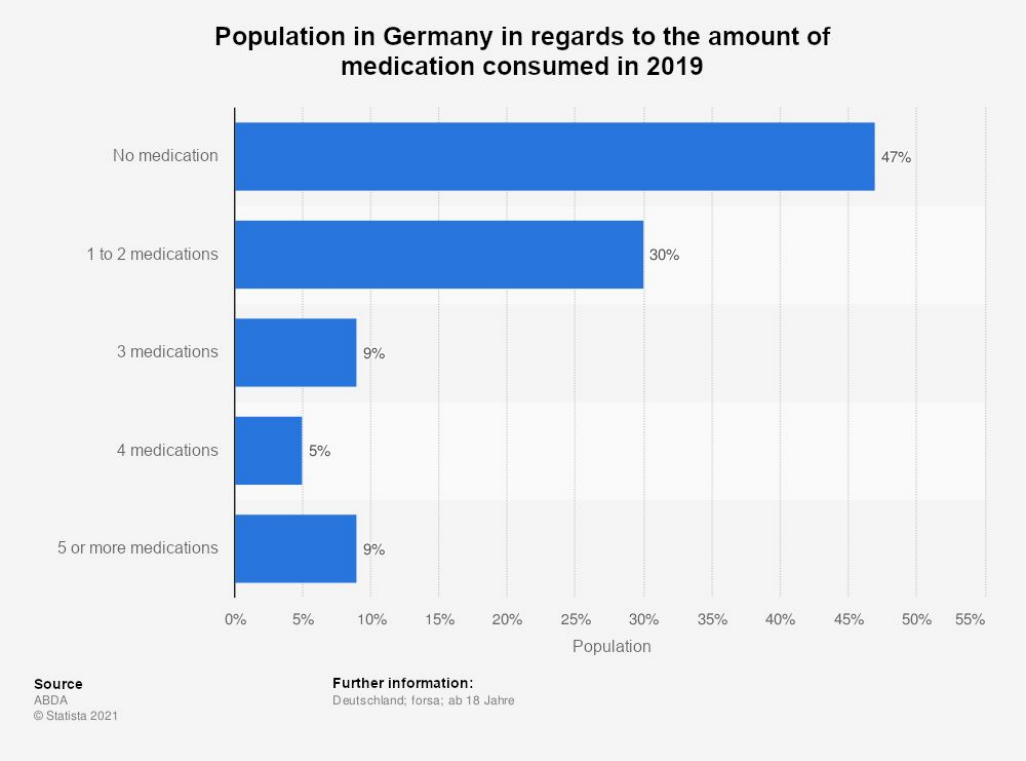
Medify

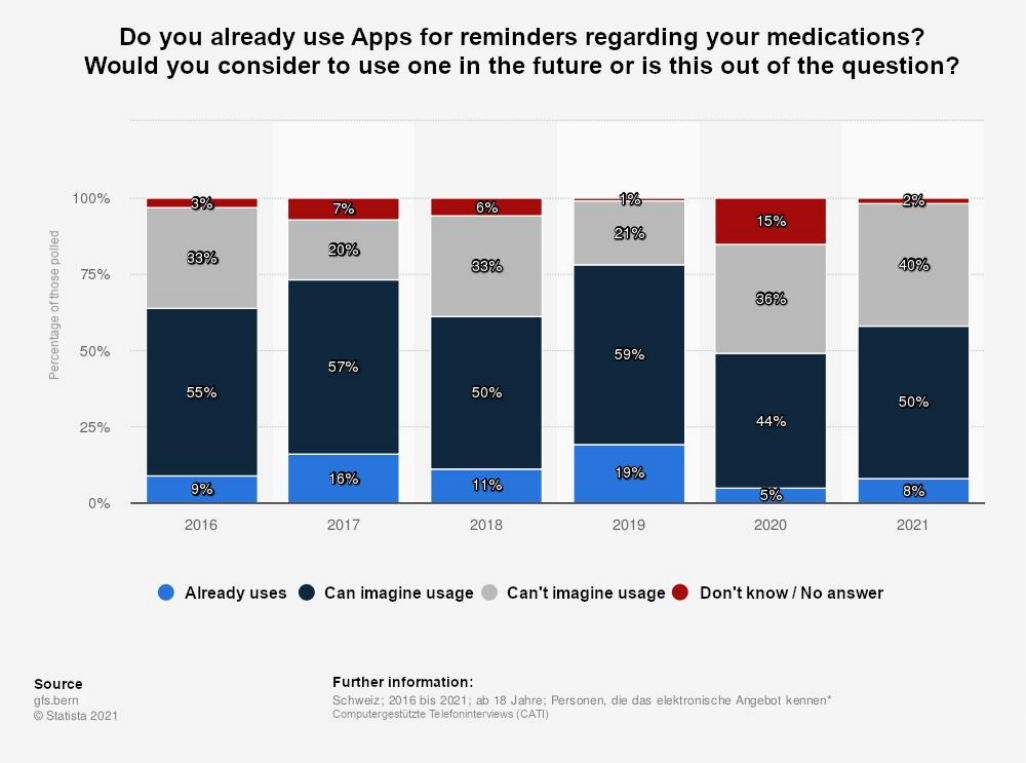
a medication reminder app

Mobile Computing WS 21/22
Ekrem Emre

Motivation


Population in Germany in regards to the amount of medication consumed in 2019
No medication
47%
1 to 2 medications
30%
3 medications
9%
4 medications
5%
5 or more medications
9%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
55%
Population
Source
ABDA
© Statista 2021
Further information:
Deutschland; forsa; ab 18 Jahre

Motivation


Do you already use Apps for reminders regarding your medications?
Would you consider to use one in the future or is this out of the question?
Percentage of those polled
100%
75%
50%
25%
0%
2016
2017
2018
2019
2020
2021
3%
33%
55%
9%
7%
20%
57%
16%
6%
33%
50%
11%
1%
21%
59%
19%
15%
36%
44%
5%
2%
40%
50%
8%
Already uses
Can imagine usage
Can't imagine usage
Don't know / No answer
Source
gfs.bern
© Statista 2021
Further information:
Schweiz; 2016 bis 2021; ab 18 Jahre; Personen, die das elektronische Angebot kennen*
Computergestützte Telefoninterviews (CATI)

Goal of the project

Develop an app, that helps the users to keep up with their regular medication intake.

Requirement analysis

Requirement analysis

Personas

Name: Rosalyn Foster
Age: 68
Marital status: Married
Occupation: Retired
Computer skills: poor

Key characteristics

- Retiree, former tailor.
- Because of her advanced age, she got forgetful.
- Is regularly taking different medication, which needs she needs to be reminded of.
- Is concerned about her health, because she just became a grandparent and wants to spent as much time as possible with her grandchildren.

Goals

- Be healthy.
- Remember taking her medication regularly.

User Story

As an older person, Rosalyn wants to be reminded to take her medicine, because she forgets them and wants to get healthy.

Requirement analysis

Personas

Name: Christian Metz
Age: 32
Marital status: Engaged
Occupation: Physiotherapist
Computer skills: strong

Key characteristics

- Working as a physiotherapist and doing a lot of sports, therefore is very healthy.
- He's a member in several sport clubs and a volunteer in the local animal shelter.
- His schedule is always pretty full and he's always on the go.
- He wants to increase his health by taking some vitamins, because he suspects he has some deficiencies.

Goals

- Be reminded, to take his vitamins.

User Story

As a healthy person, Christian wants to be reminded to take his vitamins, because he's busy all day and not thinking of it and wants to stay healthy.

Requirement analysis

Storyboards

Requirement analysis

Storyboards

Requirement analysis

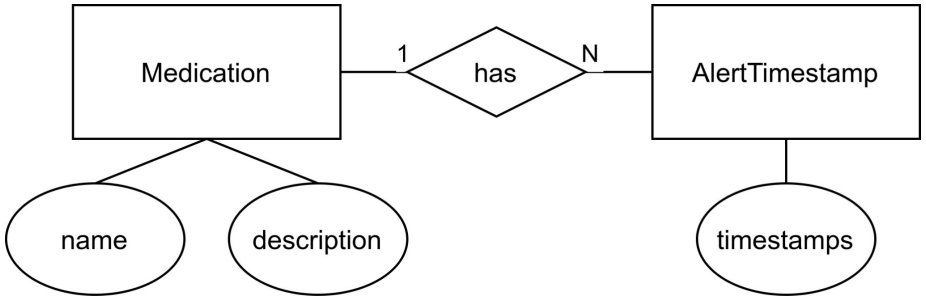
Requirement specification

- Application must be capable of reminding the user when to take their medicine
- Reminder time must be set by the user
- Multiple medications with multiple reminder times must be recordable
- GTIN/EAN scanner should be implemented, to fetch the name of scanned medication

Conceptual model

Conceptual model

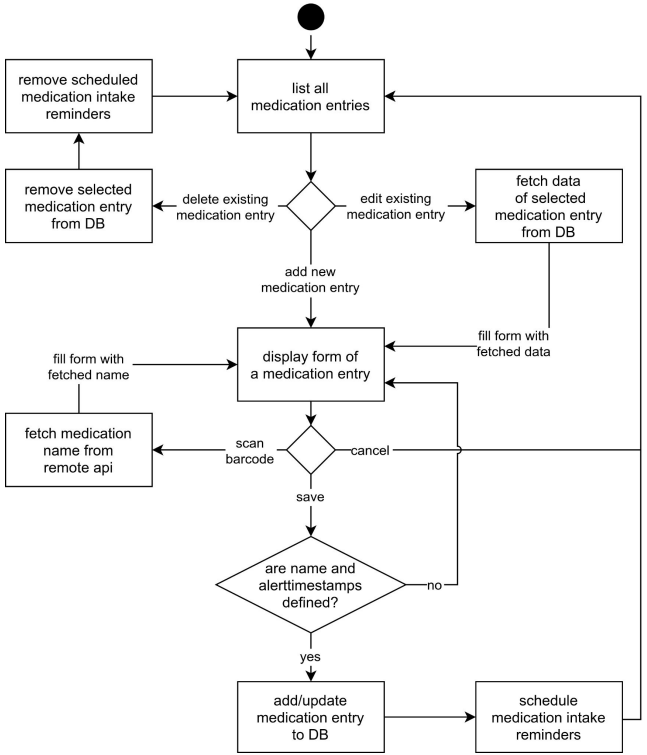
Entity relationship diagram



- Two entities
- `Medication` has a One-to-Many relationship to `AlertTimestamp`

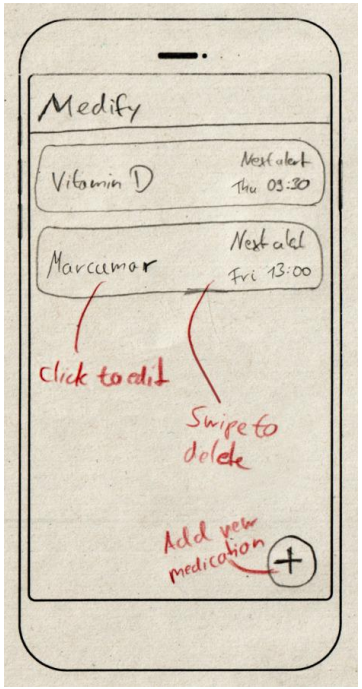
Conceptual model

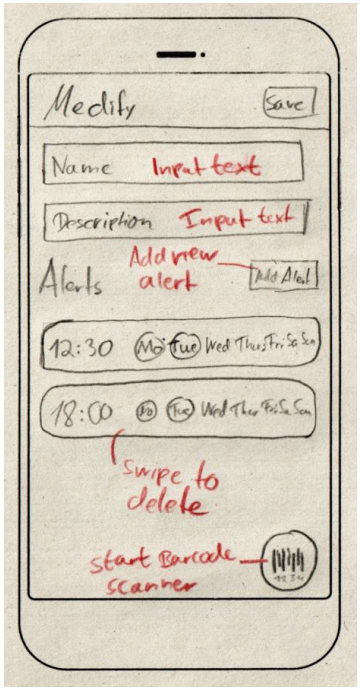
Activity diagram



Conceptual model

Mockups



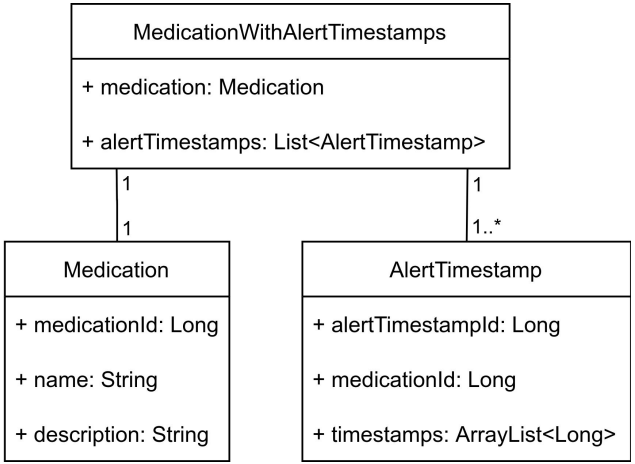


Design decisions

Design decisions

Database

- One-to-Many relationships are implemented in `Room` using helper-classes
- Fetching `MedicationWithAlertTimestamps` entries from the database yields all `AlertTimestamp` entries associated with `Medication` entries



Design decisions

Managing alerts

- Android library `AlarmManager` class enables the app to run code at a specific time.
- Whenever a new medication entry is added, the `AlarmManager` schedules new alarms.
- If medication entry gets updated, the `AlarmManager` updates associated alarms.
- Deleting medication, triggers the `AlarmManager` to cancel the alarms.
- Consistency between database and scheduled alarms is achieved, by setting these operations in the `ViewModel`.

Design decisions

Scanning GTIN/EAN-labels & API calls

- Scanning labels is achieved using *code-scanner*[1] by Yuriy Budiyev.
- Starting the scanning activity, the app checks for for camera privileges.
- Whenever a label is recognized, the activity finishes and yields the GTIN/EAN-number to the parent activity.
- The product name is fetched from *Open EAN/GTIN Database*[2], by using the library *Retrofit* to parse the results.

[1] https://github.com/yuriy-budiyev/code-scanner [Accessed Jan. 12, 2022]

[2] https://opengtindb.org/ [Accessed Jan. 12, 2022]

Results

Results

Testing

- Tested CRUD-operations of database, consistency of `AlarmManager` and predictable behavior of camera features.
- Reliability of `AlarmManager` was manually tested on a physical device, by scheduling alerts at 12 o’clock on all weekdays.

Degree of completion

- The tasks from the requirement analysis were fulfilled completely.

Conclusion

Conclusion

Outlook

- Upgrade alerts to be more attentive seeking.
- Medication entries could include images of the actual drug.
- Time selection of alerts could be more fine-grained.
- Support backing and restoring database.

Sources

- ABDA - Bundesvereinigung Deutscher Apothekerverbände, e.V., “Polymedikation - Bevölkerungsanteil in Deutschland nach Anzahl eingenommener Medikamente 2019 - Statista,” statista.com, June 2020. [Online]. Available: https://statista.com/statistik/daten/studie/561628/umfrage/bevoelkerungsanteil-in-deutschland-nach-anzahl-eingenommener-medikamente/. [Accessed Jan. 12, 2022].
- gfs.bern, AG, “Schweiz - Nutzung Apps Erinnerung Medikamenteneinnahme 2021 - Statista,” statista.com, March 2021. [Online]. Available: https://statista.com/statistik/daten/studie/527313/umfrage/umfrage-in-der-schweiz-zur-nutzung-von-erinnerungs-apps-fuer-medikamente/. [Accessed Jan. 12, 2022].

- Personas images: thispersondoesnotexist.com
- Storyboards created using: storyboardthat.com