Automated App Limits

Predicting if individuals are overusing smartphone apps

The Alan Turing Institute

Overview

A team of developers working for a smartphone manufacturer have been tasked with creating a notification system, which uses machine learning to predict when users are at risk of "over-using" their devices.

This service is available for everyone but targeted towards vulnerable users with pre-existing and diagnosed mental health issues, such as gambling addiction or bipolar disorder. In such instances, the underlying mental health issue is strongly associated with problematic patterns of usage, such as finanical difficulties from monetised games or gambling apps.

When a device identifies patterns of usage that are likely to be problematic, it notifies the user and requires them to carry out additional steps to continue using the device. For instance, it may inform the user that use of a social media app has exceeded a pre-specified threshold or is being requested at a time of day that is unexpected for the particular individual. The service is entirely opt-in and can be deactivated by the user at any stage.

The developers are struggling to decide on how the notification system should be designed and implemented. On the one hand, the very goal of this system is to reduce the ability of the user to engage in activities they have determined to be problematic, based on an automous choice. However, when the user encounters the notification, they may be in a different emotional or psychological state, choose to override it, and then later regret doing so.

Key Consideration

An automated restriction made at a specific point in time may align with the previous attitudes of the user, but cause tension with their current desires.

If the user suffers from mental health issues, such as episodes of mania or addictive behaviours, evidence of this misalignment can exacaberbate symptoms.

Deliberative prompts

1. **How do you think the developers should navigate the trade-off between respecting the user's autonomy in the present (e.g., enabling them to override their pre-commitment to limit usage) and respecting the user's original intent to restrict access (e.g., requiring them to carry out additional steps and confirm they are in a fit state of mind).**

2. **Are the developers acting in a responsible manner if they make it very difficult to override pre-commitments?**

© The Alan Turing Institute

Datasheet

Category	Details

Available Data	• Data collected from user's smartphone, including:
	  • daily usage (minutes)
	  • apps used
	  • time of app use (hour of day)
	  • number of overrides of notifications
	  • purchases made
	  • location data
	  • touchscreen interaction data
	• User feedback about perceived value of service

Analysis Techniques	• Neural network (deep learning) that infers whether the user is engaged in "worthwhile" activities or "problematic" usage. These labels are in part determined by the feedback the user provides (e.g., they are asked to confirm if their usage is "worthwhile" at regular intervals) as well as anonymised data from similar users.

Groups, Organisations and Affected Individuals

1. Service users
2. Developers
3. Smartphone Manufacturer

© The Alan Turing Institute