COMP4971C - Independent Work Final Report

Mobile social application with community-based content rating and sorting algorithm

KU Chun KIt
Advised by Dr. David Rossiter

Department of Computer Science and Engineering
The Hong Kong University of Science and Technology

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1. Motivation

The Internet contains an unmeasurable amount of useful information, Facebook users alone share about 2.5 million pieces of content every minute[1]. When the information is presented to the right person, on a right platform. Meanwhile there are an unmeasurable amount of junk information: ads, unrelated messages, outdated information, disturbing Internet surfers every now and then. To ensure quality information can be accessed with ease, this project aims to employ a content rating and sorting algorithm empowered by the users themselves. Junk information will sink to the bottom of the list as users help to “down-vote” them while the useful will submerge from the chaos.

This project aims at developing an anonymous social network, HKUST Secrets, for user content generation with community-based content rating and sorting. Content published by anonymous users on the social network will be rated in a crowd-sourcing manner, where the system would rate the content by certain action users (e.g. up vote, down vote or comment) performed.

2. Deliverables

A mobile-optimized application portable on Web and in various modern Android phones such that users can enjoy a near-native experience on Android, and still be able to use the application on different platforms supporting web browsers.

A back end application on a web server running PHP5.4 and MySQL. The back end application is capable to run on web server software like Apache and is portable by its source code as PHP script to different servers, no recompilation is needed.

[1] James, 2014. Data Never Sleeps 2.0. Retrieved from http://www.domo.com/blog/2014/04/data-never-sleeps-2-0/

3. Features

3.1 Common social network features

Users can post, read, and comment to posts on HKUST Secrets anonymously. Although users have to login before use, their actions are totally anonymous to other users. The login feature is used to track the issues of up/down votes to prevent vote spamming. The application content are served over encrypted HTTPS to ensure security.

3.2 Crow-sourced content rating and sorting

To each individual post, users can issue either up or down vote to show whether a post is useful and interesting to them or not. The listing of posts will be sorted by a hot function - each individual post is rated by its time of posting and number of up and down votes it has. Users expect to see the “hottest” post of the current time, and the posts with many down votes are sinking to the bottom.

3.3 Cross-platform compatibility

Today’s multi-device trend demands an application to be portable to a number of platforms. The best solutions to date are either web or java. In this project web technologies are used to ensure any device with a web browser new enough can use the application. Android 4.0+ and iOS6+ are officially supported by the framework used, and modern Webkit browser such as Safari and Chrome are very well supported.

3.4 Mobile optimized interface

One emphasis to this application is accessibility. Despite the application is perfectly functional on browsers, its design primarily centers at mobile usage with touch screen and one-hand operation. Mobile-optimized features in this application include infinite scroll where users do not need to press a “next page” button, the post content/comments will load automatically; pull-to-refresh in which users are not pushing a “refresh” button but simply use a “pull down” gesture in a post list to read

new content

4. Demonstration

The demonstration will follow the use cases in Appendix 1 in which users will (1) explore posts; (2) create posts and (3) leave impressions on post. At the end we will also demonstrate the cross-device compatibility of this application.

4.1 Explore posts

Login and "Remember Me"

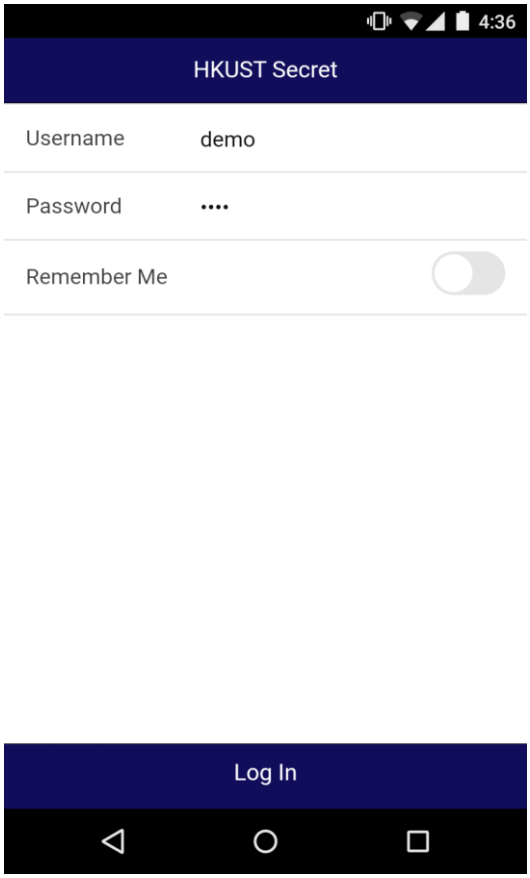


Fig 1. this is a standard login screen, user press the button at the bottom to login

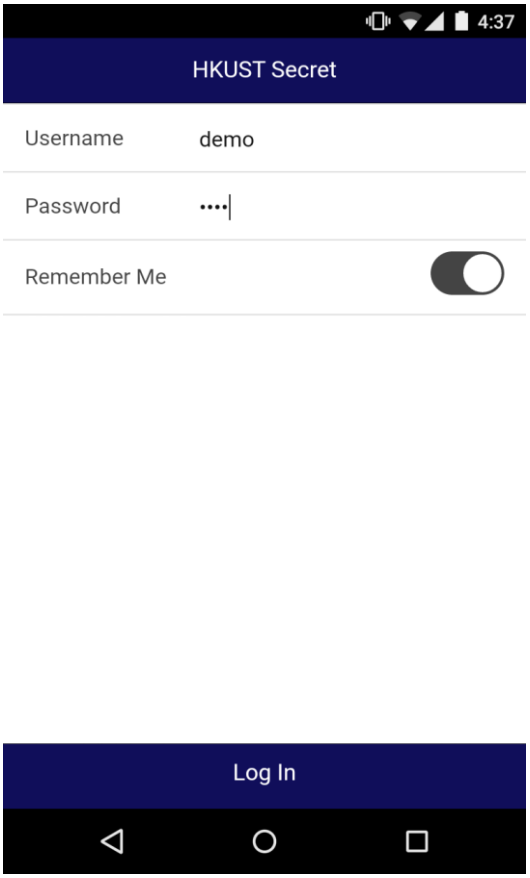


Fig 2. user may choose to auto-login next time, only the authentication token is recorded instead of the password

Login and “Remember Me” (cont’d)

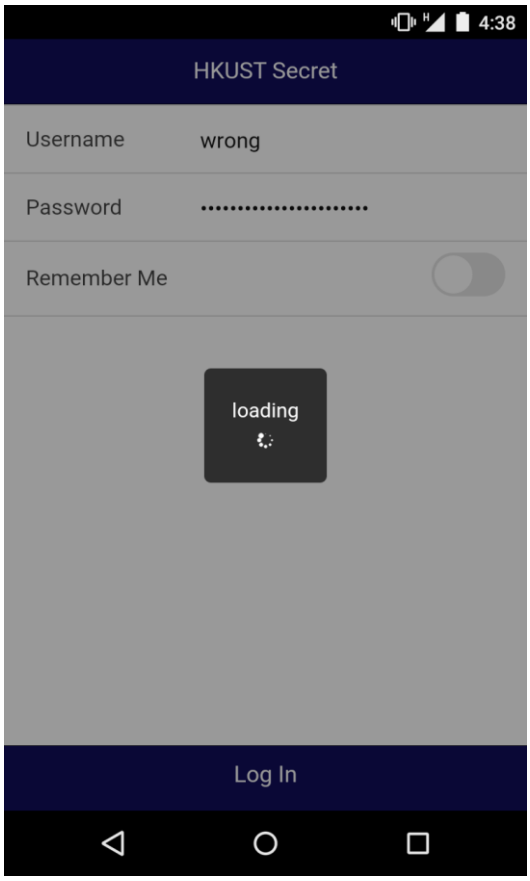


Fig 3. a loading screen is shown when the application is processing the request

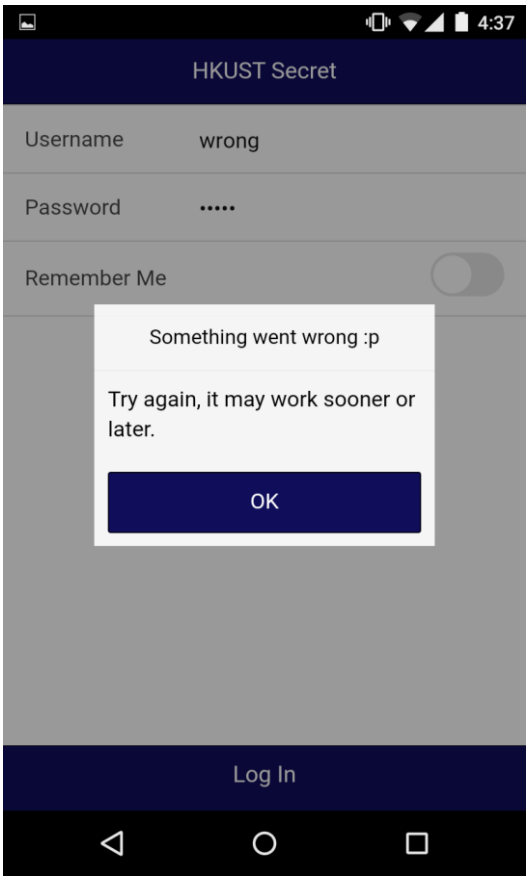


Fig 4. if user typed a wrong password or the network is unstable, error message is shown

Post listings

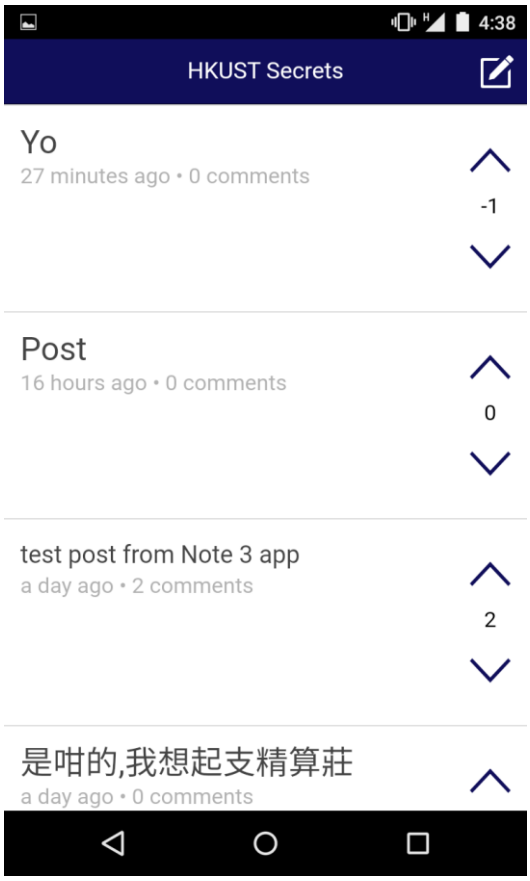


Fig 5. on the right shows a net amount of votes (up minus down). font size varies according to the title length

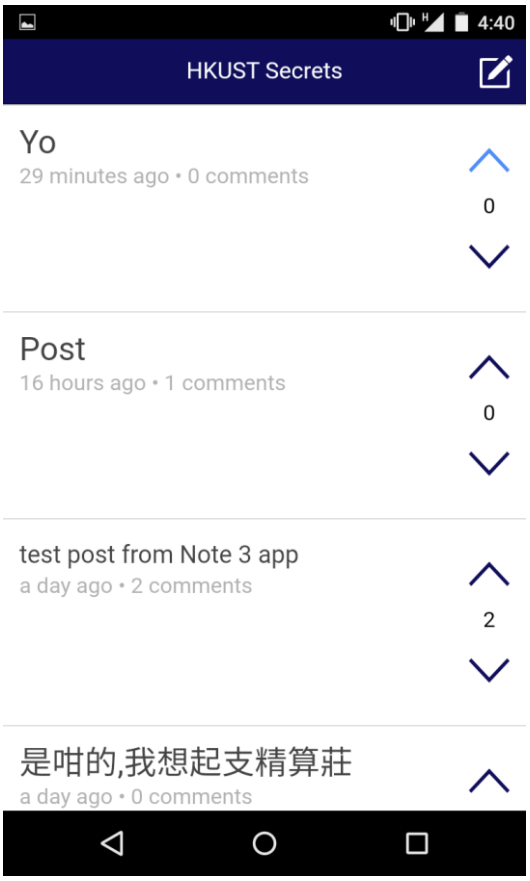


Fig 6. if this user has posted a vote, the arrow of that post will show a lighter blue color

Post listings (cont'd)

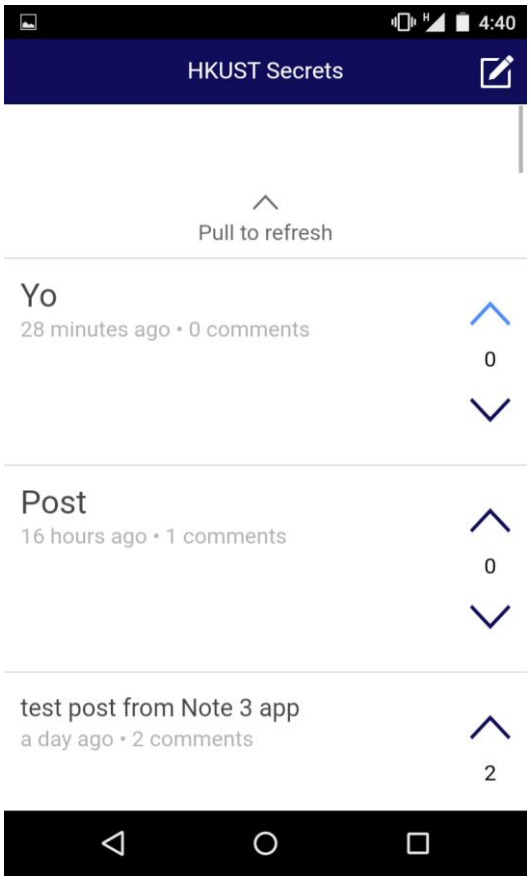


Fig 7. by pulling up in the list view user can reload the posts to see updates

Fig 8. as user scrolls down, more pages are automatically loaded to save bandwidth

Post read

Fig 9. tapping a post in the list view brings user to reading the post, post content and comment are only loaded at this point to save band width

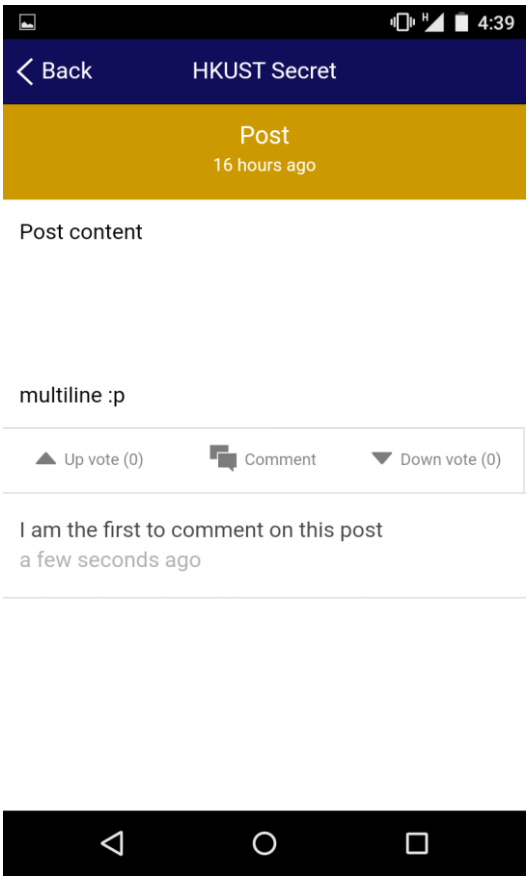


Fig 10. by swiping left or right users are directed to next/previous post, where again the comments are loaded in an infinite scroll manner

4.2 Create post

Post write

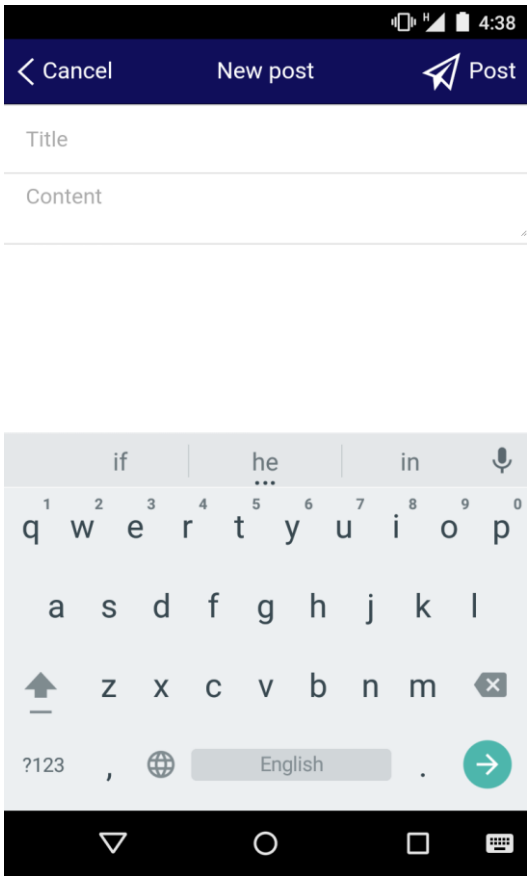


Fig 11. by clicking the icon on top left of post list view, users can write a new post, anonymously. the post is sent by tapping the top left "Post" icon

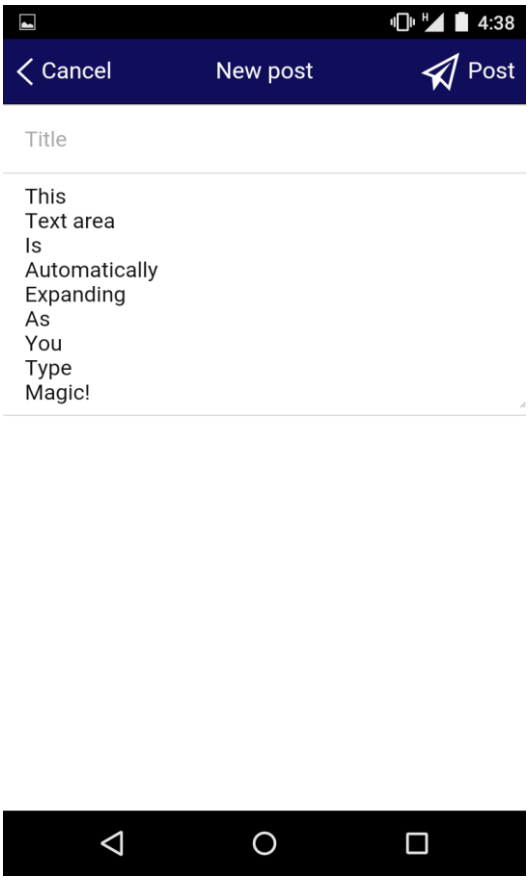


Fig 12. unlike normal HTML textarea, it reassembles the native Android behavior of text boxes

4.3 Leaving impressions on post

Leave comment

Fig 13. by tapping comment button in the middle, a text box is shown, user can type in the comments

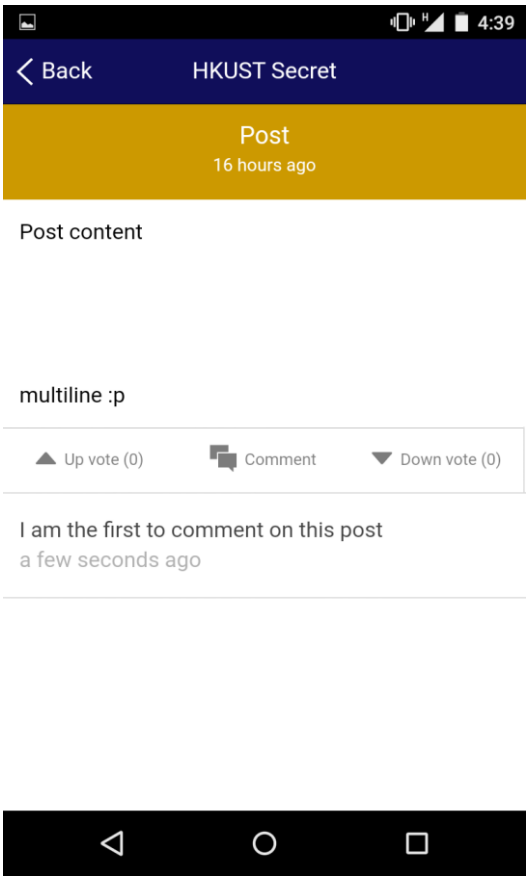


Fig 14. to create an illusion that it loads super-fast, the comment is shown in the comment section before the server confirms the submission

Placing vote

Fig 15. by tapping up/down vote button in the middle, the text turns light blue to create an illusion that it is super-fast

Fig 16. the icon will have a jumping animation once the server received the vote, this user can no longer give another vote to this post

Placing vote (cont'd)

Fig 17. a light blue arrow shows up in list to show it has been voted

4.4 Cross-device compatibility

The web app version is available at
https://chair-thesecretchair.rhcloud.com/app/www/index.html

It is essentially the same as the native app version.

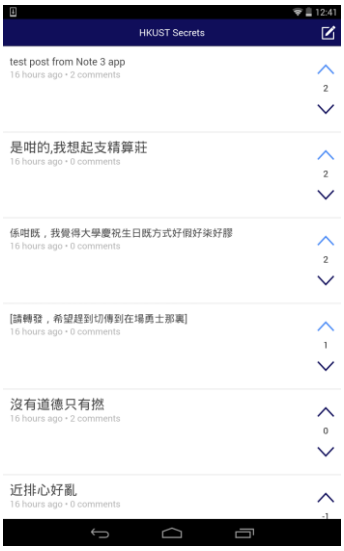


Fig 18. Nexus 7 (native app)

Fig 19. iPhone[2] (Safari browser)

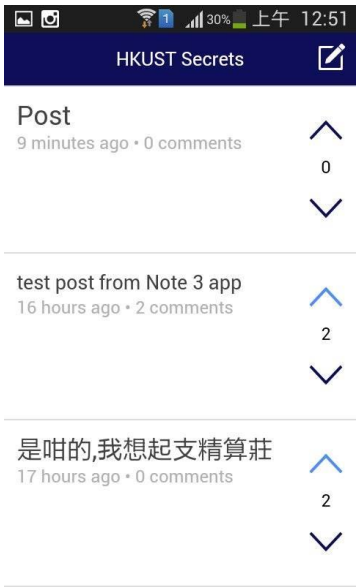


Fig 20. GALAXY GRAND Neo (native app)

[2] This screenshot is captured from an older build of the application, so the number between arrows is shown differently

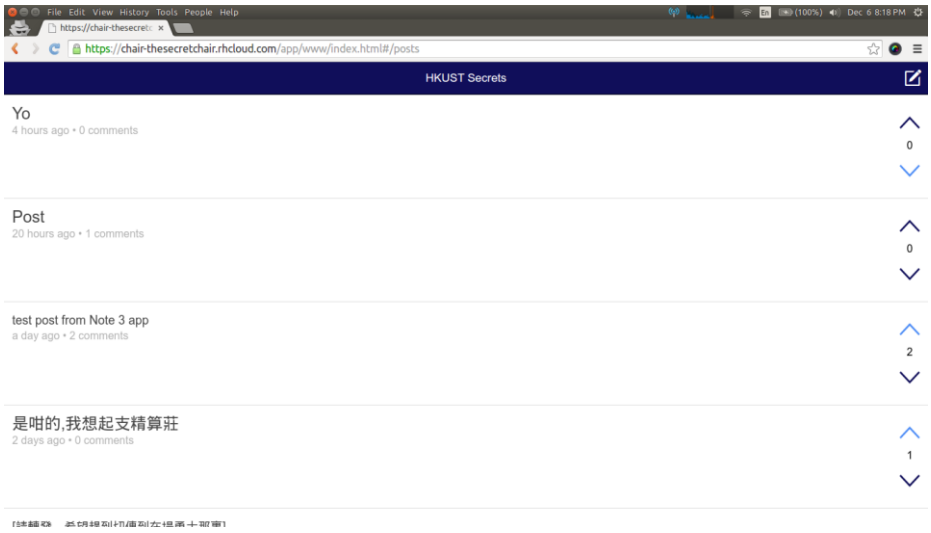


Fig 21.
Google chrome
(web app)

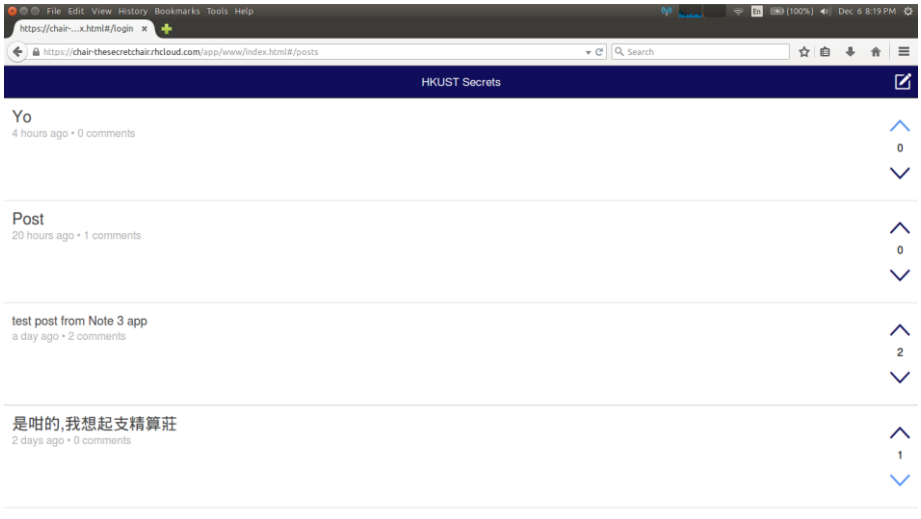


Fig 22.
Firefox
(web app)

5. Competitive analysis

Feature / Platform	**Anonymity**	**Give response to content**	**Content rating and sorting**	**Cross platform**
HKUST Secrets	Yes	Up/down vote, comment	Yes	Web, Windows phone, Android, iOS
Facebook	No	Like, share, comment	Yes (FB decides what you see, like advertisements)	Web, Windows phone, Android, iOS
Reddit	No	Up/down vote, comment	Yes	Web, iOS
Twitter	No	Favorite, Retweet, comment	No	Web, Windows phone, Android, iOS
Secret	Yes	Like, comment	No	Web, iOS, Android

The primary advantage HKUST Secret has over its alternatives are its cross-platform compatibility and anonymity. Being a web app makes HKUST Secret easier to maintain because modifying the web app itself automatically update other versions. All of the actions users have taken in HKUST Secret are essentially anonymous, which is the biggest selling point of HKUST Secret.

6. Implementation

6.1 Front end (Ionic, AngularJS, SASS, HTML5/Javascript/CSS3)

To provide support to various devices, a framework called Ionic has been used. It allows for compilation of Android application package (.APK) and direct reuse of the source code as a web application. Web application is so flexible that with an appropriate wrapper such as Node-Webkit, the application can even be wrapped into a desktop application, but this has not been implemented for this project. In the Android version of the app, it is actually a Webkit engine wrapping the application as if a webpage is being shown, that is why the web version and mobile app version look 100% the same, except for performance difference subjected to the rendering engine used.

The internal working of the application are composed with AngularJS, which provides for model-view-controller decoupling: each view has its own controller, like individual sub-programs. This way the Javascript code are decoupled from the HTML code and the HTML files of individual view can be loaded only when needed, thus saving bandwidth.

The visual elements and view architecture are done with heavy use of CSS, HTML, and SASS, a CSS preprocessor required to modify Ionic's built-in styles. CSS drives the dynamic visual elements in the application such as transition animations, content fade-in, which Javascript can hardly give an equally impressive result as the rendering engine favors CSS animation than Javascript animation. Without HTML, the application cannot even have a recognizable interface for user to interact with.

6.2 Back end (PHP/Laravel, MySQL, Openshift web hosting)

To ensure scalability and maintainability, PHP framework Laravel is used to construct the backend of this application. Laravel has already provided a set of libraries to ease the pain of reinventing the wheels for developer. Laravel uses RESTful routing to create interface for manipulation of resources like posts and votes over the Internet, and uses composer to manage its packages, plus its own 'artisan' command line tool for manipulating creating database, controllers and a lot more.

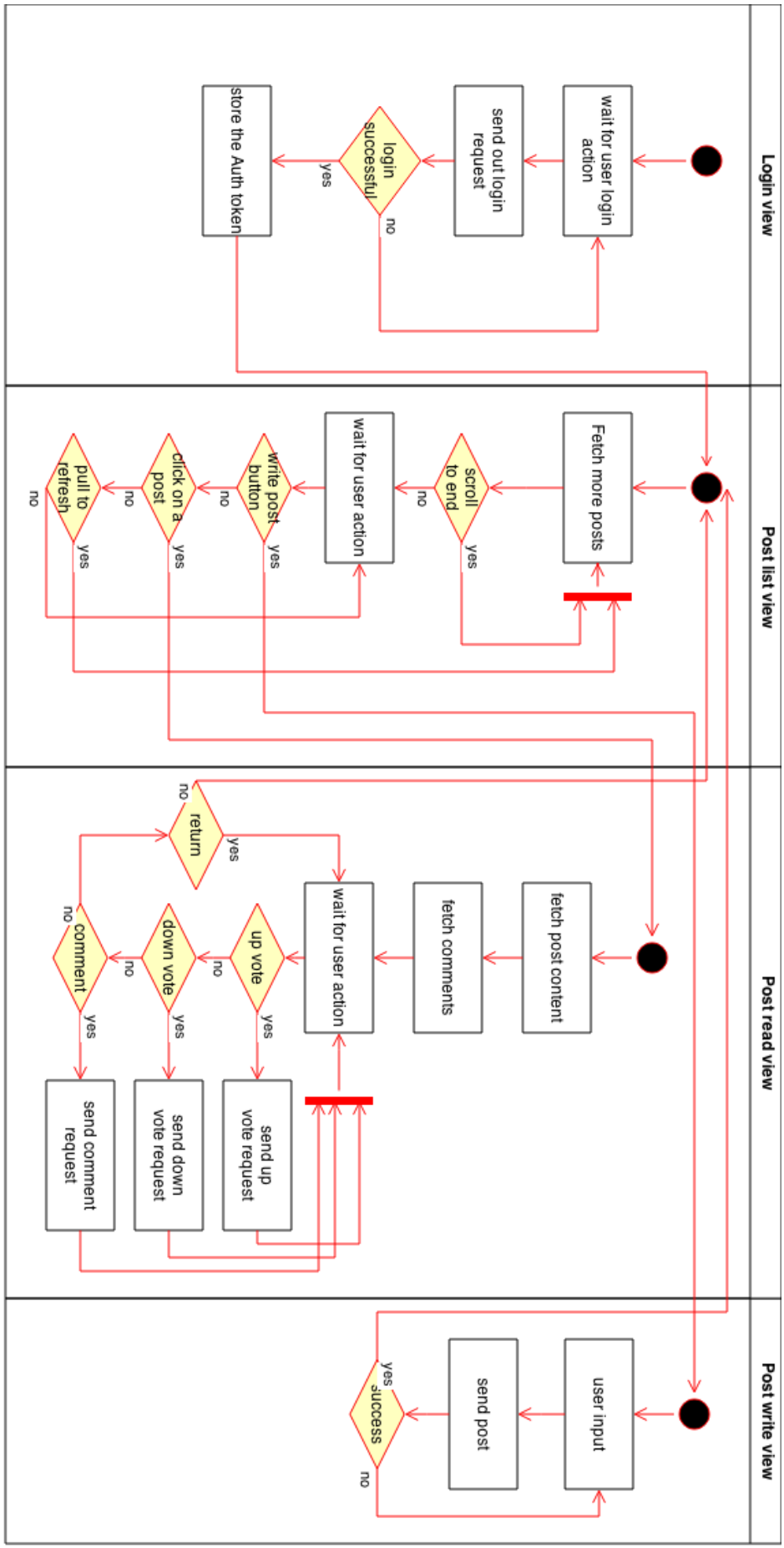
MySQL is the database software of choice because it is free, well documented and maintained, and it is natively supported by Laravel. SQL functions and many SQL queries are called via Laravel's libraries, thus minimizing the amount of raw SQL a developer has to write. To rank the content[3], we implement the content ranking algorithm which Reddit has been using, in which time gives a linear impact and the amount of up/down votes give logarithmic influence to the overall ranking.

While the SQL might run slow as the number of posts to rank increase, we see a rather concern as re-ranking 10,000 records takes 2.60 sec. It might seem irrelevant as the current data load is small, yet it might become a bottle neck to the system as the number of records increases.

Openshift is a cloud web hosting solution used in this project to host both the web app version and the back end itself. It is free and applications are deployed by git, a version control software, such that developer can maintain a record of changes made in each deployment and revert to previous commits if something goes wrong.

[3] Billard, 2014. Reddit's empire no longer founded on a flawed algorithm. Retrieved on http://www.outofscope.com/reddits-empire-no-longer-founded-on-a-flawed-algorithm/

Fig 23. Flowchart



7. Testimony

7.1 Benoit Travers (BBA, year 3, using iOS Safari)

I have been using the HKUST Secrets page on Facebook for quite a while. I have liked the page. Secrets therefore pop up on my Facebook homepage news feed on a rather regular basis. In the past I have posted two secrets from what I remember. The process was quite simple: I clicked on a link in the Facebook description and was directly redirected to the Google Docs page. There was just one field for me to fill in: the secret in question.

I was quite confused about how my secret was selected: it was not posted automatically and don't really understand what the process was.

With the new web app developed for the HKUST Secrets page, I am able to see the latest secrets and have my posts appear directly. It feels much better to see what I wrote show up immediately, without any delay.

I guess it would be good if there is a simple tutorial about how to use it when logging in for the first time. Though the interface was very simple, I was a bit unsure about how the voting system worked. It would also be good to clear why a registration is necessary.

8. Improvements

8.1 Loading efficiency

Loading time of the application can be reduced by caching post content once a user read it for later revisit. The application can also load the popular posts such as the ones with many up votes before users click on it because it is likely for them to read those posts.

8.2 Responsive layout for bigger screens

Currently the application serve the same interface for any screen size. Like Twitter, the application can have a responsive interface like Twitter which switch to an alternative design more suitable for bigger screens once a big screen is detected.

8.3 Social network integration

A social network without many user is hardly a social network. This would be a good way to promote this social network if users can share what they found interesting in this application.

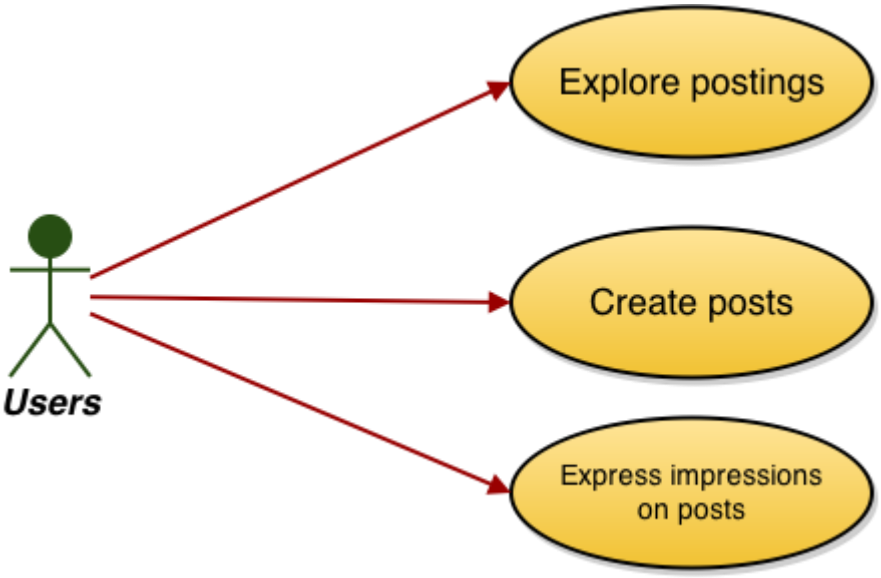
8.4 Selective content re-ranking

Currently the content are re-ranked every time there is new post, new comment or new vote. However, the rank is more or less irrelevant as the posts are getting older. So the ranking may become selective and only re-rank the newer posts while keeping the older posts at the bottom by adding a big negative number to them.

8.5 Tutorial to first-time user

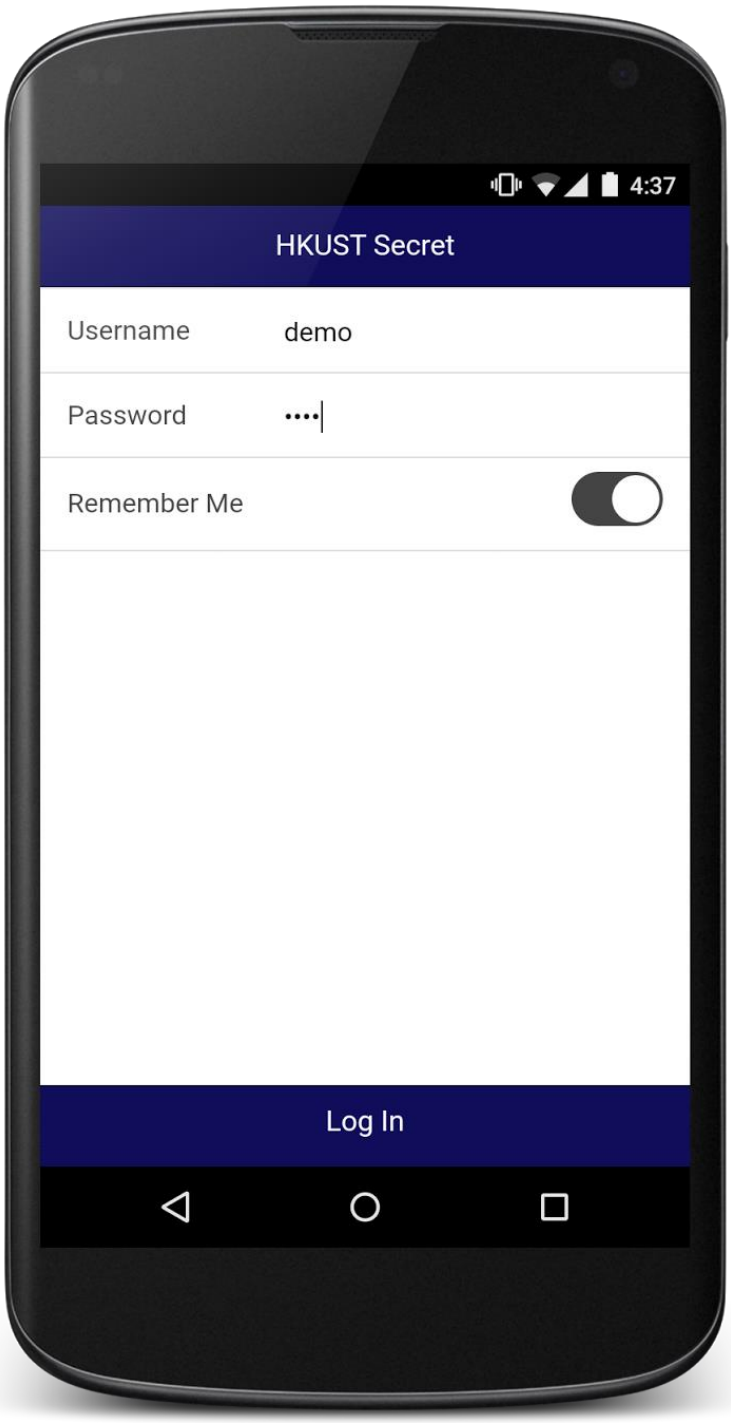
The interface may not be utterly intuitive that it creates confusions on the usage of buttons and users find it fearful to try out anything because actions like posting, commenting and voting are not revertible. It would be nice if there is a tutorial explaining the internal working of the app.

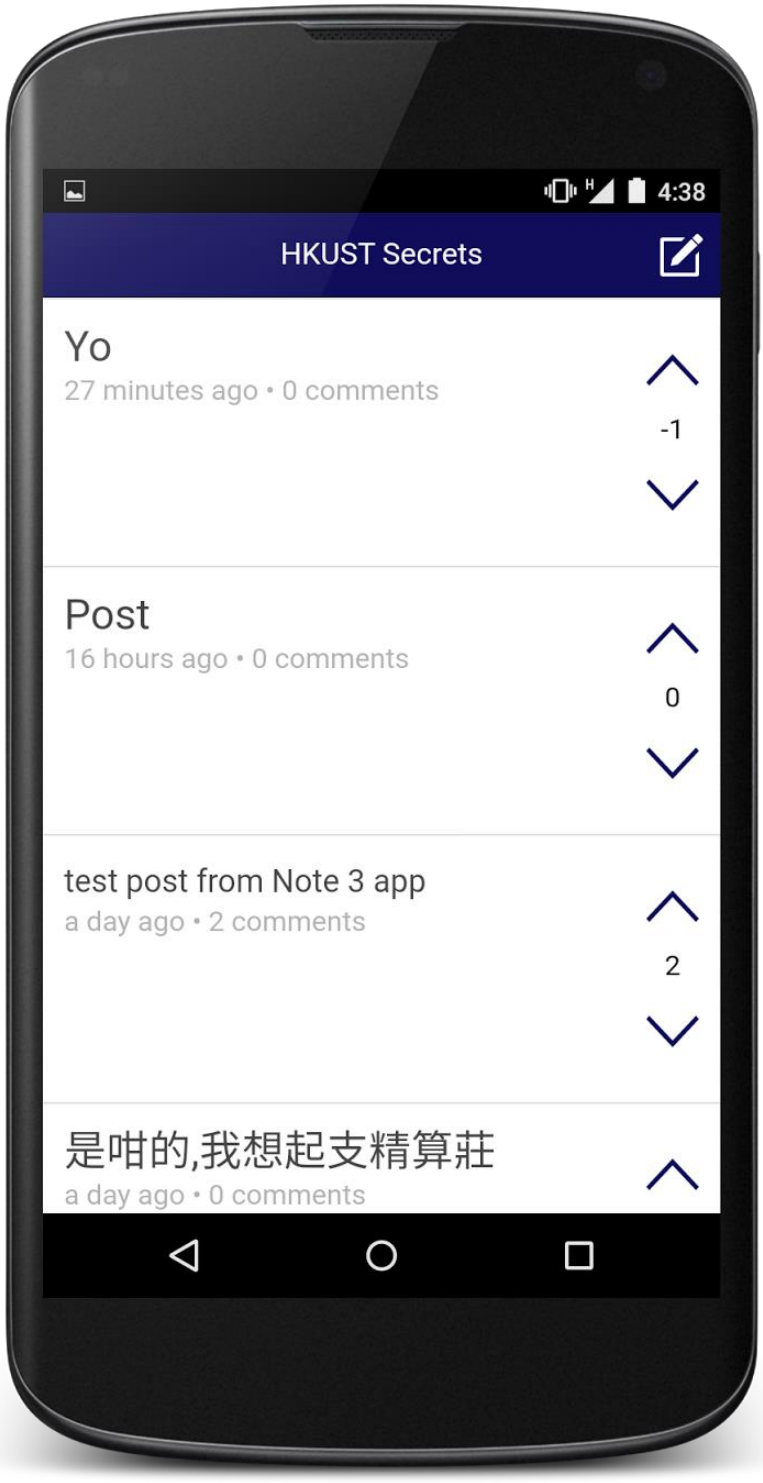
Appendix 1: use cases



Appendix 2: full scale screenshot

See next page


4:37
HKUST Secret
Username
demo
Password
Remember Me
Log In


4:38
HKUST Secrets
Yo
27 minutes ago • 0 comments
-1
Post
16 hours ago • 0 comments
0
test post from Note 3 app
a day ago • 2 comments
2
是咁的,我想起支精算莊
a day ago • 0 comments


4:39
Back
HKUST Secret
其實都唔明ust d hall點解要捉到咁嚴
a day ago
其實都唔明ust d hall點解要捉到咁嚴...明明整咗部嘟卡機仲要有個人坐係到，見你跟人入手就逐個check卡，唔係住客就算跟人入都要寫名，我唔知淨係ust先係咁定其他u都係咁，但以我所知cu鬆好多，雖然都會捉蛇但起碼好似平時d屋苑咁嘟卡就入得，又冇個人坐係到睇住你舒服好多，有時上一上去都要寫名好麻煩，或者明明係有hall都要逐個check好冇家既感覺
Up vote (1)
Comment
Down vote (1)
你自己已經答左，個度係CU，呢度係UST，完。
a day ago
大家都知UST多報警____。
a day ago