



PassBeat authentication

[1]

Challenge

The goal of our project is to develop a prototype for PassBeat - a rhythm-based authentication method for a music streaming app.

This project will address the challenge of digital authentication and access, and will use the research through design approach. Our developed prototype will be used to answer our research question on the retentiveness and convenience of rhythm-based passwords.

Research Question

Are rhythm-based passwords easier to remember than conventional, text-based passwords?

Learnings from Previous Prototypes

To evaluate our three prototypes from the previous deck, we conducted a small-scale empirical study to get some feedback from potential users.

According to the participants, the secure prototype had the most weaknesses:

- unintuitive due to lack of input button
- some response to tap input wanted
- lags / freezes not obvious

Based on this feedback, we chose to delete this prototype. Furthermore, we implemented a silent mode to turn of any auditory or vibration feedback e.g. when the user is in public, which was suggested by one of the participants.

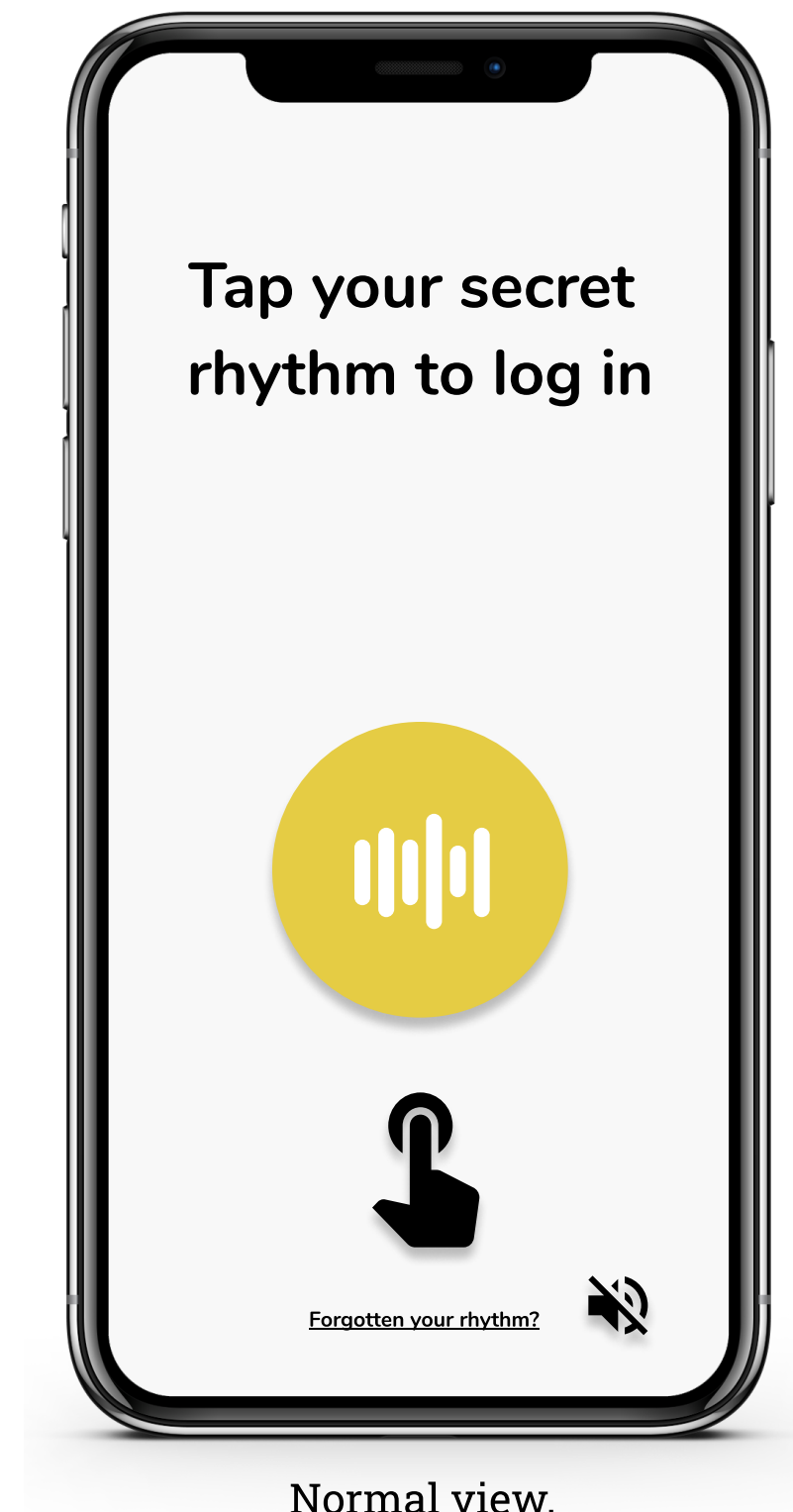
Prototype 1

- Users can enter their secret rhythm by tapping the button.
 - The input button gives visual feedback when tapped.
 - The level of feedback is on par with what is generally available on the market.
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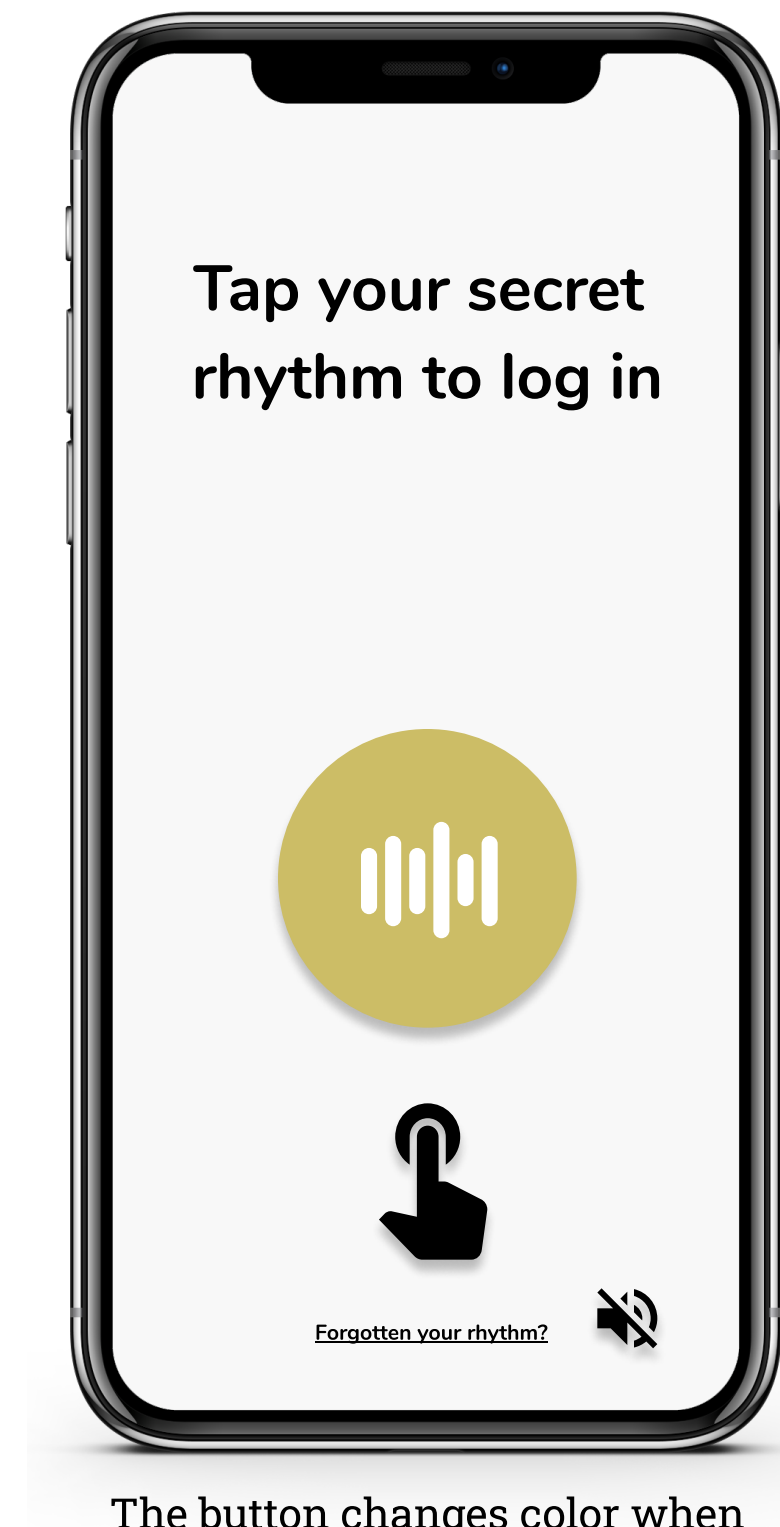
Hypothesis:

A rhythm should be relatively easy to remember.

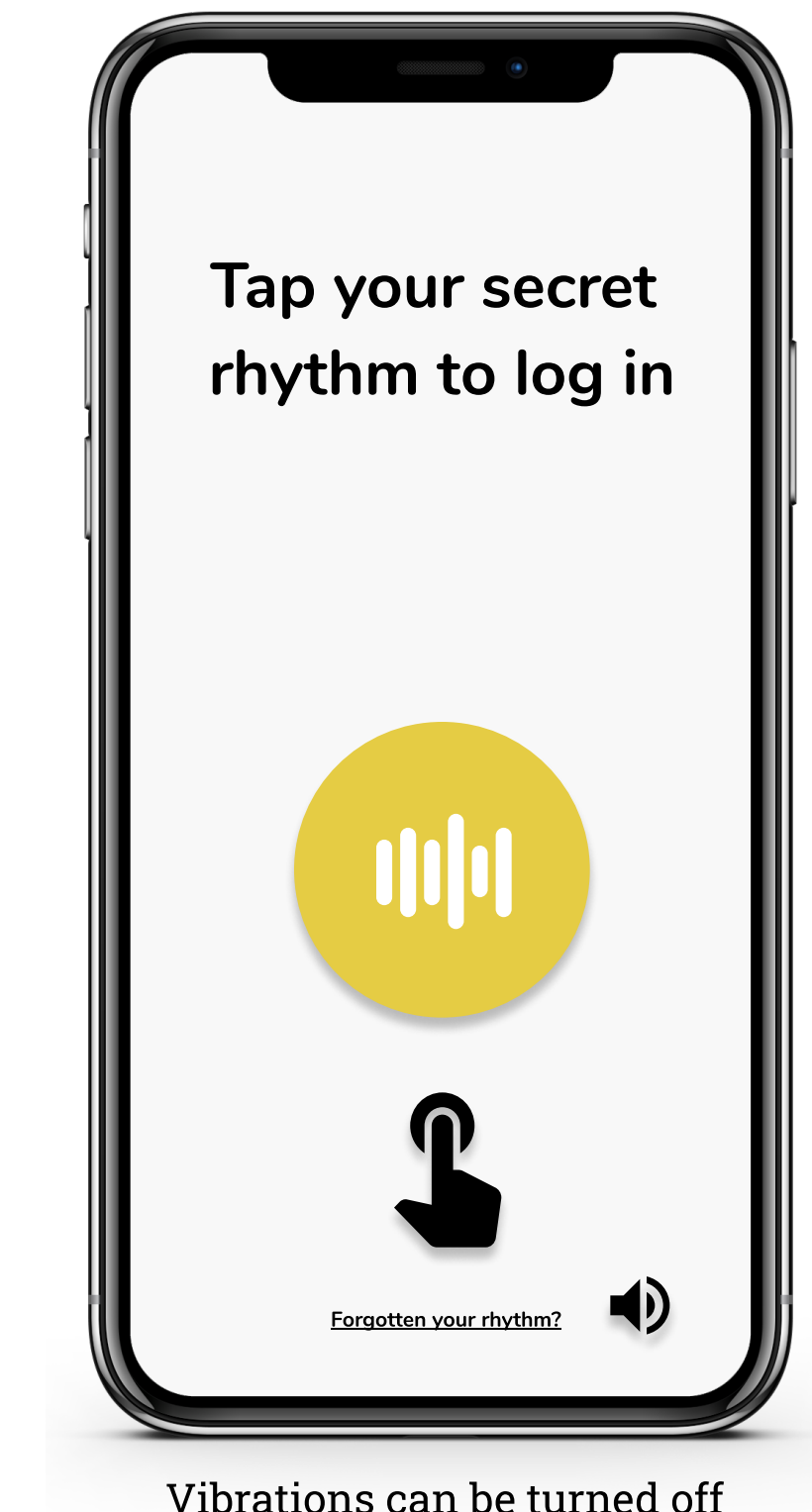
Prototype 1 will have two kinds of feedback: the button changing color and haptic feedback when the button is tapped. This design is supposed to represent the most common type of feedback on the market and could act as a benchmark when comparing different designs.



Normal view.



The button changes color when it's being tapped.



Vibrations can be turned off using the mute-button.

Strengths

- good compromise between security and visualization

Weaknesses

- visual and haptic feedback increase security risk

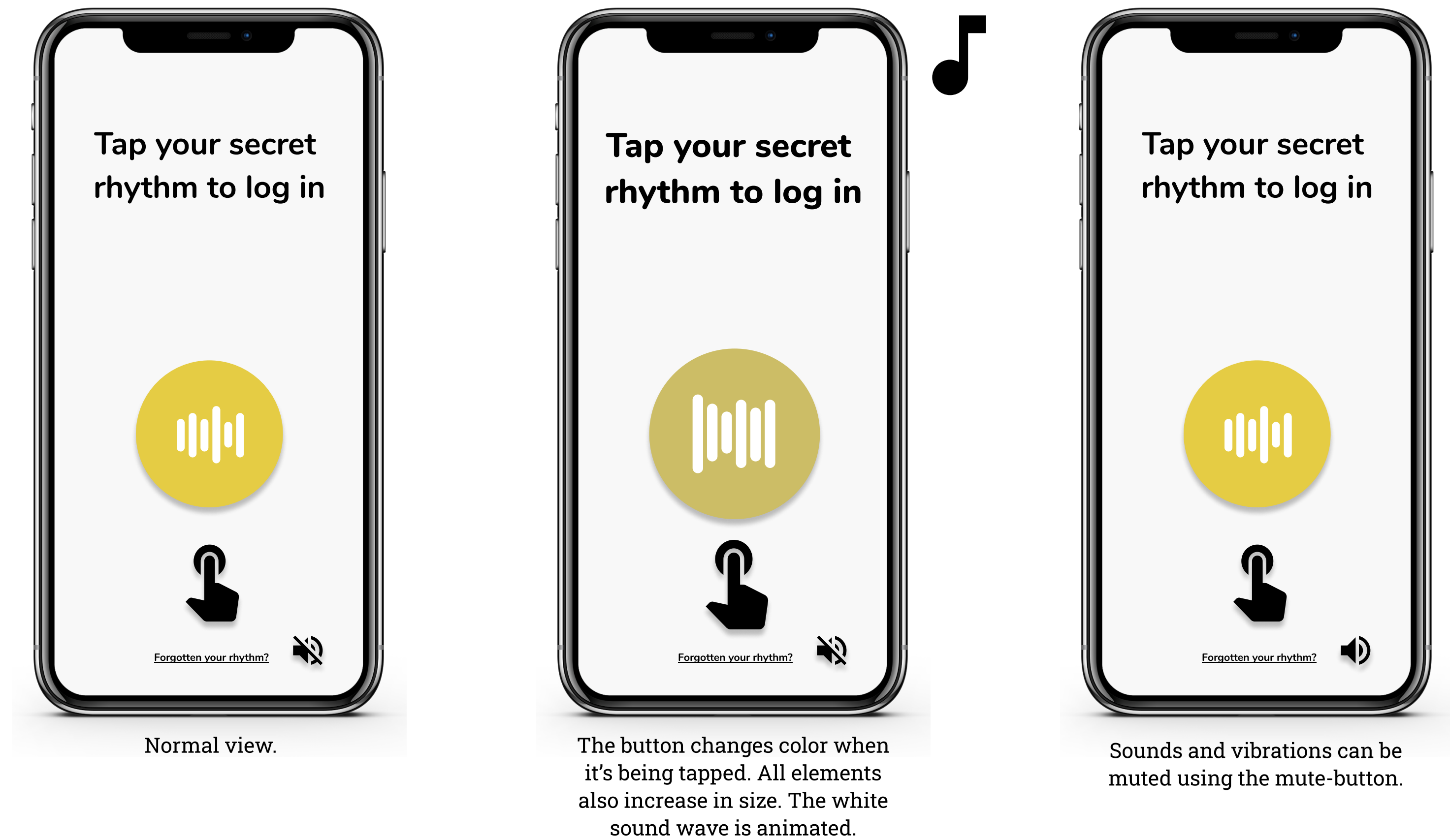
Prototype 2

- Users can enter their secret rhythm by tapping the button.
- The app provides visual of auditory feedback in form of:
 - moving or morphing elements
 - vibration and auditory responses

Hypothesis:

Rich visual and auditory feedback helps users memorize their rhythm. But can be more vulnerable to over-the-shoulder attacks.

Prototype 2 will also have two kinds of feedback, but the haptic feedback is replaced with auditory feedback and the visual feedback is much more noticeable. The purpose of this design is to test whether more feedback will help the user remember their PassBeat better.



Strengths

- implements research findings on improved memorization of songs through visualization [1]

Weaknesses

- auditory feedback poses higher security risk
- feedback might be over-the-top and distracting

[1] Reichling, M. (1989). Memorizing piano music: what the research offers teachers. *Update: Applications of Research in Music Education*, 8(1), 9-14.



Next Steps

Learnings

After receiving the early feedback from potential users, the two prototypes we are left with both implement some kind of visual and/or auditory feedback. The two prototypes also have a few shared strengths; the rhythm input is more intuitive, the new silent-mode increases security, the elements are placed so that they are reachable by both right-handed and left-handed people[1], and the designs fulfill most of Nielsen's 10 usability heuristics.

If only one prototype was to be developed, however, it would have to represent the level of feedback that applications are normally designed with, i.e. prototype 1.

Next Steps

After resolving the weaknesses previously mentioned, the development of a prototype for the authentication system will begin. The prototype will be developed in Kotlin using Android Studio as IDE.

Once the application is finished various research methods will be used to answer the research question: are rhythm-based passwords easier to remember than conventional, text-based passwords? The design will be tested with users, after which a short survey or interview will be held to record their opinions on the system. An evaluation using design heuristics will also be conducted.