

Wandering as CLOUDS: Designing Soft Nudges for Mood Logging and Reflection on Smartwatches

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Figure 1: The user flow design for mood entry in the CLOUDS smartwatch app. Mood entry begins with the user selecting a general mood category, such as "Positive," or "Negative." Once a category is chosen, the user narrows down their mood state by selecting a more specific mood within that category, like "Satisfied" under Positive or "Helpless" under Negative. After selecting a specific mood, the user adjusts the intensity or magnitude of their mood using either a touchable slider or the smartwatch crown. Following this, the user has the option to either finish and save the mood log or continue to explore personalized insights generated by ChatGPT, which are based on their mood data and contextual information.

Abstract

Mood plays an important role in shaping individual life experiences, and mood tracking has gained great attention within personal informatics research. However, existing mood tracking solutions, which are typically smartphone-based, face several limitations, including notification fatigue, low user engagement, and inconsistent user input. These challenges often arise from the intrusive nature of smartphone notifications and the fact that smartphones may not always be immediately accessible. To address these issues, this study explores the potential of a smartwatch-based solution. We designed and prototyped the CLOUDS app, which leverages nudge theory to create a more seamless and effective mood tracking experience. It also incorporates generative AI to provide personalized narratives to encourage deeper self-reflection on mood.

CCS Concepts

• **Applied computing** → **Consumer health**; • **Human-centered computing** → **Ubiquitous and mobile computing design and evaluation methods**.

Keywords

Mood tracking, self-tracking, smartwatch, nudge, personal informatics, wearable computing, mHealth

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1 Introduction

*I wandered lonely as a cloud
That floats on high o'er vales and hills,
When all at once I saw a crowd,
A host, of golden daffodils;
Beside the lake, beneath the trees,
Fluttering and dancing in the breeze.
...
For oft, when on my couch I lie
In vacant or in pensive mood,
They flash upon that inward eye
Which is the bliss of solitude;
And then my heart with pleasure fills,
And dances with the daffodils.*

William Wordsworth, *Daffodils* (1802)

Mood tracking is a deeply personal and context-dependent activity. Despite the significant influence of mood on daily experiences, many people find it difficult to consistently reflect on their moods. This has led to growing interest in developing personal informatics tools that can support sustained mood tracking, a topic that has garnered considerable attention within the HCI and digital health communities. However, existing solutions, which are predominantly smartphone-based, rely heavily on notifications to capture user attention. These notifications can often be intrusive and anxiety-inducing [5], a concern we aim to address.

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Figure 2: Three types of cloud visuals serving as subtle cognitive cues, gently nudging users to log their mood. Left: Green cloud with dual message (icon and text); Middle: Green cloud drifting across the screen (icon only); Right: Motivational messages (text only).

A promising alternative platform for mood tracking is the smartwatch. Over the years, smartwatches have proven to be valuable tools for health tracking [6, 9–12]. They are capable of collecting real-time behavioral and environmental data, which have been shown to correlate with mood fluctuations and coping strategies [14]. Furthermore, smartwatches offer the potential to encourage quick micro-interactions throughout the day [7]. However, their small screen size poses a design challenge. Crafting an effective smartwatch application requires optimizing interactions for limited screen space and incorporating intuitive input methods, such as gestures and voice [7]. Although mood tracking on smartwatches holds great potential, there is a notable gap in designing applications specifically tailored for this platform.

In this study, we designed and prototyped a smartwatch app named CLOUDS, aimed at enabling frictionless mood tracking by integrating nudge theory [4]. Our design optimizes the smartwatch UI for ease of use, while leveraging generative AI to deliver personalized narratives for self-reflection. Instead of relying on explicit notifications to prompt users to log their moods, the app employs passive nudges on the watchface to reduce obtrusiveness and coercion. The design prioritizes usability by utilizing icon-based interfaces and the watch crown for precise mood selection and rating. Furthermore, the app processes rich contextual data, such as time of day, location, heart rate, weather, and historical mood data, and utilizes a large language model (LLM) to generate personalized, narrative-driven insights. By focusing on digestible, personalized reflections rather than raw numbers, the CLOUDS app aims to help users gain a deeper understanding of how their mood patterns and influencing factors over time.

2 Related Work

Many different types of tools have been developed to support mood tracking. The simplest is bullet journals. They offer users a flexible, personalized way to visually document their emotional states on paper. These journals often incorporate various artistic and aesthetic designs, making the tracking process both engaging and introspective. While bullet journals are highly customizable, they are paper-based, which can limit the analyzability of the data [3].

The advent of smartphone apps has further expanded mood tracking capabilities [18]. Several apps, including MoodPanda[17], MoodMap[15], and MoodPrism[16], offer convenient platforms for users to log their moods and analyze mood oscillation trends. These apps often include additional features such as daily prompts, visual mood graphs, and even recommendations based on mood data.

Automatic mood tracking systems such as MoodScope [13] have also been developed. These tools measure mood through behavioral cues and attempt to correlate emotional states with patterns in user behavior, such as activity levels and social engagement. However, a significant challenge with this approach is determining whether universal patterns exist that can reliably map behavior to mood, which may contradict recent findings in psychological research [2]. In addition, users may be hesitant to trust automated mood tracking systems [14].

3 Design

3.1 Overall Design Concept

The CLOUDS smartwatch app was designed to provide an intuitive and efficient method for users to log their moods directly on their smartwatch. Considering the constraints posed by the small screen size and short interaction duration typical of smartwatch use, the UI prioritizes ease of touch and glanceability. The design employs large icons and fonts, as shown in Figure 1-3, ensuring that users can easily interact with the app even during quick checks. The app also leverages the hardware capabilities of the smartwatch, such as the rotating crown, to achieve tangible interactions. This allows users to interact with the page scrolling and a circular slider to quickly select or adjust their mood status. The intuitive use of the watch crown facilitates swift mood logging, preserving the quick-check nature of smartwatch interactions. As shown in Figure 1, the user flow begins with selecting the general mood category (i.e., negative or positive), followed by choosing a specific mood, adjusting the intensity, and then receiving personalized insights generated by ChatGPT. A demo of the CLOUDS prototype can be accessed at [1]. The following sections provide a more detailed description of the app features.

3.2 Wandering Clouds on Watchface as Nudges

To facilitate mood tracking, the CLOUDS app integrates a dynamic watchface that displays animated visuals of drifting clouds or still motivational messages. These visuals serve as subtle cognitive cues, gently prompting users to log their moods. The cloud animations were chosen for their metaphorical connection to emotions—representing the ever-changing nature of mood and feelings. The design ensures that the visuals remain visible but not intrusive, giving users a consistent yet non-coercive reminder to engage with the app.

The visuals are interactive: users can tap the cloud or message on the watchface, which then directs them to the mood logging interface of the app. Inspired by previous research on smartwatch data representation [8], we designed three distinct visual styles to cater to different user preferences:

- **Green Cloud with Dual Message (icon and text):** This hybrid design combines a calming green cloud icon with motivating text. The dual-message format encourages both engagement and emotional awareness (Figure 2 left).
- **Green Cloud (icon only):** A minimalist design featuring a calming green cloud that drifts across the watchface, symbolizing a neutral or positive mood. This design utilizes the cloud icon alone for a serene effect (Figure 2 middle).
- **Motivational Messages (text only):** This design presents an encouraging message, with different phases shown at various times of the day. Examples include "Every sky tells a story", "The clouds always pass", "In every cloud, a silver lining", and "Skies change; so can we". This text-based approach promotes a more reflective interaction without any accompanying icons (Figure 2 right).

3.3 Color-coded Mood Clouds

To visually represent different mood states, CLOUDS utilizes a color-coded system of clouds. Softer hues are used to denote milder moods, while more saturated colors represent more intense moods. This creates a nuanced and easily interpretable depiction of mood variations. The color coding helps users quickly identify their mood status at a glance, providing an intuitive way to assess mood without needing to read text-based information, which can be difficult on small screens. By using this color-coded design, the CLOUDS app improves visual accessibility, as over time users may develop associations between colors and moods.

3.4 Tangible Interaction

Beyond typical touch screen interactions, CLOUDS also leverages the hardware components of the smartwatch, particularly the rotating crown, to provide users with more tactile ways to interact with the app. This feature allows users to scroll through mood options or adjust the intensity of their mood states by rotating the watch crown. This tangible interaction offers a precise alternative to touch-based interactions, and make mood selection and rating more intuitive and engaging.

3.5 AI-Driven Personal Insights

As shown in Figure 3, the CLOUDS app offers a 'Smart Insights' feature designed to provide users with personalized feedback after



Figure 3: AI generated insights using contextual data.

logging their mood. With a single tap, the app processes contextual data—including location, date, time, heart rate, weather, and past moods—and uses ChatGPT to generate a tailored, insightful response. These personalized narratives are presented in a friendly and suggestive manner, encouraging users to reflect on the potential mood-triggers and how their mood states might influence their physical well-being and daily experiences. We hypothesized that this feature offers users "food for thought". While the insights may not always be entirely accurate, they are intended to spark reflection, deepen self-awareness, and help users better understand their mood states and overall well-being.

4 Limitations and Future Directions

One of the key limitations of the current design is the assumption that all users are capable of accurately identifying and distinguishing between various mood states. This ability is highly individualistic, with some people finding it difficult to recognize or differentiate between more subtle or nuanced moods. Psychological research has consistently shown that emotional experiences are highly subjective and influenced by factors such as emotional intelligence, cognitive style, and life experiences [2]. This variability suggests that a one-size-fits-all approach may not be effective for all users.

To address this, future versions of the CLOUDS app should incorporate greater flexibility and personalization in the mood-tracking process. The app should allow users to customize the granularity of their mood clouds by selecting whether they prefer a broader, more generalized overview of their emotional states or a more detailed, nuanced breakdown of their moods. In fact, previous studies showed that even a two dimensional rating scale, one for negative and one for positive mood, may be sufficient to capture the day-to-day mood variations [18]. By offering this level of customization, the app can better accommodate individual differences and ensure that the tracking system aligns more closely with the user's unique emotional landscape.

Looking ahead, our team plans to continue developing the CLOUDS app toward a fully functional version. Following the completion of the implementation, we intend to conduct a randomized controlled trial (RCT) to assess the effectiveness of the app in encouraging regular and sustained mood tracking. Specifically, the trial will investigate whether the app can successfully nudge users to engage with the mood tracking feature, as well as explore the potential impact on emotional awareness, self-reflection, and mood regulation.

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