MULTI SOCIAL MEDIA APPLICATION FOR ANDROID

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SIGNATURE PAGE

PROJECT: MULTI SOCIAL MEDIA APPLICATION FOR ANDROID

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ABSTRACT

When I tried to look for some inspirations about a good project idea, the most common tip I found is to find something bothering or annoying people every day, and then make an app that makes the problem easier. So, the motivation of this project is based on one of the problems that frustrates me when using smartphone every day.

Throughout my daily life, one of the most frustrating things when using smartphone is having to constantly switch between different applications that serve similar purpose but different brand, this problem is mostly focusing on social media application. There are lots of social media application on the market, most of them have similar approach and purpose but different user base and content. It makes sense that people have the need to switch between them while browsing.

The solution this project provide is building a multi social media application on android. User will be able to enter multiple account information for different social medias, they don’t need to reenter them every time while switching between multiple social media source. After entering the credentials, user will be able to seamlessly browsing different social medias on an application with different fragments without opening another application.
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CHAPTER 1

1.1 What is Social Media

Kaplan in his research think that theoretically Social Media is a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content. When Web 2.0 represents the ideological and technological foundation, User Generated Content (UGC) can be seen as the sum of all ways in which people make use of Social Media (Kaplan, 2010). In practice, social media is websites and computer programs that allow people to communicate and share information on the internet using a computer or mobile phone (“Cambridge Dictionary”, 2018). It refers to a content production and exchange platform based on user interactions on the Internet. Social media is a tool and platform for people to share opinions, understandings, experiences and standpoints with each other. Currently, common social media includes Twitter, Facebook, Snapchat, Instagram, YouTube, Reddit, etc. Social media and the information have spread has become an important part of what people browse on the Internet. It has not only created some hot topics in people's social life, but also attracting traditional media to follow.

1.2 Why Social Media matters

The reason social media become such a powerful tool is because their huge user base. As of July 2018, Facebook had 2234 million monthly active users, YouTube had 1900 million, WhatsApp had 1500 million, and Instagram had 1000 million. Take Facebook as an example, 2234 million monthly active user means there are over 2000 million different accounts used the application at least once on July 2018. That means about ⅓ of global
population is using Facebook this month, since we only have 7.7 billion people live on earth. And you can basically target anyone, anywhere on social media from its user base.

Figure 1. Most popular social networks worldwide as of October 2018, ranked by number of active users (in millions)
Lenhart, Purcell, Smith and Zickuhr’s finding shows that for the age of 12 to 29 more than 90% of the young teens and young adults are on the internet, and more than 70 percent of them have a passion for online social networks (Lenhart, Purcell, Smith and Zickuhr, 2010).

Social media is important to your academic progression too. For students, social media can produce thoughtful content, interesting insight and deep understanding of areas of professional, career or personal development. As you navigate the university setting, for example, you can rely on the guidance and connections you form online to help understand your new environment and how to best take advantage of all you will be offered and exposed to (“Why Social Media Matters”, 2018).

Figure 2. Teen and young adults converge in enthusiasm for social networking sites

(ÇETİNKAYA & ŞAHİN & KIRIK, 2014)
According to the above statement, we can conclude that social media is a very powerful and popular communication tool between students, teenagers and young adults.

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Figure 3. Participants using social media (ÇETİNKAYA & ŞAHİN & KIRIK, 2014)

Based on ÇETİNKAYA, ŞAHİN and KIRIK’s study, from 180 respondents’ survey over a two-week period, 46.6% of respondents spend between 2-4 hours per day on social media, and the majority of the sample reported using social media sites on smart phones, which is 75.6% of people (ÇETİNKAYA & ŞAHİN & KIRIK, 2014). This study proves that social medias are an important aspect of people’s personal life, especially on smart phones.

Below tables from Kumah’s research shows that a high amount of people that use social media daily, which are 55.8% for Facebook, 13% for Linkedin and 26% for twitter
respectively. These studies show that most people, check Social Medias several times a day for hours. And Most of them use several different type of Social Media sites.

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Figure 4. The Frequency of Facebook Usage (Kumah, 2017)
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Figure 5. The Frequency of LinkedIn Usage (Kumah, 2017)

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<tr>
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</tr>
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<td><strong>77</strong></td>
<td><strong>100.0</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Figure 6. The Frequency of Twitter Usage (Kumah, 2017)

1.3 Analysis
Above statistic shows that social media is an incredibly powerful tool in both business, political and daily life, but there are just too many of them. We find that people especially young adults, have a huge passion for Social Media sites nowadays. A large portion of them check Social Medias several times a day for hours, and they basically repeat this habit every day in their life. More importantly, most of the people will not only use one type of Social Media, since most of the popular existing Social Media servers a different row in people’s social networking. To utilize all of the Social Media sites or applications user will need to constantly switching between different applications, memorizing and entering credentials for different social medias and getting tons of notifications from different sources. This project is focusing on creating an all in one social media application to solve this problem, this way user will be able to use one application to browse all the important social medias with a smooth user experience.
CHAPTER 2

2.1 Importance of Android

Android is a mobile operating system developed by Google, based on a modified version of the Linux kernel and other open source software and designed primarily for touchscreen mobile devices such as smartphones and tablets. In addition, Google has further developed Android TV for televisions, Android Auto for cars, and Wear OS for wrist watches, each with a specialized user interface. Variants of Android are also used on game consoles, digital cameras, PCs and other electronics (Android (operating system), 2018). There are two major operating system on the mobile device market, probably more back in early 2000. But the reason I started this project on Android is because several reasons below. Android itself is an open source project, it’s very developer friendly to start building you application with java as the major programing language, compare to the IOS counterpart that developer need to pay money to start develop application with a new programing language swift. Due to that, Android also have a very large developer and community base on the low initial commitment. With the support from google and google play market, Android application now have an increasingly high success ratio, and very cost-effective environment with low development cost compare to IOS, since the SDK and tools are completely free for developers.

2.2 Android System Architecture

Android OS is a stack of software components which is generally divided into five sections and four layers, Linux Kerner, Libraries, Android runtime, application frameworks and system applications.
Linux Kernel

Linux kernel is the bottom layers of Android architecture. Android was created on the open source Linux kernel. It provides all the core features to develop a mobile operating system, which includes security between applications and Android system, network communication, hardware drivers, effective memory management and process management.

Libraries

On top of Linux kernel is a set of libraries with various features. It combines with the C/C++ core libraries as well as the Android runtime. The libraries are including core Java library, OpenGL graphic library that used to produce computer graphics, WebKit open source engine for web browsing, media framework for audio and video recording, then at last SSL secure socket layer for internet security.

Android Runtime

The android runtime is the next section in Android Architecture. It’s basically acted the same as Java runtime, since it provides the Dalvik Virtual Machine which act the same as Java Virtual Machine, but specifically designed for Android. This custom virtual machine will use the system’s Linux kernel to manage resource and memory that will achieve an effective multi-threading computing power.

Application Framework

The application framework provides service to application level for the developer. The Android system developer has built in a set of well-known and well proven libraries in the
background. So, they will be useful when the developer needs them without building any additional custom libraries. The framework includes the activity manager that manages the android activity, the telephony manager that provides wireless service to user, view system that support all the custom layouts and views and location manager for the devices GPS system.

System Applications

System application are the applications that built in the system when you first time open your phone, like the dialer, email and camera application.
Figure 7. The Android software stack.
2.3 WebView in Android

WebView is the system component android operating system to render web pages. It allows Android apps to display web content directly inside an application, which is the main thing this project are going to use.

2.4 XML in Android

XML stands for eXtensible Markup Language, which is a markup language just like HTML. It is designed to communicate and store data between the applications. And It is considered as a self-descriptive language. In Android, while XML can definitely still fulfill it’s usual job as a data store and transport media like JSON, but more importantly XML is the designated language for Android UI designing. All the application’s component’s user interface layout is designed in XML files.
3.1 Design decision and challenges

The goal of this project is to design an application that combines multiple social media tabs seamlessly in a single app. Those different tabs will load at the same time when open the app, and not need to refresh every time you revisit them.

The most straightforward solution is to implement a native client tab for each of the social media source. The challenge to that approach is it’s easy to build a simple client with just some basic functionality, but it will take a lot of time and resources to implement a native client that contains every single functionality as the original application or the web version for even one social media. The work around I’m trying to do in this project is using android built in WebView to load the social media’s own mobile web application. The modern social media application’s mobile web version actually become really good, they feel very close to the native application. More importantly they have full functionality that the desktop version has which are better than a lot of native applications.

However, most of the successful applications on the market choose to build their own native applications, include those social medias’ official application. The reason is that native application is more user centric compare to web application. Native application usually has better and smooth user experience, while being much more expensive and resource consuming. Web application on the other hand are much cheaper and more convenient to build, but sometimes won’t feel as good on the user experience part. The challenges to this project are utilizing the advantages of the WebView, and eliminate the disadvantages as many as possible.
The way we implement the application in this project is using android Fragment Activity to implement multiple fragment in a single activity to build a multiple tab UI, each fragment will contain a WebView that will load the social media source’s mobile web application. This interface will be able to reuse all the fragment on runtime without reload at all. To achieve that we are going to utilize android’s ViewPager, Fragment and FragmentPagerAdapter.

3.2 Built multiple multi-pane UI with fragment and ViewPager

In this project we use Fragment class to contain each Social Media with their own WebView. Fragment is generally a sub activity that has their own layout, so we can combine them in a single activity to build an application with multiple view load at the same time.

ViewPager is a Layout manager that allows the user to flip left and right through pages of data. To utilize this feature, we need to implement PagerAdapter to populate the pages inside of ViewPager, which are the WebView Fragments in this project. In this project we use FragmentPagerAdapter which is a more specific implementation of PagerAdapter since we are using Fragment class. This adapter will be able to represent each page as a fragment. It also great for an application that have only a few pages, since this adapter will keep all the fragments that user have visited in memory and result in a much better performance when this application only has three fragments and user will have a better experience when sliding around. The cost to that feature is significantly more memory usage compare to the counterpart FragmentStatePagerAdapter which will only keep the saved state of the fragment that are not visible, those fragments will be completely destroyed after the states are saved. However, this downside is completely negligible since we only have three
fragments in the application, so the memory usage is not really a big concern in exchange of a smoother user experience. Using PagerAdapter and ViewPager with Fragment will also solve the problem mentioned before about WebView compare to native app, which is it will keep reload it self while you are doing some work on other tabs. With this implementation all three fragments will be loaded at the same time at the beginning of the application even when user has not seen them yet, they will be kept in the memory and will not refresh themselves when user revisit the page.

For the actual implementation, this project used the android’s navigation drawer as the item selection interface and listener, each item pressed will pass the current item selected to the ViewPager with a number the number will be passed to the PagerAdapter.

Code sample:

```java
nvDrawer.setNavigationItemSelectedListener(
    new NavigationView.OnNavigationItemSelectedListener() {
        @Override
        public boolean onNavigationItemSelected(@NonNull MenuItem item) {
            switch (item.getItemId()) {
            case R.id.facebook:
                viewPager.setCurrentItem(0, true);
                Log.d("facebook", "touched");
                break;
            case R.id.twitter:
                viewPager.setCurrentItem(1, true);
                Log.d("twitter", "touched");
                break;
            }
        }
    }
);```

15
break;

case R.id.linkedin:
    viewPager.setCurrentItem(2, true);
    Log.d("Linkedin", "touched");
    break;

case R.id.fbnotification:
    isFbNotificationQuickLink = true;
    viewPager.setCurrentItem(0, true);
    Log.d("facebook notifications", "touched");
    break;

case R.id.moments:
    isMomentQuickLink = true;
    viewPager.setCurrentItem(1, true);
    Log.d("twitter", "notifications touched");
    break;

case R.id.notifications:
    isNotificationQuickLink = true;
    viewPager.setCurrentItem(1, true);
    Log.d("twitter", "moments touched");
    break;

case R.id.dm:
    isDMQuickLink = true;
    viewPager.setCurrentItem(1, true);
Log.d("twitter", "dm touched");
break;

With this implementation we can also have quick links in the navigation draw like any native application would do. Usually in WebView applications this will result in opening new tab, but with ViewPager, we can pass same page number to the adapter when a quick link is clicked, and then call the correct instance of fragment and call the method to load the quick link.

Code sample:

private void twitterQuickLink(Fragment fragment, boolean isMoment, boolean isNotification, boolean isDM) {
    if (isMoment) {
        if (fragment instanceof SocialTabFragment) {
            ((SocialTabFragment) fragment).momentQuickLink();
        }
    } else if (isNotification) {
        if (fragment instanceof SocialTabFragment) {
            ((SocialTabFragment) fragment).notificationQuickLink();
        }
    } else if (isDM) {
        if (fragment instanceof SocialTabFragment) {
            ((SocialTabFragment) fragment).dmQuickLink();
        }
    }
}
//reset flags
isMomentQuickLink = false;
isNotificationQuickLink = false;
isDMQuickLink = false;
}

public void momentQuickLink() {
    Log.d("fragment2", "reloading");
    mWebView.loadUrl("https://twitter.com/i/moments");
}

We also did some optimization in the WebView fragment with progress bar and refresh listener. The ability to store user’s credential, so user does not have to login every time using the application, and a log out button are also implemented to simulate a native application experience.

Code sample for login and logout:

@Override
public void onPause() {
    super.onPause();
    // enable synchronization for account information
    CookieManager.getInstance().flush();
}

}
android.webkit.CookieManager cookieManager = CookieManager.getInstance();

if (Build.VERSION.SDK_INT >= Build.VERSION_CODES.LOLLIPOP) {
    cookieManager.removeAllCookies(new ValueCallback<Boolean>() {
        // a callback which is executed when the cookies have been removed
        @Override
        public void onReceiveValue(Boolean aBoolean) {
            Log.d("test", "Cookie removed: " + aBoolean);
        }
    });
} else cookieManager.removeAllCookie();
CHAPTER 4

4.1 Related Works

There are several applications in google play claims to be the multi social media app solution, however most of them serve on a different approach than this project, one of the most popular one is Buffer. This application is managing all the user’s social network account in a single application, it will put different social media account into different tabs which is similar to the approach of this project. However, they are only focusing on your post, the Buffer application have various features to make it easier for user to post something on social media, most significant one is scheduled post which can let you post on a timer. However, this application is missing out most of the social media feature, which is interaction with other people, it most likely an app that serve as a addon to your main social media applications.

The other one is called Social Network All in one, which basically have the same concept as this project. Using WebView to load different social media application’s mobile web version, so user can use them in one application. The advantages of this project is it have way more different social network source, basically everything people will use on the market, while this project only focusing on 3. But this is easy to improve by just adding more fragment with different URL if it’s necessary. This project also has a lot of advantage compare to the Social Network All in One. For example, it can only display one social network at a time which can be frustrating when switching between different social networks back and force, while this project has the ability to display all of them at once just slide left and right to browse.
CHAPTER 5

5.1 Conclusion

In this project an Android mobile application has been developed to solve the problem that people have to switch different Social Media applications while browsing every day. The solution this application offers is building a multi Social Media application that will display different Social Media source in a single application. We used multiple fragments to contain different Social Medias, by using ViewPager and PagerAdapter to build a smooth, near native user experience with WebView.

The ultimate objective this project is aiming for is building an application that feels as good as the official native application without the need for switch application while browsing. There are a lot of aspect that I can improve this project in the future. The most important one is when there are more time and resources available, the application will move towards all native application, and drop the WebView. Although the WebView is pretty good with not much of a difference based on the way we are implementing the Native application, a well-built high-quality native app certainly have the potential to surpass it.

Overall this project fulfilled the goal I have when start this project, which is finding some problem that we are facing every day, and build an application to make it easier. It will provide convenience to the vast majority of people using Social Media today.


