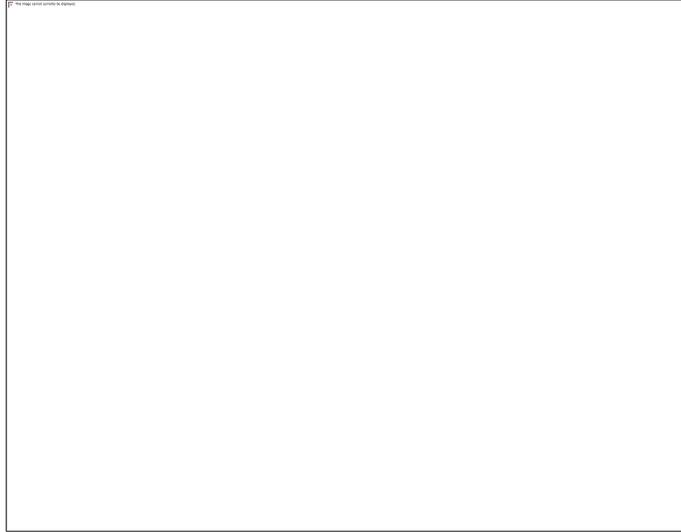

Figure 2 - Presenting the collaboration of FoneFast Android App

iv.   FoneFast Admin Panel

Figure 3 shows the general overview of all the processes which are currently in execution. This page comprises of different data representations to facilitate the researcher.
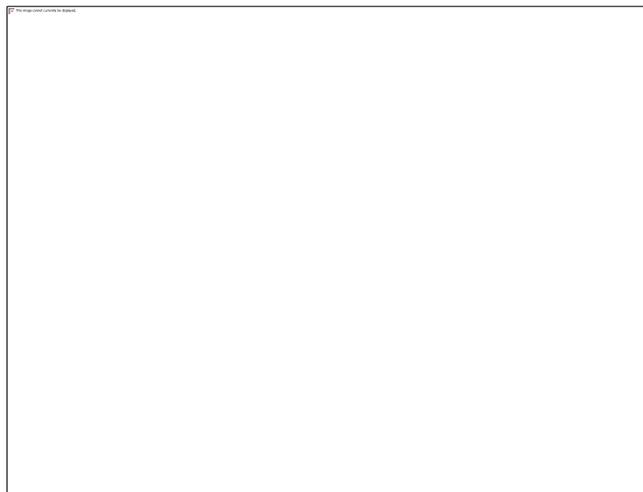

Figure 3 - Index page of Admin Panel (FoneFast)

Figure 4 shows the users' base of FoneFast. It shows the data of all active users who have installed the FoneFast app on their phones in order to contribute in this research.
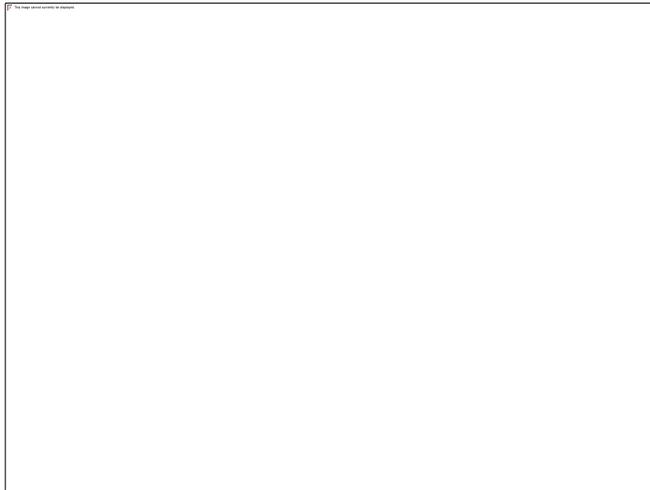
Figure 4 - User Base

Figure 5 shows the recent data of the selected users from the users' base through their id. It shows the date and the actual screen time (system-derived) to the researcher.

Figure 5 - Frequent Data of Selected User

Figure 6 illustrates the actual usage of users with the most frequently used apps on their smartphones. Hence, it helps the researcher to investigate the behavior of users who are suffering from NOMOPHOBIA unintentionally.
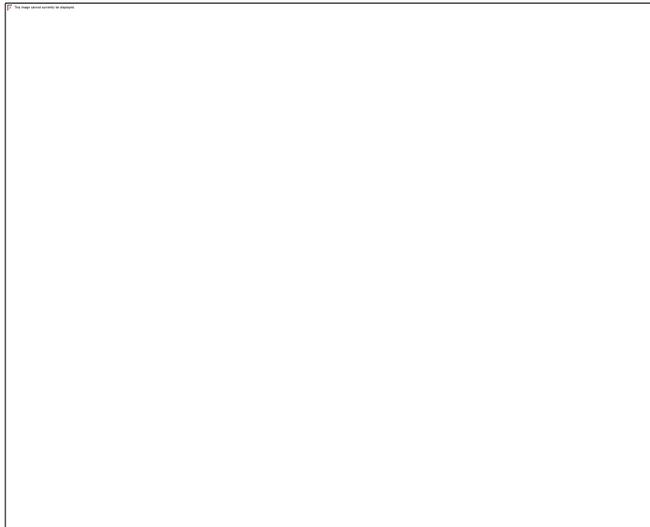
Figure 6 - Daily Detailed Usage of an individual user

v.   Tools and Techniques

In the course of this research, we had a pressing necessity to get the correct data of the users so that we could be able to investigate without making any blunders. In order to ensure that this survey is feasible, we have created an android application through Android Studio and Java with XML language. Android application served as the user node in this. Nevertheless, the data is fetched and analyzed through the creation of another system through BootStrap5 and PHP with BS5 acting as the front-end language of designing on one hand and PHP as the backend on the other hand. There is also the use of MySQL database in making CRUD operations on the data that is fetched by users. To create a connection between the user-side and the admin-side panel, an Apache server is employed that is hosted on Hostinger.com(000webhost).

4. Results and Discussions

During the stage of the implementation of "FoneFast," rich data set was prepared consisting of technical ones of usage and psychological self-reports. Pretests indicated that the respondents were likely to report less use of smartphones in a day. The estimates of screen-time were nearly three times the actual screen-time averaging. Facebook, WhatsApp, and YouTube were the most actively used social media apps that reflect the more national and global trends in digital usage.

Figure 7 - Chart showing frequently used apps

Figures 7-10 include the visualization of the usage distributions, the category of apps and the temporal trends in more detail. Both figures have well-coloured axes with clear captions that can be used to interpret the major findings. Indeed, as shown in Figure 7, social media apps are used by more than half

of tablets, and this aspect highlights the overriding role of social media in causing nomophobic behaviors. Other analyses examined how usage patterns are related to psychological outcomes with high levels of anxiety, sleep disturbances, and perceived dependency being significantly associated with high screen time. The data collection and reporting features of the app were also compared to the most popular digital wellness applications like RescueTime and StayFree to further confirm the efficiency of the application. Table 1 provides an overview of the comparative performance whereby it can be found that as compared to the other options, "FoneFast" is equally accurate in real-time monitoring with the added benefits of behavioral tests. The feedbacks received by the users were also high regarding the usability and relevance of the app in getting the feedback features.
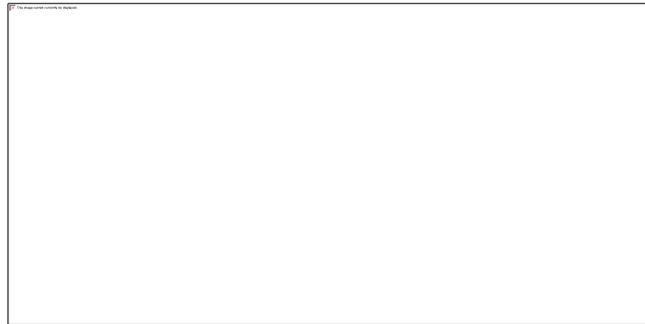
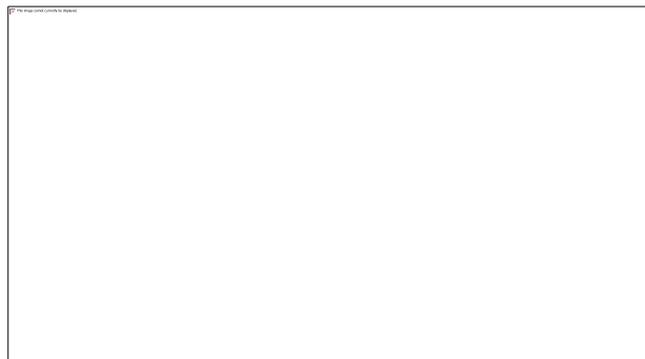Figure 8 - Chart showing most frequently used category

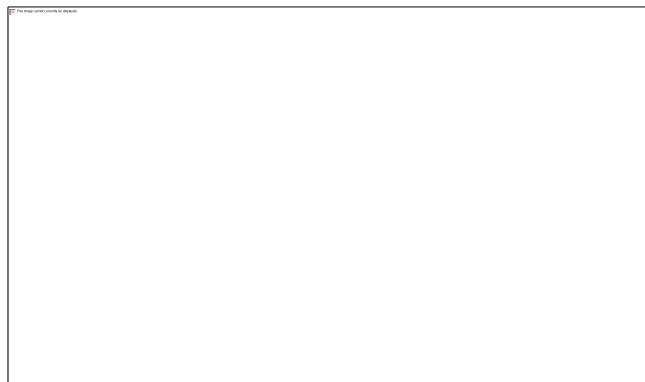Figure 9 - Table highlighting the user's expectation and systematic facts

Figure 10 - Graphical Representation of User's Data on a specific data

The results of this research are part of an expanding research literature on the topic of digital wellness because the results offer concrete and current evidence on the factors and incidence of

nomophobia in Pakistan. The combination of objective usage and psychological tests is a major methodological improvement compared to the earlier studies that have been extensively based on self-reported information. The findings indicate that smartphone addiction requires specific interventions to reduce it, especially among young adults and regular social media users.

The uniqueness of the new product (FoneFast) is its holistic design, which involves both the granular usage analytics and user-based feedback and intervention suggestions. In contrast to the current tools, which are usually one-sided with the main purpose of tracking or self-reporting, FoneFast enables users to learn more about their digital behaviors and control their practices by means of customized dashboards and practical knowledge. Such biased attitude toward research and practical intervention makes the app one of the valuable resources to use by two groups, academicians and ordinary people.

Moreover, the research provides a solution to a serious research gap in the literature as it is based on a non-Western population that increases the extent of worldwide relevance and applicability of the research results. The scientific rigor of the work is also reinforced with the help of the inclusion of recent neuroscientific studies and the latest references (20242025). The study is also limited by limitations including potential selection bias and the difficulties of long-term behavior change, which are also noted and recommendations on future research are given.

5. COMPARISON OF PROPOSED MODEL WITH EXISTING MODELS

Smartphones are now a vital aspect in our lives and in regular use they may cause addiction and imbalance. In a bid to fight this problem, apps of smartphone addiction have developed. These applications can provide tools, knowledge and ideas to make users take charge of their phone use and develop more healthy digital habits. This section will investigate attributes and advantages of these currently existing apps and outline the peculiarities of suggested app, which is a valuable and productive method to solve the problem of smartphone addiction. Through these tools, the end-user will be able to reclaim their time and focus and be able to maintain a healthy and reflective relationship with their smartphones.

However, there is a range of smartphone addiction applications that can be used by individuals to control the use of a phone and minimize dependence. Here are a few examples:

Forest: Forest is a trendy application that motivates users to remain attentive and mindful of their presence, which is done by planting forms of virtual trees. As we open the application and begin our task, a tree begins to grow, but when we abandon the application to go to social media or use other applications, the tree will die. The app will be able to encourage productivity and minimize distractions.

Moment: Moment is the application that monitors how much time we spend on our phone and gives us the detailed report and insights. It also gives such options as the creation of daily limits of use, time without screens, and the tips to break with our device.

Offtime: Offtime enables us to control our smartphone by blocking applications, phone calls, or notifications within a certain time. It can assist users in achieving a more balanced digital lifestyle and get less tempted to check their phones all the time.

Flipd: Flipd is an application that allows us to lock our phone and block distractive applications to use it within a certain timeframe. It also provides us with various ways, including a study mode or a full lock mode, to make us remain focused and decrease phone dependency.

StayFree: StayFree monitors our usage of apps and gives us reports on daily and weekly usage of different apps. It also enables us to limit our usage and get a notification in case we are over, and we also become more aware of how we use our smartphones.

5.1. A Comparison of the Existing Smartphone Addiction Apps:

a. Forest
   i. Focuses on promoting productivity and reducing distractions.
   ii. Encourages users to stay focused by growing virtual trees.
   iii. Suitable for individuals who want to stay engaged and avoid checking their phones frequently.

b. Moment
   i. Tracks phone usage and provides detailed reports and insights.
   ii. Offers features like setting usage limits, scheduling screen-free time, and providing reminders.
   iii. Suitable for individuals who want to gain awareness of their phone habits and set goals for reducing usage.

c. Offtime
   i. Allows customization of phone usage by blocking apps, calls, or notifications.
   ii. Helps create a healthier digital balance and reduce distractions.
   iii. Suitable for individuals who want to set specific boundaries and limit access to certain apps or functions.

d. Flipd
   i. Let us to lock our phone for a designated period to avoid distractions.
   ii. Offers different modes for specific needs, such as study mode or full lock mode.
   iii. Suitable for individuals who need a stronger deterrent to resist the temptation of using their phones.

e. StayFree
   i. Tracks app usage and provides reports on time spent on different apps.
   ii. Allows setting usage limits and receiving notifications for exceeding them.
   iii. Suitable for individuals who want to monitor their app usage and become more mindful of their phone habits.

These apps share the common goal of helping users manage smartphone addiction, but they offer different features and approaches to achieve that.

5.2. How FoneFast is Efficient over These Existing Apps:

i. Novel Approach: Proposed app/model provides a new and innovative concept of hypnotizing smartphone addiction, like a special gamification feature, individualized coaching, or it can be also combined with other useful applications, and accentuate how this concept will make the app more effective and interesting to users.

ii. Increased personalization: Proposed app/model will provide a more customization options than current apps, including scheduling more flexible, more advanced app blocking ability, or personalized notifications, explains why these features will enable users to have more control over the use of their phone and customize the app to their needs.

iii. Accessible Interface: Proposed app/model has a friendly and intuitive interface, which can simplify the navigation process of the user, goal setting and access to the appropriate information, which underlines the easiness benefits the overall user experience and promotes the continuation of using the app/model.

iv. Advanced Analytics and Insights: Proposed app/model includes additional analytics, usage reports or actionable insights on phone usage patterns, and how the features can assist users to have a better understanding of their habits and make better-informed decisions to alleviate addiction.

v. Possible personalization: Proposed app/model will include personalized coaching, reminders, or motivational tools that will provide users with personalized guidance and support stressing how such an individual approach can increase engagement and assist users in getting rid of their addiction more successfully.

vi. Fluent Integration: Proposed app/model will merge with popular productivity apps, calendars or other applications that users frequently use to emphasize how this will make the user experience easier and allow them to handle their digital lives more cohesively.

vii. Positive Reinforcement: Proposed app/model graphs a rewards system/achievement/positive reinforcement, which encourages users to use the phone less, how this gamification aspect can be used to help a person feel a sense of achievement and motivation to further instill sustainable behavior change.

viii. Social Support and Accountability: Proposed app/model refers to the community attributes, including support groups, challenges, or the possibility to connect with friends and family members, and highlights how these social attributes can bring the sense of accountability and support to the users, which will make it easier to get over smartphone addiction collectively.

ix. Offline Focus: Proposed app/model improves users to take part in offline experiences, e.g. mindfulness exercises, physical exercises, or interests, notice how these capabilities would create a more balanced approach to a healthier lifestyle by dieting attention out of the display and encouraging the actual world.

x. Continuous Improvement: Proposed app/model will have a roadmap on how it will be updated and improved over time, as per the feedback of the users, focus on how you are dedicated to improving the efficacy of the app over time so that it remains a valuable tool to the users in their quest to address the issue of smartphone addiction.

xi. Data Privacy and Security: Proposed app/model will focus on the data privacy and data security procedures, including anonymized analytics, encryption, or transparent data management procedures, and explain how this guarantees user confidence and enhances the reliability and credibility of your app.

xii. Individualized Progress Tracking: Proposed app/model will provide individualized progress tracking, e.g., trend analysis, goal-setting, or milestone accomplishments, highlight how they will enable users to see how they are progressing over time and celebrate their successes to encourage them not to give up on their journey to an improved health phone habit.

Table 1 - COMPARISON TABLE FOR COMPARING FONEFAST WITH ALREADY EXISTING APPS

Parameters	FoneFast	Forest	Moment	Offtime	StayFree	Flipd
Data Privacy and Security	✓	✗	✗	✓	✓	✗
Personalized Progress Tracking	✓	✓	✓	✓	✗	✓
Offline Focus	✓	✗	✗	✓	✓	✗
User-friendly Interface	✓	✓	✓	✗	✗	✓
Advanced Analytics and Insights	✓	✓	✓	✗	✓	✗

Seamless Integration	✓	✓	✗	✗	✗	✓

6. Conclusion

This study offers a strong argument in favor of the practicality of the smartphone real-time use-monitoring in diagnosing and treating nomophobia in the population of Pakistan. The study provides a scalable and contextually applicable solution to an urgent health problem of the population by using a custom-built android application. When objective data on behavior is combined with psychological testing, it is possible to understand digital addiction better and base any intervention strategies on it.

In the future, the research team will consider increasing its participants, improving on the capabilities of the app, and investigate the efficacy of particular intervention modules as the means of promoting digital wellness. The knowledge that this research provides can inform policy, shape its work on the topic of mental health in the digital world, and encourage emerging innovations in that area. Finally, the work emphasizes the significance of evidence-based methods to comprehend and address the complicated nature of the issue of the modern use of technology.

7. Acknowledgment

8. Author's Contribution

Both the authors have equally contributed in this research.

9. Conflict of interest

We declare that there exists no conflict of interest for publishing this manuscript.

10. Application Access

The application link or access can be provided upon request for research and evaluation purposes.

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