

IPTK

Location-Aware Polling - (LAP)

Documentation for STG-App

Internet - Praktikum Telekooperation WS-21/22 /// Group K.

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1 Introduction

The STG-App is an app for the local sports-club "Sprendlinger Turngemeinde 1848 e.V." in Dreieich. This app has the main purpose to offload and automate organisational work and connect members, trainers and other club functionaries. For example members are to track their participation in training sessions. Especially during the corona-pandemic it is important to track participation in order to fulfill the regulations. The app will also bring quality of live improvements to the trainers, since they have to manage their lessons as well as create invoices for payment. All members will also see the huge supply of different courses and events, which are changing regularly.

All these things should help improving the user experience with the sports-club and involve more members actively into the club: A digital home for everyone.

1.1 Motivation for the project

The project requirements were to create a location-aware polling app, where there is the possibility to create a poll in a specific location, e.g. in the lecture room, where everybody can join, if they are in the room. The polls should have the option to vote anonymously and visualize the results. After the poll has been opened, you are only allowed to vote once to prevent biased voting behaviour of getting influenced by the majority.

Since our sports club organizes events frequently, we wanted to include the polls inside a dedicated events section of the app. If you have your location services enabled, you are able to participate in location-based polls. The app was primarily designed to be used by logged in members. To let people vote, although they are not member in the sports-club, we also wanted to use a QR-Code system to let these people join the polling via a web-interface. Furthermore, no account creation is needed for participating in the polls.

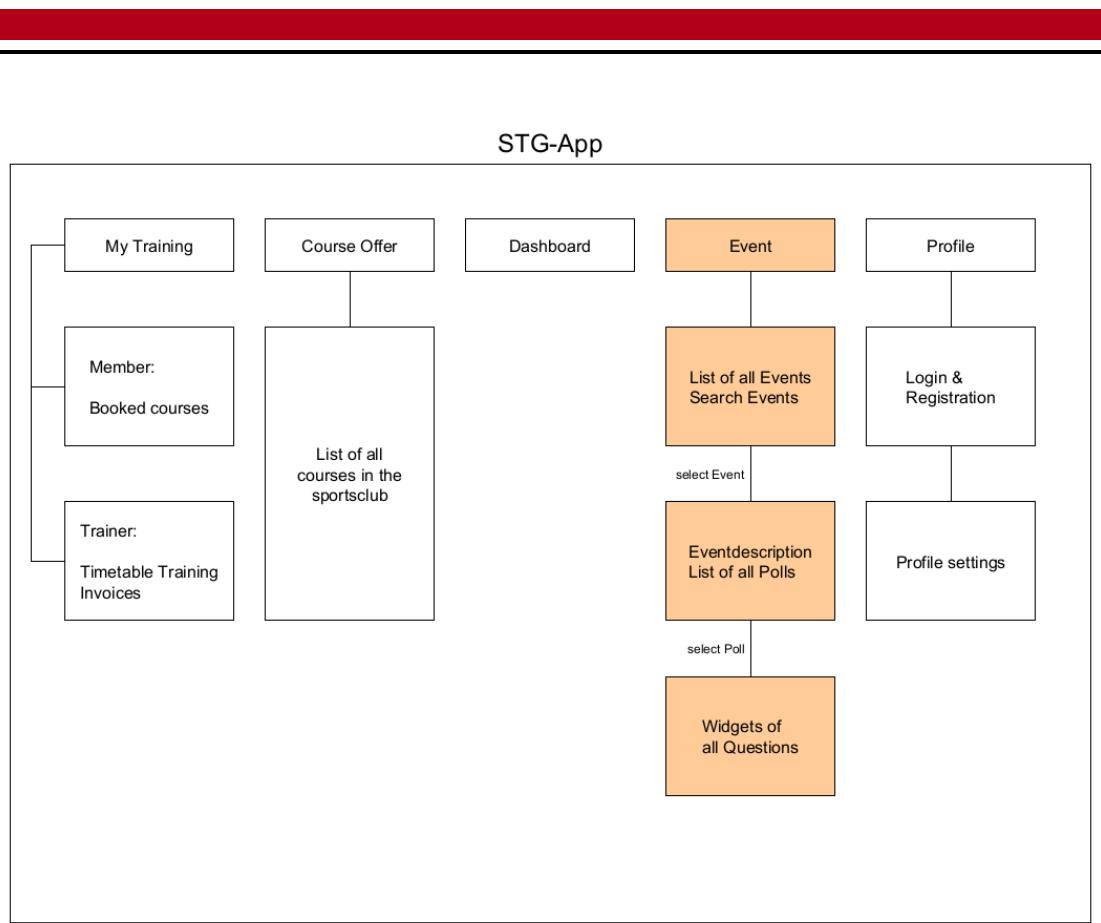


Figure 1.1: App structure

1.2 Project structure

Our project is divided into two parts. First part is the app with the frontend [2.2] and the second part is the backend [2.3] running on the locally or on an external server like a Raspberry Pi or a hosted V-Server. As in the graphical overview [1.1] shown, the app has been structured in 5 parts. For this lab project, we only focused on the two parts: Events and Profile. On the one side, there is the login-page, where the members can login. If you are new to the service, you can create a new account in the app and the user is created and then you are able to login with the new created account. On the other side, there is the event-page. This is mainly used for the LAP. Here you are able to see all events. If you have the permission, you could even create a new event. If you choose an event, you get

an overview of the polls. You can choose a poll, which inherits at least one question.

2 Technical documentation

Our Location-Aware Polling app is a cross-platform app consisting of the mobile or web-based frontend and a web server. The backend server answers requests from the app and stores all the data. To work with more flexibility and cross-platform capabilities, we decided to use Flutter for the front-end framework. Flutter is an open-source UI software development kit created by Google. It is used to develop cross platform applications for Android, iOS, Linux, Mac, Windows and the web from a single codebase. In addition we used Python, with the Flask framework as the backend server running a SQLite-based relational database.

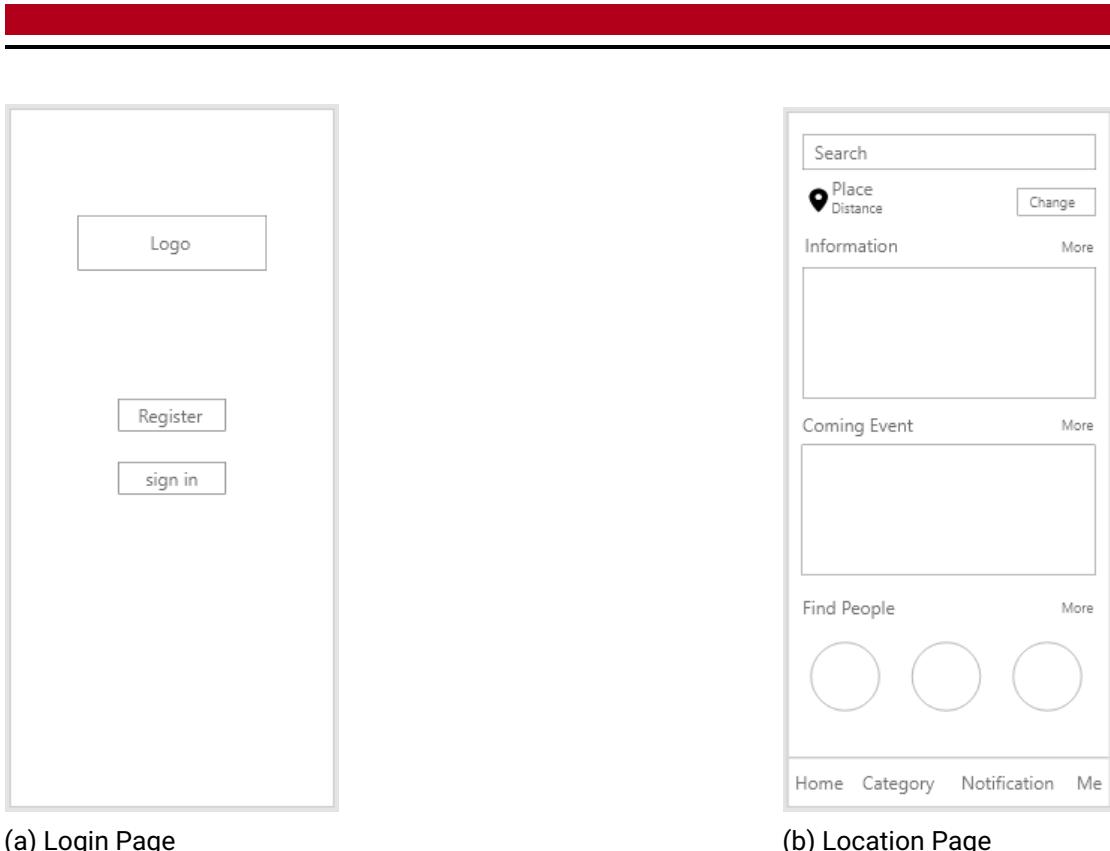
2.1 Concepts

2.1.1 Adobe XD

Adobe XD is a powerful and easy-to-use design platform that gives teams the tools, they need to craft user experiences collaboratively. It allowed us to work together in real-time on wireframe and mockup designs as well as prototype iterations.

2.1.2 Wireframe

Wireframing is an important communication tool in any web or app project. It gives the client, developer, and designer an opportunity to walk through the structure of the website without getting sidetracked by design elements such as colors and images. Our wireframe work shown down below:



(a) Login Page

(b) Location Page

Figure 2.1: Wireframe

2.1.3 Mockup

Mockups give viewers an idea of how the final product will appear, and the implementation of interactive elements like buttons and icons also hints at the function. Mockups are the best way to explore visual design decisions before we need to live with the consequences of code.

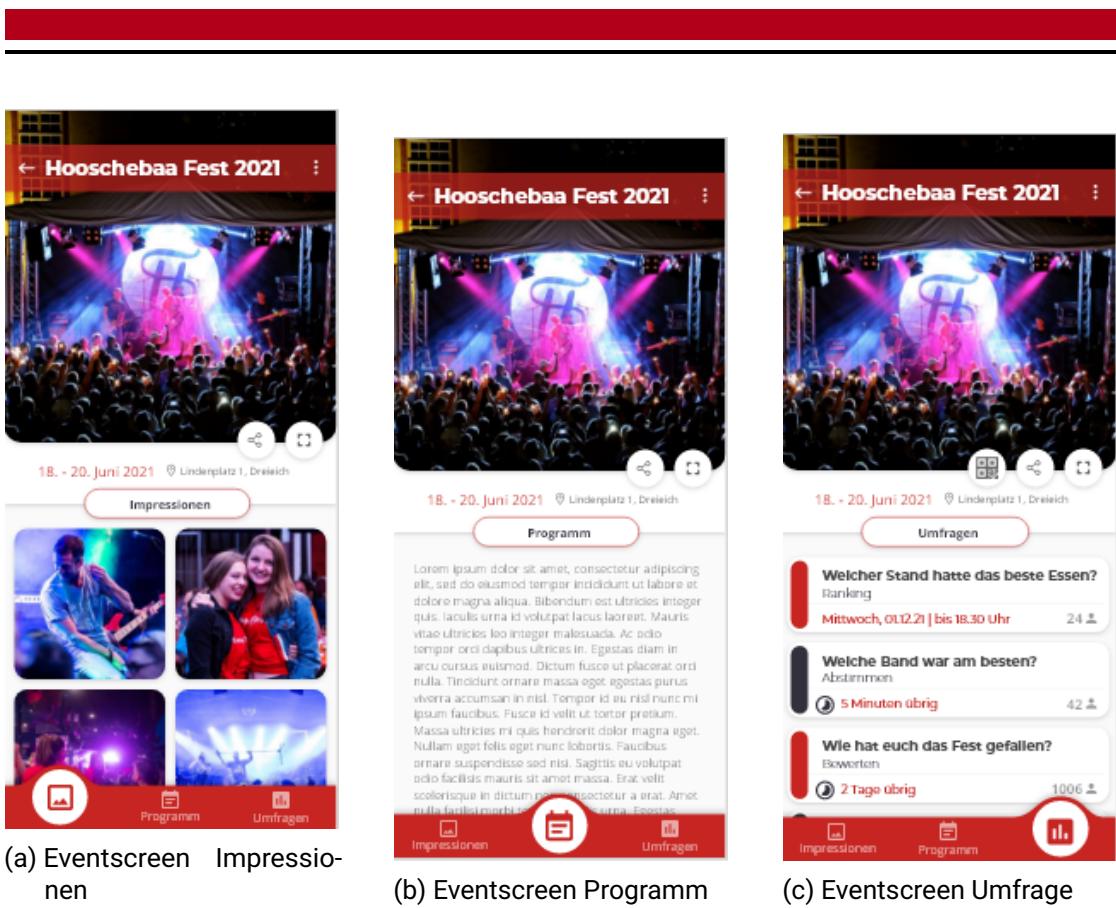


Figure 2.2: Mockup-1

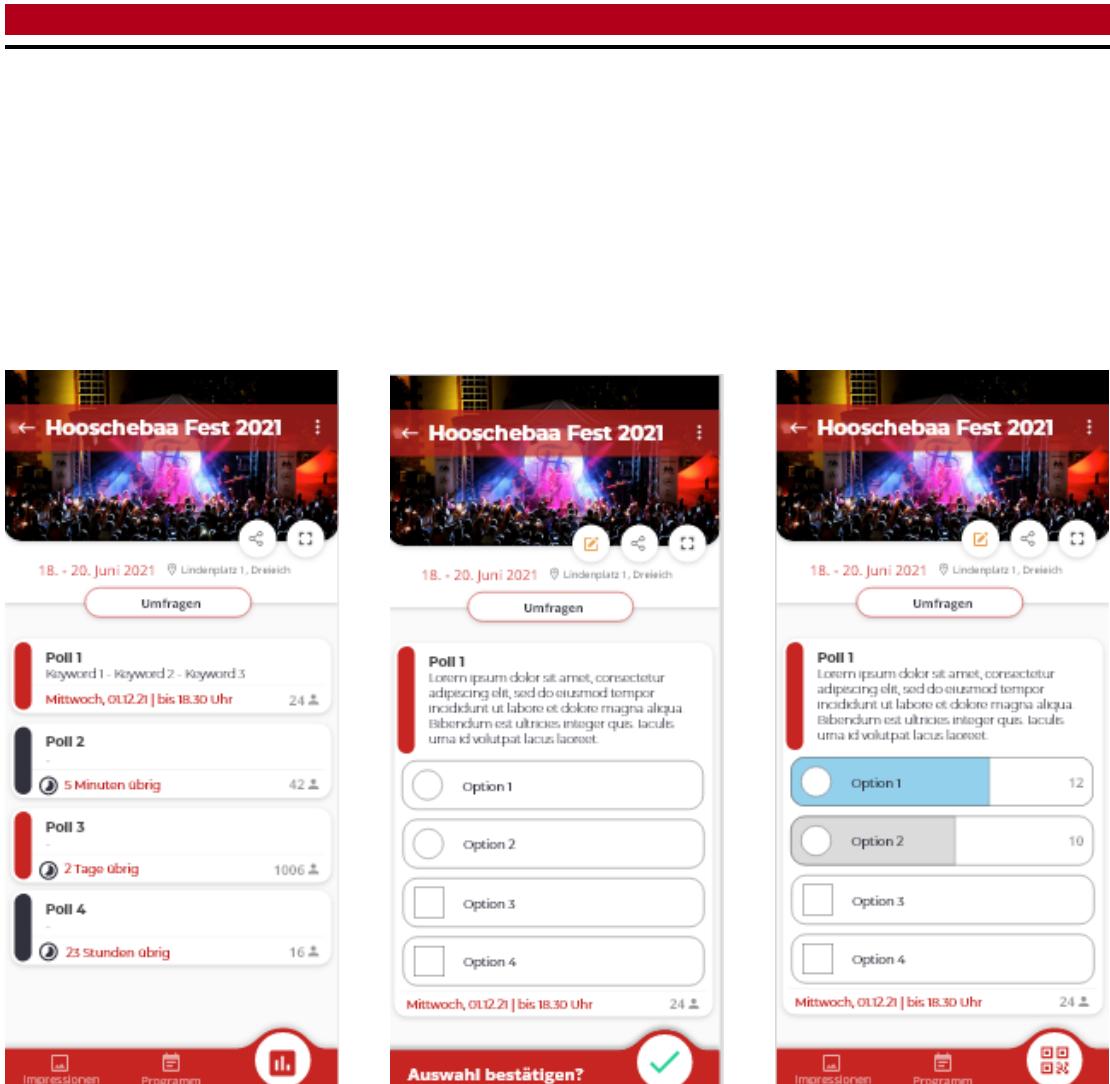


Figure 2.3: Mockup-2

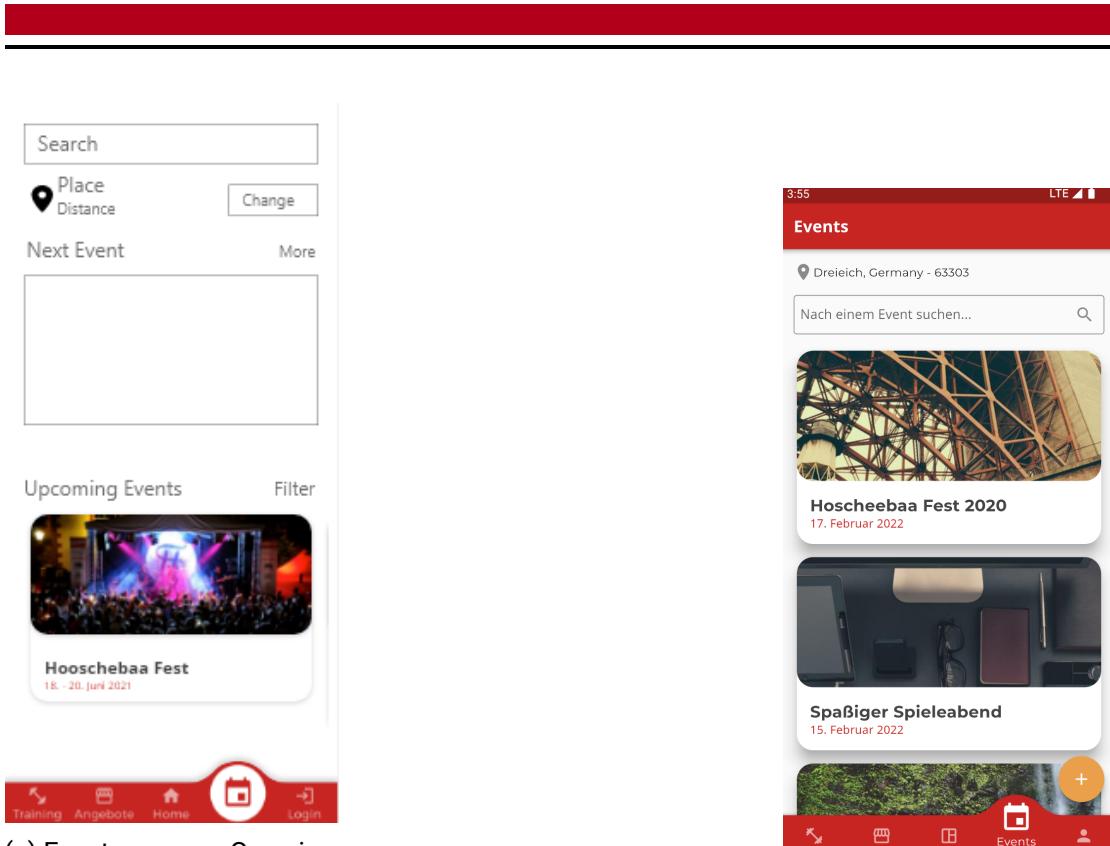


Figure 2.4: Mockup Comparison

2.2 Frontend

2.2.1 Flutter

Flutter apps are written in the Dart language and make use of many of the language's more advanced features. Flutter uses a variety of widgets to deliver a fully functioning application. The central idea is that you build your UI out of widgets. These widgets are Flutter's framework architecture. Flutter's Widget Catalog provides a full explanation and API on the framework.

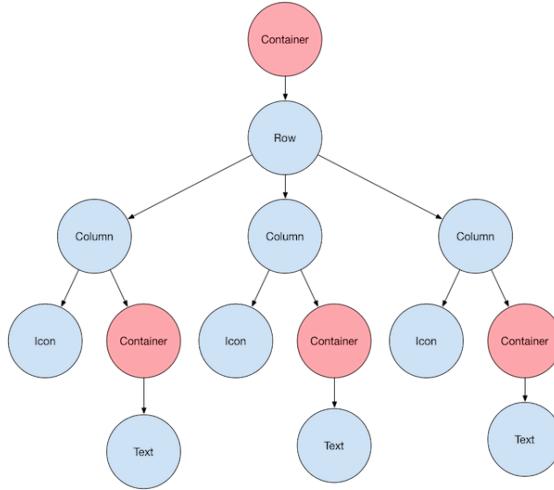


Figure 2.5: Flutter layout

Layout

There are different types of widgets in Flutter to build a complete functional UI. Most commonly used widgets are Text, Row, Column, Container, Stack and buttons etc. The diagram [2.5] shows an example of the Widget Tree for the UI.

2.2.2 Events-Screen

On the Homepage of Events Screen, the user can see the list of events, which can be filtered using search bar. All the events are displayed in the form of Card widgets and the user can get further details by clicking on the card. It will be routed to next screen (Event-View-Screen [2.2.3]) We have also implemented a Floating action Button to create new events (if the user is authenticated).

Geolocation

To get the current location of the device we used Flutter Geolocator plugin which provides easy access to platform specific location services.

Features

- Get the last known location
- Get the current location of the device
- Get continuous location updates
- Check if location services are enabled on the device
- Calculate the distance (in meters) between two Geo coordinates
- Calculate the bearing between two Geo coordinates

2.2.3 Event-View-Screen

In the Event view screen, user can see the details of the event. All the polls option will be displayed in another widget. User can participate in the polls if his current's location is in the range of Geo fence radius. Otherwise the polls will be greyed and not functional for user.

Flutter-Geo-fencing

Flutter Geo-fencing is a Flutter package for Flutter Application which provides Geo-fencing functionalities. Geo-fencing combines the awareness of users current location and proximity to locations that may be of interest. The Latitude Longitude and radius define the Geo-fence, which is circular area of fence around the location of interest. you can limit the duration of Geo-fence by specifying an expiration time in milliseconds. After the Geo-fence expires the location service automatically removes it.

2.3 Backend

2.3.1 Flask

Flask is a most frequently web application framework in Python. It is very easy to setup Flask environment. Python3 should be installed for prerequisite to Flask. After that you have to use 'pip3 install Flask' in a terminal and Flask is ready.

2.3.2 API's

We have used REST APIs for communication in our app. Following are the some of the important routes:

- */events* Gets a list of all events
- */events/<id>* Gets a specific event or adds/updates a new event.
- */events/<id>/polls* Gets all polls of a specific event.
- */events/<id>/image* Gets an image of a specific event.
- */vote/<id>/question_id* Votes or gets results of a specific question
- */poll/<id>/poll_id* Gets a poll
- */login* To login to the app
- */signup* To Sign up for new user
- */refresh_token* Used for JWT-token refreshing with the mobile applications
- */auth* Authenticates user credentials and provides account details
- */logout* To Logout of the app



3 User guidance

3.1 Organiser of Events and Standard User

There are two roles to use this app. Being a normal user you simply download STG app and participate in the Events polls listed on the Homepage. You don't need to Sign up or Login for voting. But if you are an Organiser of the Event and you want to add Polls and edit and delete Polls and Events. First step is to create an account as Admin role. If you have already an account then sign in using login page located in Menu bar at the bottom of the app as show in the Figure[3.1].



To sign up for the app or to Login (if you have an account) please follow the Figure [3.1] on the next page.

3.1.1 Login Page

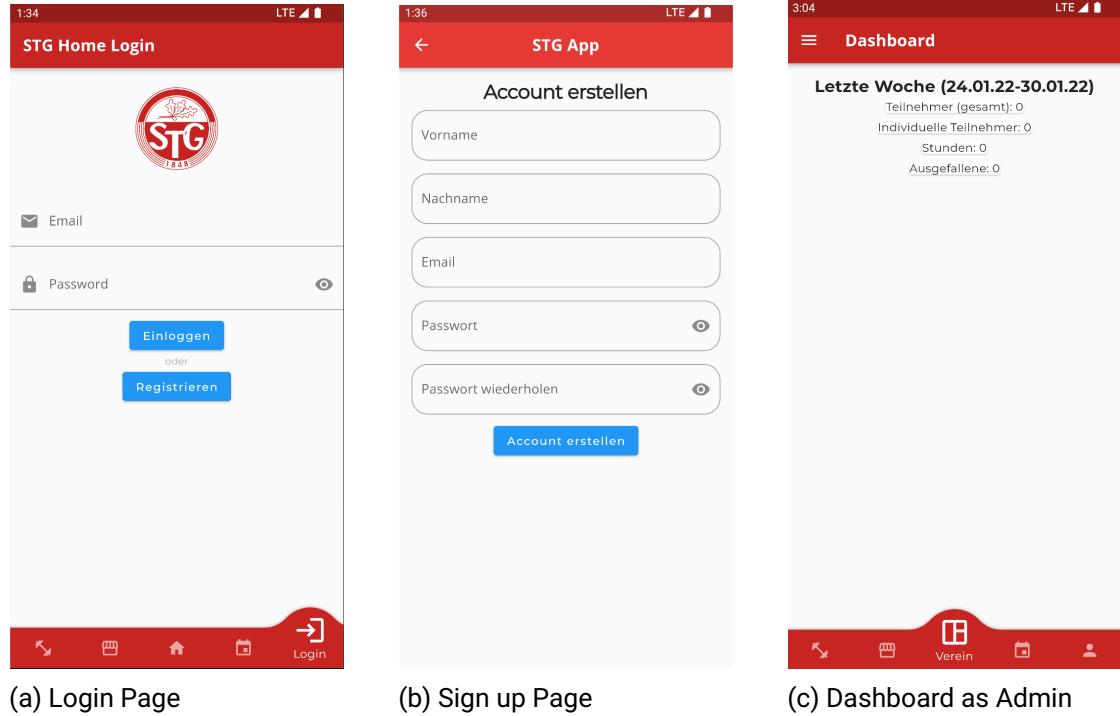
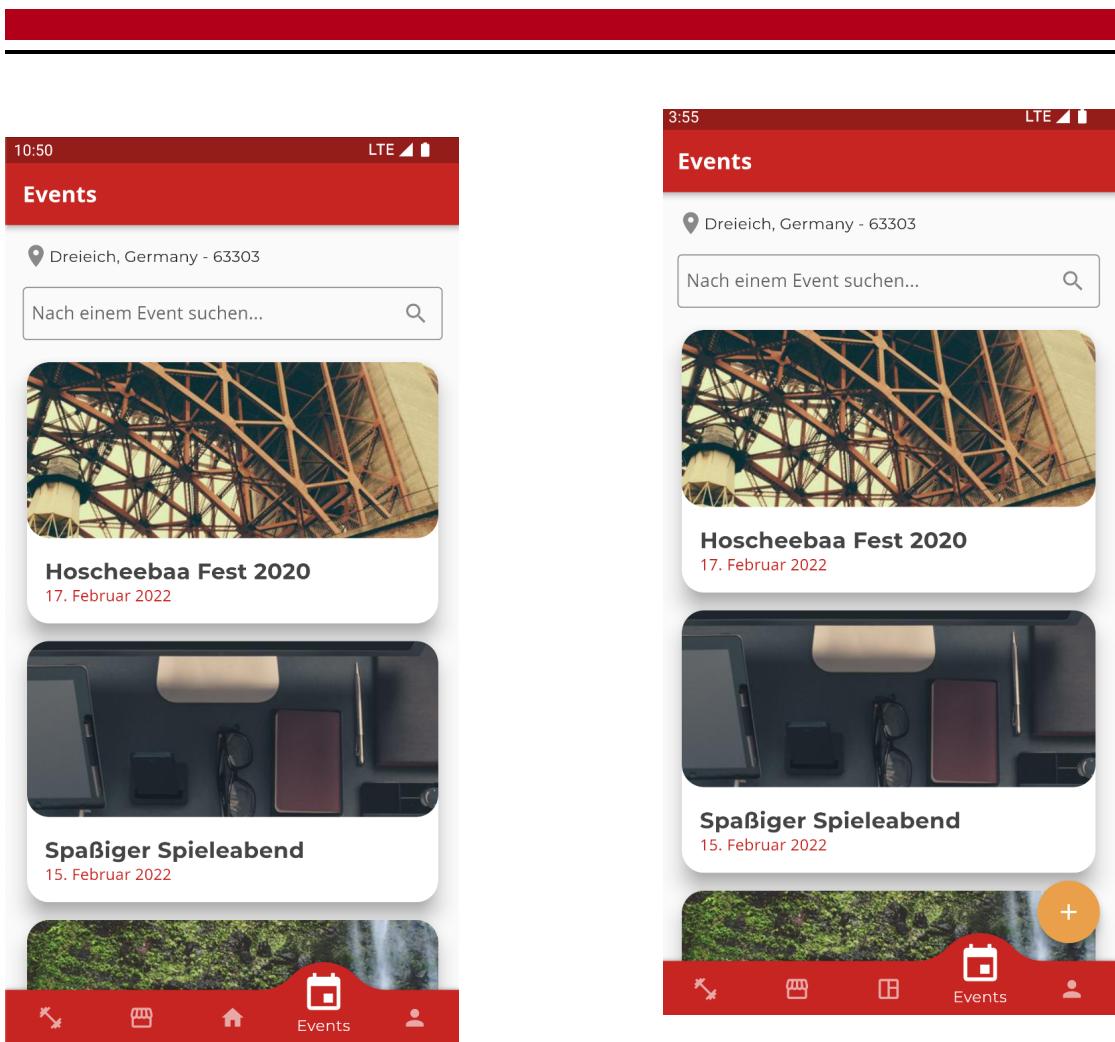


Figure 3.1: Login and Sign up Page

3.2 Events Homepage

User can see all the events happening on Event page. He can also filter for specific events using search bar. If app user is an organiser/Admin then he can add new events using yellow Floating Action Button and app will be routed to create event screen.



(a) Events Homepage for Standard User

(b) Events Homepage for Organiser

Figure 3.2: Events Homepage

3.2.1 Events Creation

Following Figures show all the options to create new events(only Organiser can create event).

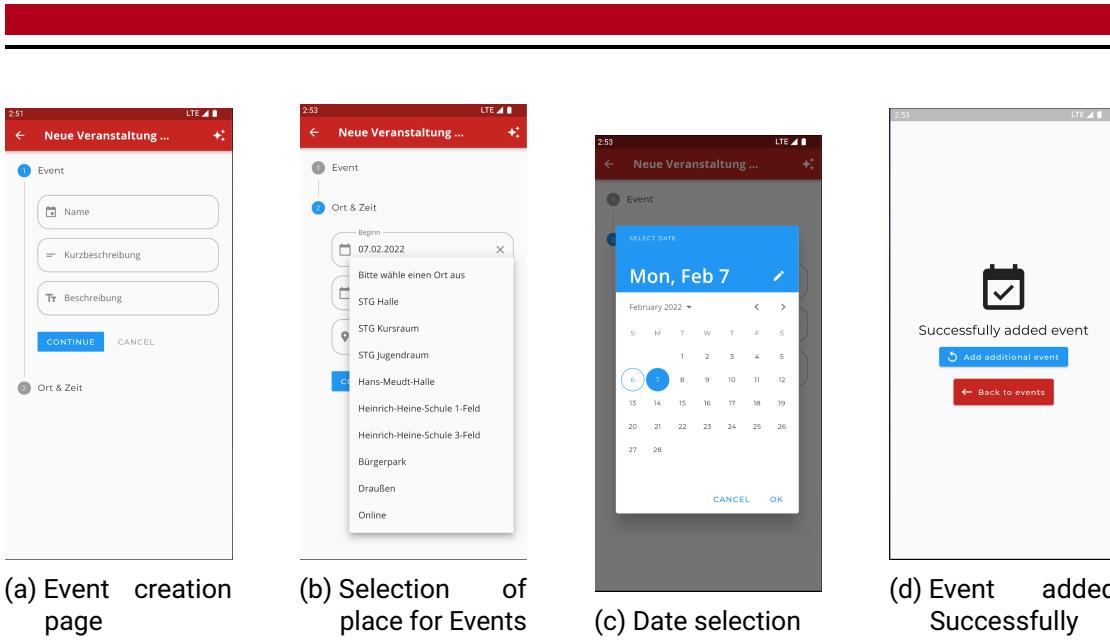


Figure 3.3: Creation of New Events

3.3 Events Details

When user will click on any Event he will be able to see the details about events and current polls. If User current location is not with in the radius of event location then polls will be greyed and he can not participate in the poll as shown in the Figure. When the user is in the range and the Polls color will be changed and he can see the polls. In Figure [3.4] Color of Poll and location icon is changed when we change the current location of Device.

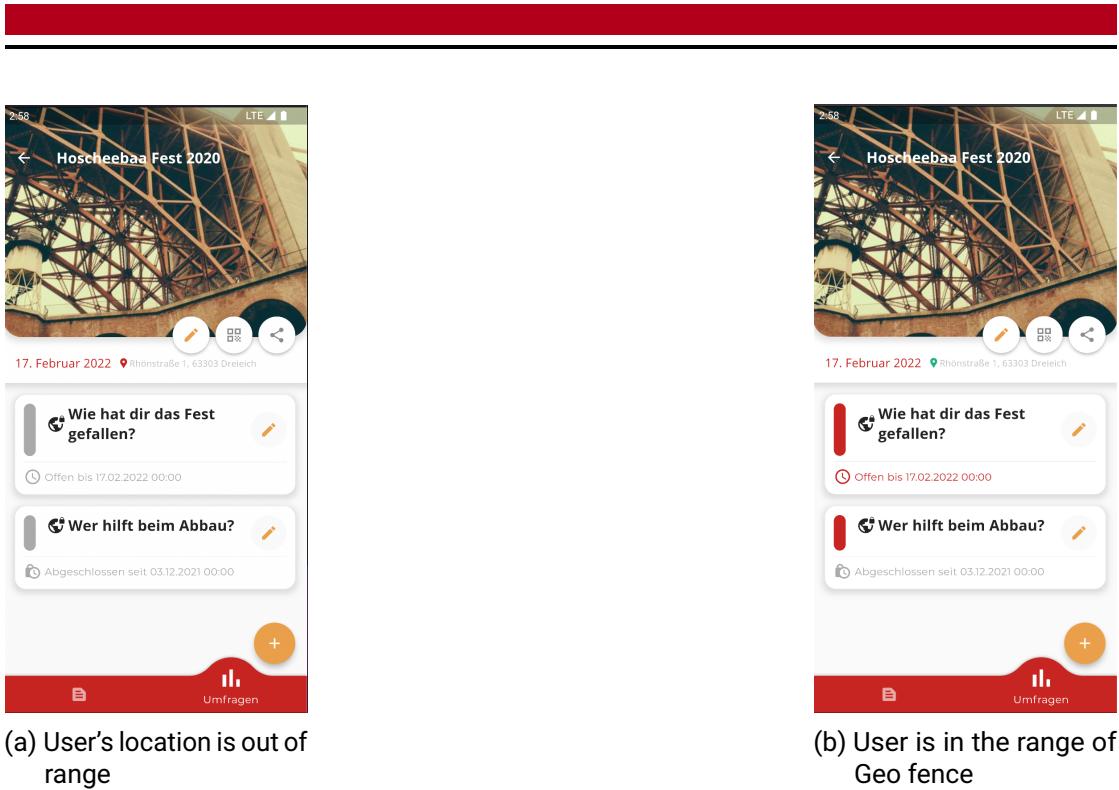


Figure 3.4: Two different locations of the user to differentiate

3.3.1 Polls

New Polls can be created and current polls can be edited only by Organiser with Admin Role. When the Admin is on event screen, he can create a new poll or edit current polls. And the user can only see the polls, after the admin has published them.

Following figures [3.5] shows all the options to create new poll.

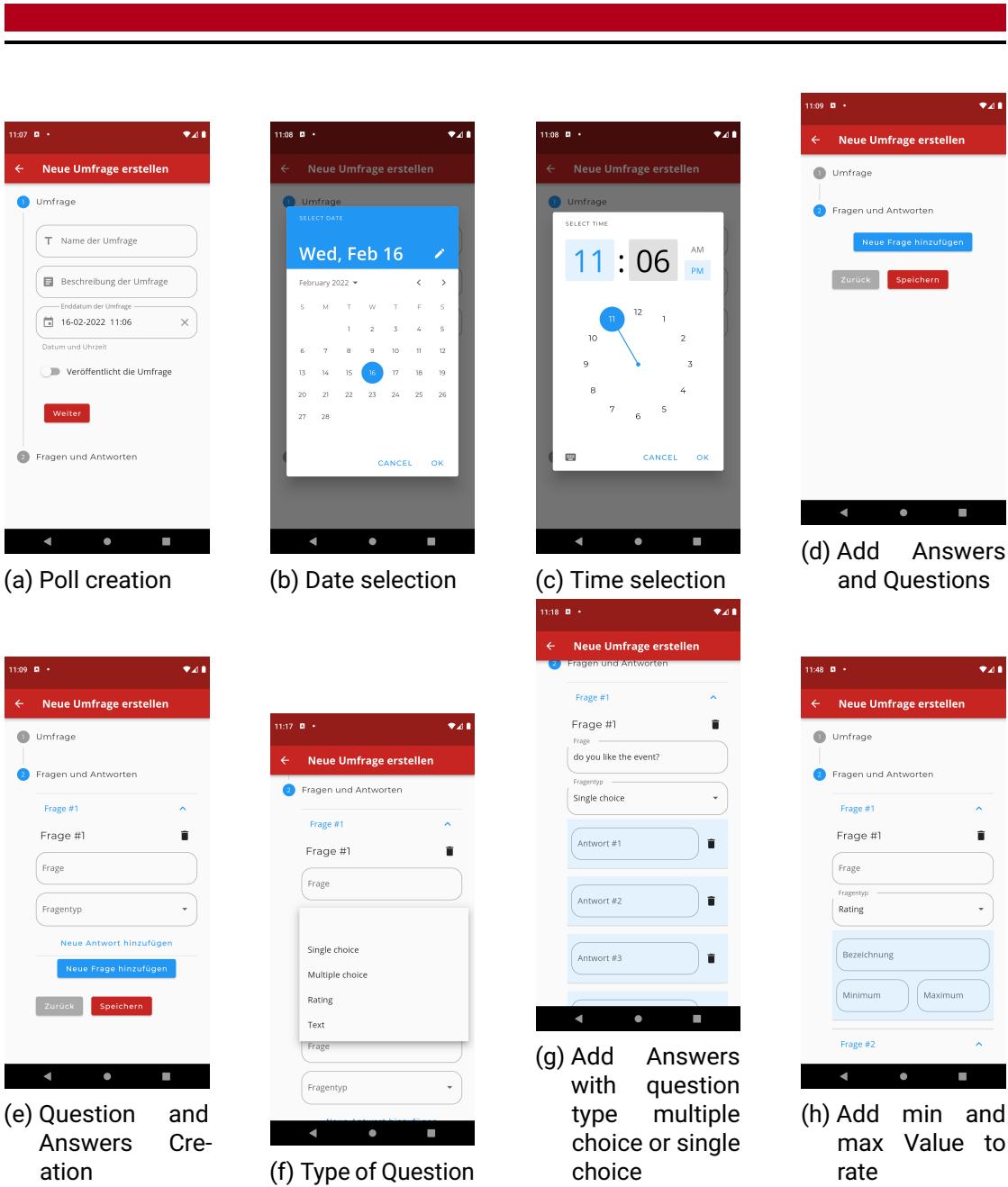


Figure 3.5: Step to create poll

Poll Editor is similar to Poll Creator. Admin can edit the poll's name, description, deadline of poll, and he can change questions and answer or add more question, answers to the poll. But when some user has voted on this poll, the admin can not edit or add questions and answers anymore.

3.3.2 Poll Questions and Results

When the user will click on the Poll he will be able to participate with four different type of questions. Single and Multiple choice questions, Rating type questions and Text Input Questions. Poll Creator can set the min and max value for the rating from options.

Following figures [3.6] shows the Questions and Results of the Polls

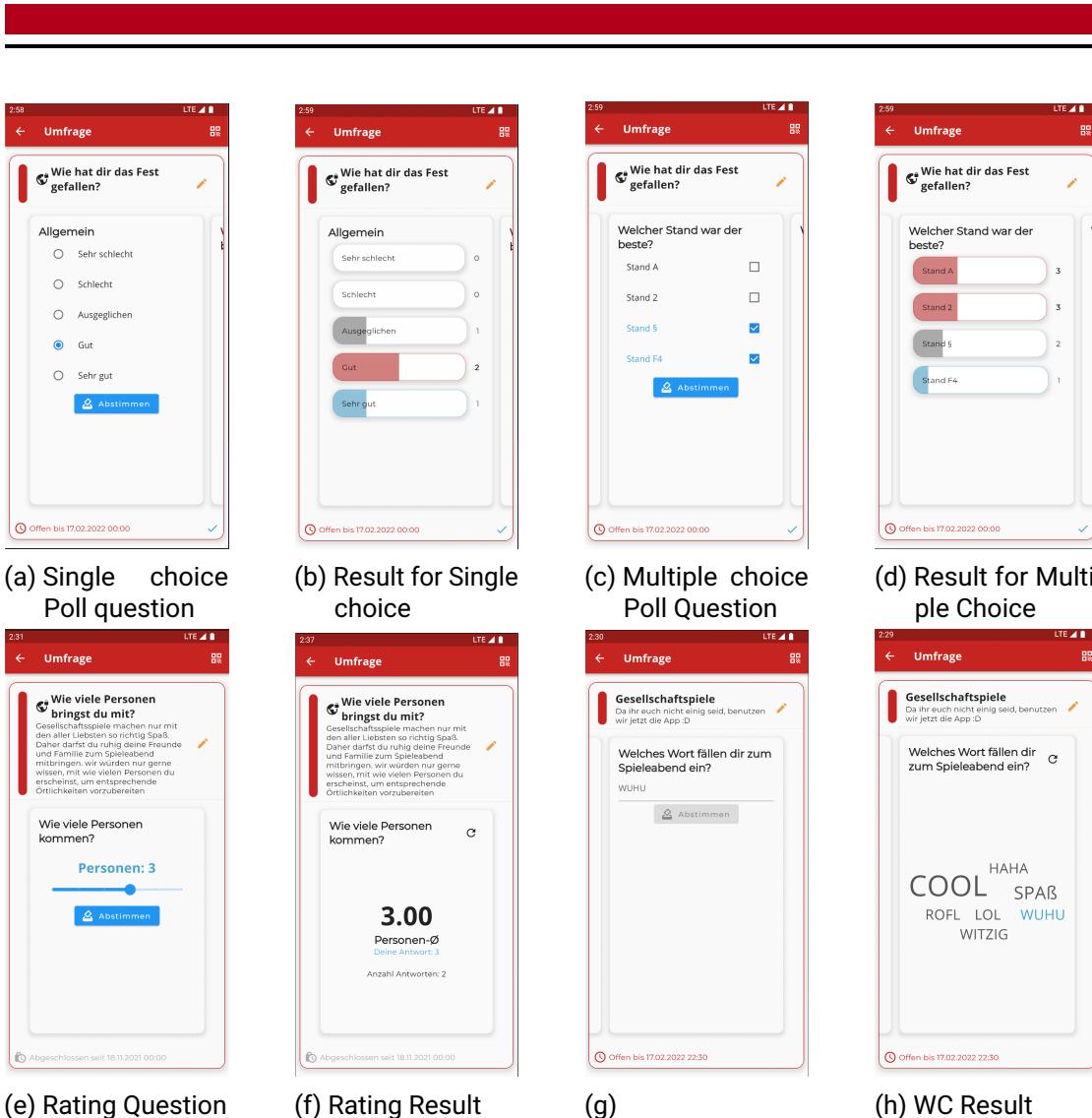


Figure 3.6: Three type of Polls and their results



4 Features

All the functions of the app are listed below:

General

- Cross-platform: Android(+iOS) and Web
- JWT-based authentication and session tracking
- Anonymous voting
- Participation by location or QR Code
- Smart notifications for new polls in close-by events

User

- E-Mail and password sign up and login
- Share poll QR codes
- Vote in public polls and local polls
- Display results with own vote

Admin (Organizer)

- Create and edit events
- Create, edit and publish polls with a customized editor

Poll features

- Four question types: Single choice, Multiple choice, Rating and Text
- public or non-public
- completion display
- unique result display for question types

5 Conclusion

The developed Location Poll App offers a comprehensive catalog of functions. As App is the part of Sports club it provides better connection to the People with Club. People can see Events happening in the club , can participate in the Polls. Polls results can be seen in different formats for clear feedback. Based on the Poll Results people can decide better to become a member of the club. Nevertheless, when looking at the individual components, there are a lot of possibilities to extend them which could be possible if we would have more time.