

Well MEing

Practical Development Overview

Matteo Bettiati
Lorenzo Bianchi
Alessio Caggiano
Francesco Ostidich
Denis Sanduleanu

May 14, 2025

Version: 2.0

Contents

1	Introduction	2
1.1	Purpose of the document	2
1.2	Definitions	2
2	User interaction	3
2.1	Features	3
2.2	Scenarios	3
2.2.1	Habit creation	3
2.2.2	Habit logging	3
2.2.3	Voice commands	4
2.2.4	Reports	4
2.2.5	Progress visualization	4
3	Architectural design	6
3.1	Deployment overview	6
3.2	Patterns	6
3.2.1	Distributed MVC	6
3.2.2	Four-tier architecture	6
4	Implementation plan	7
4.1	Development roadmap	7
4.2	Technologies	7
4.3	User interface design	7
4.3.1	UI elements organization	7
5	Data models	9
5.1	Voice commands interfaces	9
5.1.1	Client to server	9
5.1.2	Server to client	10
5.2	Report generation interfaces	11
5.2.1	Client to server	11
5.2.2	Server to client	11
5.3	Database structure	12
5.4	Input types	13
5.4.1	Definition	13
5.4.2	Insertion	13

1 Introduction

1.1 Purpose of the document

This document outlines the practical development overview for Well MEing, a highly customizable wellness tracking application. The goal is to deliver a mobile-first, engaging, and AI-assisted experience that empowers users to track the aspects of well-being that matter most to them, from fitness and nutrition to sleep and stress management.

Built upon the insights gathered in our Product Research Report (PRR), this document presents a comprehensive view of the application's envisioned use cases, technical architecture, and implementation roadmap. Through thoughtful design and modern development practices, we aim to address user pain points identified during the research by bringing a compelling and effective solution to the market.

1.2 Definitions

- **Habit/group:** a specific behavior or activity that a user wants to track and improve, such as nutrition or sport.
- **Metric:** a quantifiable measure of a habit, such as steps taken, hours slept, or glasses of water consumed.
- **Submission/log/record:** the recording of an activity that is added to the history of that habit; for that specific timestamp, a value for each of its metric is stored.
- **Goal/target/objective:** a specific value or range that a user aims to achieve for a habit.
- **Assistant:** the AI-driven set of features that provides personalized insights and voice commands functions.
- **Progress/statistics/charts:** visual representations of user data over time, helping users understand their habits and track their progress toward goals.

2 User interaction

2.1 Features

The table below displays the prioritized features that we plan to develop.

Rank	Feature
1	Custom habit creation
2	Minimalistic UI
3	Quick habit logging
4	AI-generated progress reports
5	Voice-based interaction
6	Targets
7	Configurable notifications
8	Adaptable data visualization

2.2 Scenarios

This section presents practical use case scenarios that demonstrate how the application will serve its diverse user base in real-life situations. These scenarios directly resembles the feature list defined in the user research, focussing on the themes and needs that user mentioned the most. This scenarios are more focussed on make a detailed description of the application fundamental functionalities, in order to allow the reader to well understand their behaviour.

2.2.1 Habit creation

The user, from the main dashboard page, can click a "+" button to create a new habit. It can insert some text fields for name and description, and then select, one by one, a list of metrics. Each metric has also its specific name and description, and requires the user to choose an input format: these are well defined in a scroll menu, and depending on which one the user selects, a set of input-format-specific configuration fields appear. For example, if the input format chosen is a slider, the user will be asked to set its minimum and maximum range, and furthermore choose if the values are integers or floats. After selecting an arbitrary number of metrics, (e.g. a slider for kilometers run and a time duration selector for the running time) the user can save this new habit, which is then shown on the dashboard page.

2.2.2 Habit logging

From the dashboard main page, the user can select an habit from the ones he has created in the past. A modal appears from within which the user can select a value for each metric of the habit, using the input format interactive elements he has decided at the time of creation. For example, if the habit is "Running", he can select a number of kilometers run on the slider (e.g. 10), and select a time duration from the corresponding selector (e.g. 01:30:00). The user can also insert some text in an optional "Notes" field, and can also change the submission time from the default current one to a past one. After inserting all the metrics for that habit, the "Submit" button is enabled and the user can log the submission.

If for any reason the user thinks it has erroneously recorded a submission, that submission can still be shown within a list of past submissions, and by long pressing one, he can delete it. The habit history can be seen from the calendar in the progress page, where, by tapping a day, all the submission of that day are shown. Note that it can always re-submit an old one by selecting a different timestamp from the habit logging page.

2.2.3 Voice commands

From the main dashboard page, the user can tap a "Use your voice" button. He can then start recording its speech. He can propose a list of actions to take, which must either be habit creations or habit logging ones. For example, he can say he wants to start tracking its nutrition, specifying the metrics he want to find in the habit (e.g. calorie intake and protein grams); then, within the same recording process, he can also ask to log the habits for the day, which are "Running" and "Water Drunk", telling he ran 10 km in one and a half hour, and that he drank 8 glasses of water. He may also decide to start tracking the number of LeetCode problems he is doing, saying he desire just a simple slider for counting the number of exercises he did in a session.

After he finishes asking for the actions he wants to take, he stops the recording and sends the recognized text to the AI agent for interpreting it. The AI organizes all these actions in a well pre-defined JSON format, which the mobile app receives. The actions are shown as previews to the user, and after making all the necessary edits, the user can accept them and forward the requests to the backend.

2.2.4 Reports

Once a week, from the report page, the user can press a button to ask for a user-specific report to the LLM. The user is then presented with a multi box view for selecting the habits for which he is interested in receiving a report for. After selecting an arbitrary number of habits he wants to include in the report, the last-month history of those habits is retrieved and sent to the LLM, which is under the hood prompted for producing a medium-sized, natural language text which recaps the submissions it receives, listing some insights it finds and presenting some suggestions the user can exploit to reach faster its goals.

Note that the report is a single one which comprehends information for all the selected habits all-together. This is useful since if the habits selected are "Running" and "Nutrition", the LLM can cross-use their histories to better understand the user situation and better provide suggestions. This is also nice for finding correlations (e.g. the report could understand and tell a user that its running activities have gone better since it started to drink more water).

Moreover, from the report page the user can tell its name and provide a description of itself, which are fed into the LLM to better create a user-specific report, customized on the user characteristics and objectives he told in said description.

From the same page, the user can also see all past reports to be read again. He can also see a timer telling how much time is to be waited before requesting a new report.

2.2.5 Progress visualization

In the progress page the user can look at its submissions history in two ways.

In the first place, by clicking on a specific day in the calendar all the submissions of that day are presented. Secondly, a set of charts are listed below the calendar, which show progress by weeks, with day-granularity.

There is a chart for each valid metric, and they work as follows.

Firstly, not all metrics can be shown on a graph, based on their input format; for instance, a text field metric does not have a simple way to be shown on a chart, whereas an integer insertion made with a slider is pretty easy to be shown. Therefore, in the charts, only the presentable metrics are considered. The chart shown are only tower/bar charts, as they are sufficient for showing whichever value the app supports. A chart shows the data of the week's seven days, offering the possibility to scroll to past weekas.

Let's consider a metric showable in a chart, for example, the calorie intake, which is an integer. The user wants to see the calorie intake throughout the week, thus the chart shows the total calories count for each day. This is done by grouping all submissions of each day by summing the integer values. Therefore, e.g. Monday will show a value of 2200, which is the sum of two submissions, one of 900 and one of 1300 kcal.

A final note: each input format has its "grouping function". Integers, floats and time durations (sliders and time selectors) have the sum, star ratings have the average. Time durations are converted into floats, where the unit represents the number of minutes (e.g. 01:10:30 is thus 70.5).

3 Architectural design

3.1 Deployment overview

The application will run with a client-server schema, with the client on a mobile app interacting with a Firebase server, handling functionalities like authentication, data storage, and initial API routing. Firebase hosts also cloud functions for some endpoints used for security checks and abuse control logic. A dedicated AI server, also triggered via Firebase, processes requests and mediates communication with the LLM, enforcing per-user token limits.

3.2 Patterns

The architectural design of the application is structured according to the principles of various well-known patterns, ensuring modularity, scalability, and maintainability. Additionally, the system is organized into a multi-tier architecture, with a dedicated tier for AI services, to support the features requiring an intelligent agent.

Since the application relies on Firebase as its backend, certain patterns deviate slightly from standard architectural practices. Some operations are handled through Firebase-specific shortcuts which, while efficient and intentional, can blur the traditional separation of concerns within the system. The following pattern descriptions reflect a more traditional, backend-owned architecture, thus ignoring some Firebase-specific abstractions.

3.2.1 Distributed MVC

The Model-View-Controller (MVC) design pattern is used to separate the presentation layer from the business logic and data definitions. In particular, the model contains all the elements representing the data used by the application, the view is the user interface component, and the controller comprehends all the other services and managers.

In this project, the view resides on the client device, the model reflects the database structure (which is a separate application accessed through defined interfaces), and the controller logic is handled in a backend server. Additionally, the backend relies on another server for AI operations. As a result, the MVC pattern can be considered “distributed.”

3.2.2 Four-tier architecture

The application adopts a four-tier architecture, where each layer has a distinct role while communicating through well-defined interfaces.

The Presentation Tier consists of a native Swift application that serves as the primary interface for users. The Application Tier represents the backend server, which provides the various services through API endpoints. The Data Tier corresponds to the database manager, which lets the backend server access the main storage. The AI Service Tier runs independently as a dedicated AI backend, handling mainly natural language processing, exposing its capabilities through APIs.

This four-tier approach promotes maintainability allowing each component to evolve independently while ensuring smooth communication between layers.

4 Implementation plan

4.1 Development roadmap

The first version of the application we plan to develop is an MVP able to provide the following functionalities.

1. Habit creation
2. Habit logging
3. Submissions history visualization
4. Charts for metrics visualization
5. Voice commands of a single interaction (STT)
6. Report generation

Eventually, when the first MVP is completed, we plan of adding the following functionalities.

1. Goal setting
2. Appealing UI elements support, like colors or symbols
3. Notifications
4. Voice commands of continuous interactions (STT and TTS)
5. Habit set-frequencies

4.2 Technologies

For development, we will use Swift for the frontend since it ensures a smooth and responsive user experience. The backend will exploit Firebase functionalities, as they are easy to set up, deploy and use. Then, a little Python server will be run, directly in Firebase, in order to allow an ad hoc AI interaction.

4.3 User interface design

This section showcases the design that supports the user experience and interface of the application. It also describes the organization of the UI elements across the main app sections, justifying design decisions for content placement and user flow.

The UI is crafted to be minimalist yet engaging, following the principle of simplicity prioritized by users during research. Each app page reflects the user-centric design, focussing on accessibility, speed of interaction, and aesthetic appeal, offering a preview of the intuitive and motivating environment aimed to be created.

4.3.1 UI elements organization

The application will consist of three main pages, structured for an intuitive user experience.

1. **Dashboard:** this is the main page, providing an overview of tracked habits, allowing for habit creation and logging, even with voice commands.
2. **Assistant:** the AI-based assistant page provides a place to collect the reports that the user may request weekly; the user can also set some information about itself that the LLM can leverage for specific insights.

3. **Progress:** the progress page allows the user to see the history of its submissions for any specific day, by tapping on a calendar; furthermore, a set of charts summarizes past data, by weeks, for each representable metric.

5 Data models

5.1 Voice commands interfaces

5.1.1 Client to server

```
1 {
2   "speech": "Hi, I want to track my running because I want to run a marathon",
3   "habits": {
4     "Running": {
5       "description": "Go for a run in your free time",
6       "goal": "I want to run 3 times a week in order to train for PolimiRun",
7       "metrics": {
8         "Distance": {
9           "description": "Kilometers run",
10          "input": "slider",
11          "config": {
12            "type": "int",
13            "min": 0,
14            "max": 100
15          }
16        },
17        "Duration": {
18          "description": "Minutes of running",
19          "input": "time"
20        }
21      },
22      "history": {
23        "id-1234": {
24          "timestamp": "2025-03-27T14:30:00",
25          "notes": "Today the run was on a 20% street",
26          "metrics": {
27            "Distance": 12,
28            "Duration": "01:30:00"
29          }
30        },
31        "id-2345": {
32          "timestamp": "2025-03-24T16:30:00",
33          "metrics": {
34            "Distance": 10,
35            "Duration": "01:10:00"
36          }
37        }
38      }
39    },
40    "Food": {
41      "description": "Log the food you eat",
42      "goal": "I want to eat max 2000 kcal per day",
43      "metrics": {
44        "Calorie intake": {
45          "description": "How many calories did this food have?",
46          "input": "slider",
47          "config": {
48            "type": "int",
49            "min": 0,
50            "max": 5000
51          }
52        },
53        "Satisfaction": {
54          "description": "Did you enjoy this meal?",
55          "input": "rating"
56        }
57      },
58      "history": {
59        "id-1234": {
60          "timestamp": "2025-03-26T15:30:00",
61          "notes": "Today I ate a lot",
62          "metrics": {
63            "Calorie intake": 2200
64          }
65        },
66        "id-2345": {
67          "timestamp": "2025-03-21T13:30:00",
68          "notes": "The pasta was good",
69          "metrics": {
70            "Calorie intake": 2100
71          }
72        }
73      }
74    }
75  }
76 }
```

5.1.2 Server to client

```
1 {
2   "creation": {
3     "Food": {
4       "description": "Count the calories every day",
5       "goal": "You may go to KFC up to once a month",
6       "metrics": {
7         "Calories": {
8           "description": "Total calorie intake count",
9           "input": "slider",
10          "config": { "min": 0, "max": 4000, "type": "int" }
11        },
12        "Fats": {
13          "description": "Perceived anti-fat loyalty",
14          "input": "rating"
15        }
16      }
17    },
18    "Gym": {
19      "description": "Go to the gym you slim boy",
20      "goal": "100kg on bench press we go",
21      "metrics": {
22        "Time": {
23          "description": "How much you stayed at the gym",
24          "input": "time"
25        },
26        "Exercises": {
27          "description": "Which muscles you trained?",
28          "input": "form",
29          "config": {
30            "boxes": ["Arms", "Chest", "Back", "Core", "Shoulders", "Legs"]
31          }
32        }
33      }
34    },
35    "Meditation": {
36      "metrics": {
37        "Diary": {
38          "description": "Reflect on your day",
39          "input": "text"
40        }
41      }
42    },
43  },
44  "logging": {
45    "Food": [
46      {
47        "timestamp": "2025-04-20T13:30:00",
48        "notes": "This is the only KFC of this month",
49        "metrics": { "Calories": 1000, "Fats": 2 }
50      },
51      {
52        "timestamp": "2025-04-20T19:30:00",
53        "notes": "I've broken the once a month rule",
54        "metrics": { "Calories": 1500, "Fats": 1 }
55      }
56    ],
57    "Gym": [
58      {
59        "timestamp": "2025-04-20T09:30:00",
60        "metrics": { "Time": "01:30:00", "Exercises": "Chest;Core" }
61      },
62      {
63        "timestamp": "2025-04-20T20:45:00",
64        "notes": "Today I felt of going to the gym twice, but I just chit-chatted...",
65        "metrics": { "Time": "00:30:00", "Exercises": "" }
66      }
67    ],
68    "Meditation": [
69      {
70        "timestamp": "2025-04-20T16:00:00",
71        "metrics": {
72          "Diary": "Today I went out with my friends to drink a beer together, it was really nice"
73        }
74      }
75    ],
76    "Drink": [
77      {
78        "timestamp": "2025-04-20T23:00:00",
79        "notes": "I got drunk again",
80        "metrics": { "Beers": 4 }
81      }
82    ]
83  }
84 }
```

5.2 Report generation interfaces

5.2.1 Client to server

```
1 {
2   "name": "Kello",
3   "bio": "I like going to the gym, and I'd like to hit 100 kg on bench press one day",
4   "habits": {
5     "Running": {
6       "description": "Go for a run in your free time",
7       "goal": "I want to run 3 times a week in order to train for PolimiRun",
8       "metrics": {
9         "Distance": {
10          "description": "Kilometers run",
11          "input": "slider",
12          "config": {
13            "type": "int",
14            "min": 0,
15            "max": 100
16          }
17        },
18        "Duration": {
19          "description": "Minutes of running",
20          "input": "time"
21        }
22      },
23      "history": {
24        "id-1234": {
25          "timestamp": "2025-03-27T14:30:00",
26          "notes": "Today the run was on a 20% street",
27          "metrics": {
28            "Distance": 12,
29            "Duration": "01:30:00"
30          }
31        },
32        "id-2345": {
33          "timestamp": "2025-03-24T16:30:00",
34          "metrics": {
35            "Distance": 10,
36            "Duration": "01:10:00"
37          }
38        }
39      }
40    },
41    "Food": {
42      "description": "Log the food you eat",
43      "goal": "I want to eat max 2000 kcal per day",
44      "metrics": {
45        "Calorie intake": {
46          "description": "How many calories did this food have?",
47          "input": "slider",
48          "config": {
49            "type": "int",
50            "min": 0,
51            "max": 5000
52          }
53        },
54        "Satisfaction": {
55          "description": "Did you enjoy this meal?",
56          "input": "rating"
57        }
58      },
59      "history": {
60        "id-1234": {
61          "timestamp": "2025-03-26T15:30:00",
62          "notes": "Today I ate a lot",
63          "metrics": {
64            "Calorie intake": 2200
65          }
66        },
67        "id-2345": {
68          "timestamp": "2025-03-21T13:30:00",
69          "notes": "The pasta was good",
70          "metrics": {
71            "Calorie intake": 2100
72          }
73        }
74      }
75    }
76  }
77 }
```

5.2.2 Server to client

```
1 {
2   "date": "2025-04-30T14:30:30",
3   "title": "Road to marathon",
4   "content": "You are going well, if you go running once more each week you'll do great."
5 }
```

5.3 Database structure

```
1 {
2   "users": {
3     "user-id-123456": {
4       "name": "Kello",
5       "bio": "I like going to the gym, and I'd like to hit 100 kg on bench press one day",
6       "usage": {
7         "today": "2025-05-01T00:00:00",
8         "tokens": 12345,
9         "submissions": 7
10      },
11      "newReportDate": "2025-05-07T00:00:00",
12      "reports": {
13        "2025-04-29T16:30:12": {
14          "title": "Roat to marathon",
15          "content": "You are going well, if you go running once more each week you'll do great."
16        },
17        "2025-04-21T10:24:50": {
18          "title": "Stress tested",
19          "content": "You've seemed a bit anxious in the last week, maybe you studied too much."
20        },
21        "2025-03-31T12:00:30": {
22          "title": "Eat less junk",
23          "content": "Going to KFC twice a week is too much. Consider running more since you skipped it once this week."
24        }
25      },
26      "habits": {
27        "Running": {
28          "description": "Go for a run in your free time",
29          "goal": "I want to run 3 times a week in order to train for PolimiRun",
30          "metrics": {
31            "Distance": {
32              "description": "Kilometers run",
33              "input": "slider",
34              "config": {
35                "type": "int",
36                "min": 0,
37                "max": 100
38              }
39            },
40            "Duration": {
41              "description": "Minutes of running",
42              "input": "time"
43            }
44          },
45          "history": {
46            "id-1234": {
47              "timestamp": "2025-03-27T14:30:00",
48              "notes": "Today the run was on a 20% street",
49              "metrics": {
50                "Distance": 12,
51                "Duration": "01:30:00"
52              }
53            },
54            "id-2345": {
55              "timestamp": "2025-03-24T16:30:00",
56              "metrics": {
57                "Distance": 10,
58                "Duration": "01:10:00"
59              }
60            }
61          },
62        },
63        "Food": {
64          "description": "Log the food you eat",
65          "goal": "I want to eat max 2000 kcal per day",
66          "metrics": {
67            "Calorie intake": {
68              "description": "How many calories did this food have?",
69              "input": "slider",
70              "config": {
71                "type": "int",
72                "min": 0,
73                "max": 5000
74              }
75            }
76          },
77          "history": {
78            "id-1234": {
79              "timestamp": "2025-03-26T15:30:00",
80              "notes": "Today I ate a lot",
81              "metrics": {
82                "Calorie intake": 2200
83              }
84            }
85          }
86        }
87      }
88    }
89  }
90 }
```

5.4 Input types

5.4.1 Definition

```
1  [
2    {
3      "input": "slider",
4      "config": {
5        "type": "int/float",
6        "min": 0,
7        "max": 100
8      }
9    },
10   {
11     "input": "text"
12   },
13   {
14     "input": "form",
15     "config": {
16       "boxes": ["first-value-name", "second-value-name", "third-value-name"]
17     }
18   },
19   {
20     "input": "time"
21   },
22   {
23     "input": "rating"
24   }
25 ]
```

5.4.2 Insertion

```
1  {
2    "Slider metric int": 10,
3    "Slider metric float": -18.26,
4    "Text metric": "Hi, how are you?",
5    "Form metric multi": "param1;param2;param3",
6    "Form metric none": "",
7    "Time metric": "01:40:30",
8    "Rating metric": 3
9  }
```