

Memento

A personal meme journal

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1 INTRODUCTION

Internet memes have been a prevalent part of digital culture for years. People use memes to address current events, relatable situations, personal stories, and more. The fact that creators make memes out of stories or events from their real lives that supposedly had an impact on them raises the question, whether memes can be a suitable means of processing emotion.

Past research suggests that expressive journaling can be helpful for processing events and emotions and through that have a positive impact on mental health [6]. Therefore, it is of interest to research, whether these two concepts can be combined, and internet memes could prove as a helpful addition to journaling and a tool for processing and dealing with emotions.

2 RELATED WORK

The idea of combining journaling with internet memes has been explored in Terzimehić et al. [9], where a simple app was created that could be used to create basic memes and combine them with a diary entry. The app was subsequently tested with 31 participants in a two-week study. Results indicate, that memes can be a suitable method of processing emotion. They seemed to be especially helpful and used for giving a positive, humorous spin on negative emotions, and resulted in these negative states of mind being perceived as less dramatic in hindsight [9].

Furthermore, the process of journaling was perceived as more enjoyable and motivating through the addition of memes [9].

These findings extend on the extensive body of research that has linked emotion regulation, and its promotion through expressive writing to mental health [cf. 3, 4, 6].

While these findings show the promising nature of internet memes in journaling, Terzimehić et al. [9] also pointed out a few limitations of their research.

The present project aims to build on the work from Terzimehić et al. [9] by rebuilding their app **MEMERY** from the ground up as **Memento**, a mobile app with the same concept but a significantly broader feature set. While the scope of the present work does not include conducting a user study, the implemented app contains fulfills all technical requirements to run a large-scale field study.

2.1 Improvements over MEMERY

There were several main improvements over the application from Terzimehić et al. [9] that were implemented.

2.1.1 Improved template selection. The present project includes a selection of meme templates that is collected from *imgflip.com* [1]. Each day, the 100 most popular meme templates of the day are collected and copied to our database, together with the top 100 templates of this month, and the top 100 of all time. This ensures that the selection of templates is much more up to date than in the MEMERY app, which was a complaint by the participants in Terzimehić et al. [9].

2.1.2 Expanded meme editor. Memento's meme editor implements an extended feature set when compared to MEMERY. While memes could only contain a single template which up to three captions (top, center and bottom) in MEMERY, memes in Memento are completely freely editable in a WYSIWYG editor. Captions and templates are theoretically unlimited and can be moved, rotated, and scaled freely around the canvas. This allows for combining, modifying and remixing existing memes, which is a central aspect of internet meme culture Ltd [7].

2.1.3 Custom templates. In addition to the expanded selection of established meme templates, Memento also allows for creating custom templates and adding them to the local library. These templates can be created directly by taking a picture or choosing an image from the device's gallery. Moreover, templates can also be created from the editor or from memes created in the past. This should further encourage the transformation and combination of existing memes [7].

2.1.4 Sharing functionality. MEMERY did not offer the possibility of sharing memes to other apps. This was criticized by participants in their study [9] and has therefore been implemented in Memento. Memes can be shared from the meme editor, or at any point after creation.

2.1.5 Data collection. Memento's data collection mechanism improves on the implementation found in MEMERY. Participants can

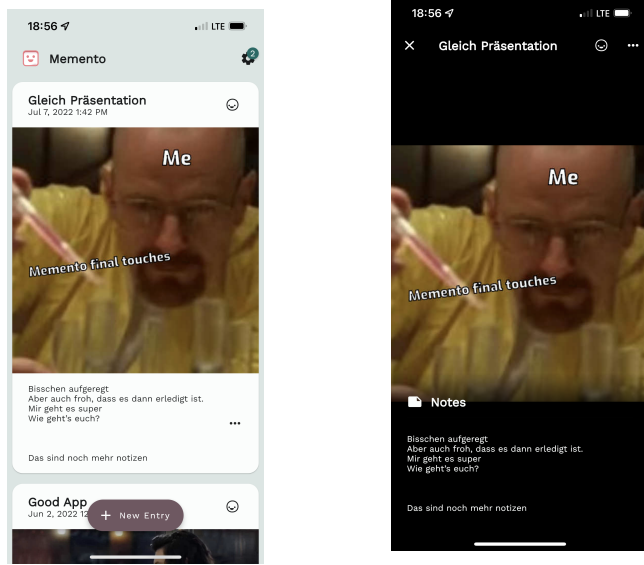
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(a) The main feed of entries

(b) A meme opened in detail view

Figure 1: The components of Memento's feed

theoretically partake in the study without any external supervision. They are registered anonymously and the collected data is not linked to their identity. Participants also have complete control over what they share at any point, even if they change their mind at a later point.

Furthermore, Memento collects additional information, like the reasons for revoking memes from the study, times for picking templates and elements, as well as the entire build up of the meme entries in addition to their final images. This data should theoretically allow for a more extensive analysis of the data.

2.1.6 Cross platform. Due to it relying on the Flutter framework [5], Memento can be deployed both on iOS and Android, while MEMEry was built as a native Android application and could therefore not run on iOS devices.

This should both allow for a larger sample size and a more varied demographic in potential studies.

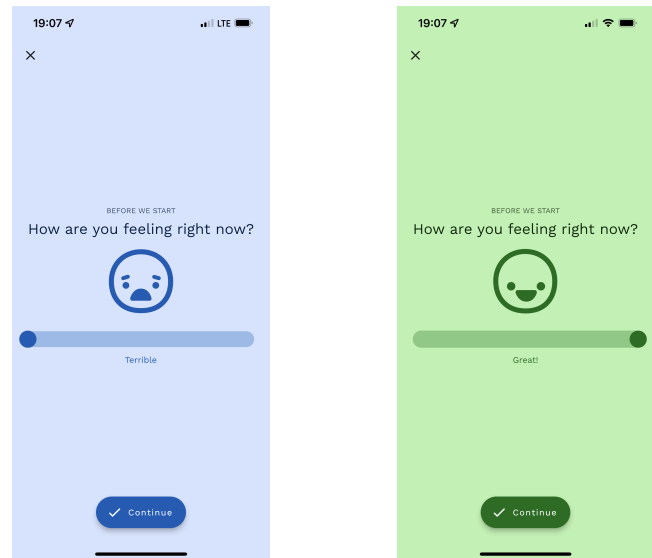
3 METHODOLOGY

The following section aims to outline the technologies and methods upon which Memento was built.

3.1 App build-up

3.1.1 Feed. The main page, and the first thing users see when opening Memento is the feed page, as seen in Figure 1a. This page presented all past entries in the form of an endless scrolling feed. Tapping on an entry in the feed opens a detail view, seen in Figure 1b, where users can inspect their meme more closely by zooming in, read their diary entry, and perform actions like sharing, deleting or turning a meme into a template.

From the feed page, users could press the "New Entry" button at the bottom to open the meme editor.



(a) Selecting "Terrible"

(b) Selecting "Great!"

Figure 2: The emotion picker

3.2 Creating an entry

3.2.1 Emotion picker. Upon opening the editor, users are first prompted to select how they are currently feeling. The selection range from "Terrible" (see Figure 2a) to "Great" (see Figure 2b). All the color shades on screen change depending on the selected emotion. This color scheme is kept through the entire meme editing process. Furthermore, the app's color scheme in all general screens reflects the average mood of the user across all the memes they created so far.

Furthermore, a simplified smiley face reflects the selected mood. This smiley face can be found on all past entries in the top right corner (see Figure 1), so users can always refer back to the way they felt upon their creation.

The emotion picker was purposefully placed before the meme editor, so that the editing itself would not have an effect on the recorded emotional state.

3.2.2 Meme editor. After selecting the emotion, the app moves to the meme editor, which displays an empty canvas at first (seen in Figure 3a). Here, users can add a variety of content to the canvas by tapping on the plus button in the bottom right corner. Users can choose to add from the following sources (see Figure 3b):

- (1) Meme Template
- (2) Image from Camera
- (3) Image from Gallery
- (4) Text caption

Added elements can be edited by expanding a sheet at the bottom of the editor (see Figure 3c). The options in that menu differ per element type.

3.2.3 Template picker. When choosing to add a meme template to the currently added meme, users are presented with the template picker, seen in Figure 4. Here, users can choose from their own

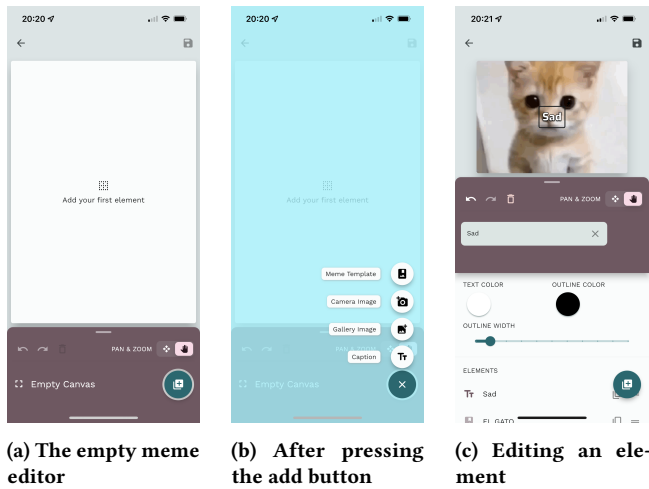


Figure 3: Different states of the editor.

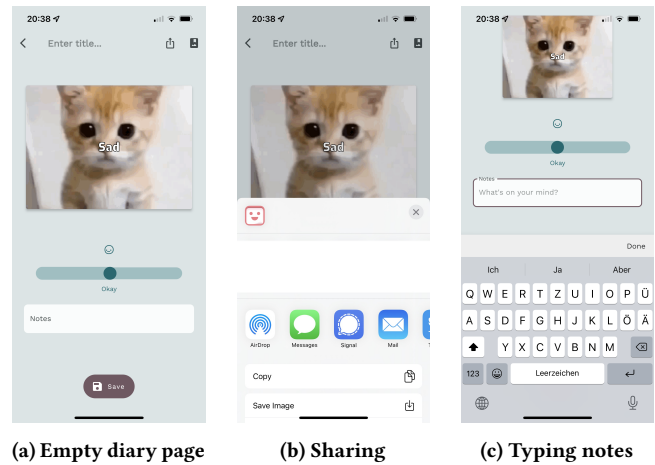


Figure 5: Notes field

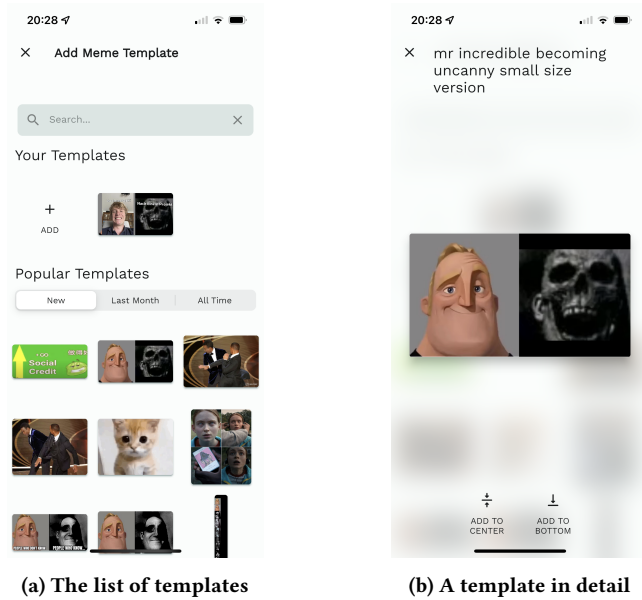


Figure 4: The template picker

templates, or templates obtained from Imgflip [1]. Imgflip templates are sorted by "Top New", "Top Last Month" and "Top all Time". Custom templates can be added from camera, gallery, or created memes.

Upon tapping on a template, users are presented with the templates title and can choose whether they want to add it to the center of the canvas, or extend the canvas and add the template to the bottom (see 4b).

3.2.4 Diary page. After users are satisfied with their meme, they can tap the save button in the top right. This takes them to the diary page, where they are asked to enter a title for their meme.

They also have the option to share the meme with other apps (see Figure 5b), or create a template from the current meme.

This page also houses the diary field, where users can write their actual diary entry in a multiline text field (see Figure 5c). After tapping the save button, the meme is saved in local device storage, uploaded to the backend if the user takes part in the study, and the user is taken back to the feed page. Users can additionally edit their picked emotion here.

3.2.5 Settings and Study participation. In addition to the main functionality, the app contains a settings page, where users can manage their participation in the study, share or revoke memes with the backend, or generate their reward code once they finish the minimum required study duration.

3.3 App framework and architecture

Memento was built entirely on the Flutter framework [5] using Dart as a programming language. No native code needed to be written, however certain functionalities (such as invoking the OS share sheet) required dependency on open-source packages that do so.

State management and dependency injection was implemented using the riverpod library [8] which made rapid iteration possible and helped keep the complexity in check.

3.4 Backend technology

The apps backend is entirely hosted on Firebase [2]. Authentication happens anonymously and Cloud Firestore security rules make sure that users can only access and edit their own data.

Firebase Analytics is used for tracking screen times and certain events like sharing and making templates.

To scrape the meme templates from Imgflip, a cloud function is triggered via a cronjob daily at midnight and stores the templates in Cloud Storage, while creating references to them in a specific Firestore collection.

Furthermore, Cloud Storage is used to store the finished memes for users that participate in the study. Again, rules make sure that users can only access and modify their own content.

3.5 Collected Data

This section provides an overview over the collected data and metrics. All data is collected anonymously and without any links to personal data or device identifiers.

Moreover, data is only collected for app users that specifically gave their consent. If users revoke their consent at a later point, data is deleted permanently.

3.5.1 Entries. This data is collected for each diary entry and reflects the actual content of the user's journal.

- Title
- Notes
- Completed meme as image
- Elements
 - Text (content and design)
 - Position on canvas
 - Template name

3.5.2 Usage data. The following general usage data is collected across the app.

- Duration per screen
- Selection duration per element
- Sharing with other apps
- Creating templates
- Reason for revoking memes (optional)
- Reason for exiting study (optional)

4 OUTLOOK

While the present provides a comprehensive framework for a user study on the usage of internet memes in the context of journaling, such a study itself is outside of the scope of this project. It is therefore up to future research to implement Memento in an actual study.

This could be used to gain insight into how memes help their creators process emotions, or which templates are used in which emotional states. Furthermore, as the participants require little to no oversight, large amounts of data could be collected with little to no extra effort, provided the app can be distributed to them and they choose to participate. This opens up more possibilities for training artificial intelligence on the connection between internet memes and emotions.

Even though Memento's features are ready to deploy, some work still needs to be done before using the app in a trial. Displaying actual privacy policies, offering a contact option and explaining the concept in a form of onboarding are still pending. Since these things depend on the actual form of a study however, they should be developed in conjunction with that.

5 CONCLUSION

The present work presented a fully working mobile application for both platforms that can be used for user research into how internet memes are used in the context of journaling. The project improved on a couple of shortcomings of its predecessor from Terzimehić et al. [9], however, studies employing this project still need to be conducted.

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