A Reddit App for Android

1. Abstract

Reddit is a social networking and news website, which allows users to submit links to content such as news articles, videos and image galleries, and provides a forum for discussion. It offers an API, which can be used by third-party developers to create browser add-ons and smartphone clients.

In this project, I developed Rebbit – a Reddit client for Android. The goal was to create an app that uses the latest Android capabilities to provide a pleasant and modern user interface. I also proposed an innovative dynamic way of displaying comment trees, to maximize the usability of small screens. Rebbit allows users to sign in, switch between different subreddits (categories), view and vote on links and submit comments. It offers a number of visual touches such as shared view transitions between screens and quick in-app display of linked images and web pages. The client was written in Java on top of Android 21 (Lollipop). The project also includes an OAuth server written in Ruby on Rails with a PostgreSQL database, which is used to authenticate the user with Reddit.

While the app offers the basic Reddit functionality, it is still not ready for release. The missing features include a more complete coverage of the Reddit API (such as editing, deleting or moderating content), as well as refinements to comment display and extension of in-app handling of special content such as videos and image galleries. In this paper, I outline the structure of the app, explain the obstacles that I faced and discuss the most important future improvements.

2. Features and User Interface

Rebbit provides the following features:

- Sign in using OAuth
- View lists of links by subreddit (category)
- View linked websites and images
- Vote on, save, hide and post comments to links
- View comments for a link
- Vote on, save and reply to comments

2.1 Sign in

To sign in, the user swipes from the left to open the navigation drawer and clicks “Log In”. This opens a web browser window in which the user has to log into Reddit and give the app permission to access their data. Once this is done, the app has access to the user account.

2.2 Subreddits and Links

Once the user signs in, the app loads the list of subreddits they are subscribed to. By default, the app loads links from the front page of Reddit. The user can select a different subreddit from the list in the navigation drawer.

The links are displayed as a list of cards. The format of the card changes depending on the type of the link. For example, self-post (text-only link) cards show a part of the text, while image links show the image prominently. Each link shows the author, time of submission and the subreddit, as well as the vote and comment count. There is also a set of buttons, which allow the user to vote on the post, save it or hide it. If the user already interacted with the card, the buttons change color to indicate that (e.g. the upvote button becomes orange if the post was already upvoted, and a second click undoes the vote).

Clickable elements of the card have a ripple touch feedback effect – the background of the element darkens in a circle originating at the point of touch.

Clicking the center of the card leads to a different action depending on the type of the link. Clicking a self-post opens a card with the full text and loads the comments for that post. Image links open in a new window where the user can zoom in and navigate the image using touch gestures, while website links open in an in-app browser window.

These actions use Android’s shared view animations to create smooth transitions between screens. For example, when the image is clicked, it will gradually increase in size and move to its new position at the center of the screen, while the other links will disappear from view. You can see these animations on the project website.
2.3 Comments

Clicking the comment count takes the user to the comment view. The card they clicked slides to the top of the screen (with a shared element animation), while the comments load below. The user can still interact with the card in the same way as before, as well as click the reply button. Clicking the reply button opens a new window where the user sees the title of the post and types a reply. After submitting the comment, the app goes back to the previous screen.

Comments are displayed in a tree view, where comments deeper in the tree have a larger margin on the left side, to separate comment levels visually. Clicking a comment expands it and reveals a set of action buttons that allow the user to vote on the comment or reply to it. Clicking it again hides the action buttons. A long-click on the comment collapses it. This hides the comment text and all of its child comments.
3. Implementation

The client was written in Java on top of Android 21 (Lollipop). The OAuth server written in Ruby on Rails with a PostgreSQL database.

3.1 Authentication

When the user clicks the sign in button, the app makes a request to the Rebbit server, which replies with a random state string. The app then sends the user to the Reddit authorization page. After the user authorizes the app to access their data, they get redirected to the Rebbit server, which receives a refresh token linked to the state string used during authentication. After it receives the token, it stores it permanently in the database. This is a one-time process.

The refresh token is permanent (unless the user revokes their authorization). It allows the Rebbit server to request temporary access tokens. Access tokens allow the app to do actions on behalf of the user, but expire after one hour. Therefore, every time the Android app does an action that requires OAuth authentication, it checks if its current access token is still valid. If it expired, it requests a new access token from the Rebbit server, which in turn gets it from Reddit using the refresh token.
The details of the Reddit authentication system are available at the Reddit API documentation website.\(^1\)

### 3.2 Data Model

The Reddit resources in the app are represented by the Listing, Post and Comment classes. These classes inherit from the Thing class, which provides callbacks for classes that display the data (those classes implement the ThingListener interface to receive callbacks when a resource is loaded or updated).

The resource classes are responsible for loading and parsing the data from Reddit, as well as submitting the data resulting from user actions. Post and Comment also provide a presenter class, which is responsible for filling a view with information from the resource (such as author, comment body, vote count etc).

To load and submit data, the various Thing subclasses use the RESTTask class. It provides an asynchronous interface to make HTTP requests to the Reddit server. It takes a HashMap parameter, which determines the HTTP method, headers and parameters. RESTTask runs on a separate thread to allow the main UI thread to run uninterrupted.

The DataProvider class is responsible for providing other classes access to the Reddit resources and for caching them in memory. There is no permanent storage of listings, posts or comments.

### 3.3 Views

The app has a single Activity, which manages fragments (ListingFragment, PostFragment, ImageFragment...), as well as the navigation drawer and toolbar. Each fragment is responsible for displaying a specific resource (a link listing, a post, an image). It also manages the backstack, which determines which view is displayed when the user clicks the back button.

The fragments that show a list of links or comments use Android’s RecyclerView. This class improves performance by using a small set of objects to display a large list of items. When an item scrolls off the screen, its container object is reused to display another item later. RecyclerView adapters populate their views with data via the presenter class of the resource. The adapters implement the ThingListener interface to receive callbacks when the resources are updated, and then update the views accordingly.

---

1 [https://github.com/reddit/reddit/wiki/OAuth2](https://github.com/reddit/reddit/wiki/OAuth2)
4. Difficulties

The only major difficulty I encountered was related to the comment display approach that I planned to implement. The goal was the following: as the user scrolls down the comments, the bottom-most visible comment is marked as the current comment. If its ancestors are not visible, all its non-ancestors displayed above it should collapse. This would make more room for the comment’s ancestors, so as the user is reading the comment they would more easily see its context. If the user scrolls back up, the collapsed comments should expand again.

The following image illustrates the idea. The bottom-most comment should be marked as current. All the other comments on the screen should collapse in order to make room for its parent.

RecyclerView provides an easy way to check the visibility of elements. However, when an element is hidden, the empty space is filled from the bottom. That is, instead of the parent comments moving down, the current comment moves up. In retrospect, that is the expected behavior since the RecyclerView maintains its current scroll offset from the top of the screen. There is no built-in way to override this behavior and rewriting the internals of RecyclerView would be very complex, therefore this feature was not implemented.
5. **Future Directions**

The following is a list of possible future improvements to the project:

- Extend the app to match all the functionality of the Reddit API. This includes live threads, private messaging, user profiles and more.
- Handle more types of links internally in the app (for example YouTube videos and image galleries)
- Optimize the app for larger devices such as tablets
- Implement permanent storage of data to provide some offline access