Lab4 Experiemtal Report

Group 11 (李聆嘉 罗雨 王琢 闫璐)

April 6 2017

Contents

1 Introduction

1.1 Our purpose

With the rapid development of mobile applications，Android—based mobile applications constantly innovation，various Android application store in the number of applications is increasing．But how to use innovative applications to help people with disabilities，is currently a major focus of the problem. Nowadays, apps designed to meet the special needs of blind people are restricted in numbers, and **our project– "Seeing eye dog" is targeted at such need to offer a third eye for the blind people.**

1.2 Our logo

Our app name is Seeing-eye dog, which means it is a good friend of the blind people.
The four circle stands for the 4 members of our group; it also represents the all-round communication and travel of blind people with the help of our app.
"The third eye for the blind" is our motto.

2 Operation Platform

Android 7.0

2.1 Developing Environment

Android Studio 2.3.2

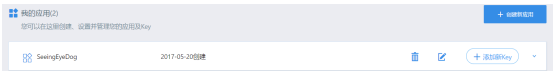
3 Task Allocation

- 李聆嘉：voice input, vibration output,UI
- 闫璐：location and navigation
- 罗雨：environment building, database design
- 王琢：Function Realization，Structure Design，Provide and Apply APIs

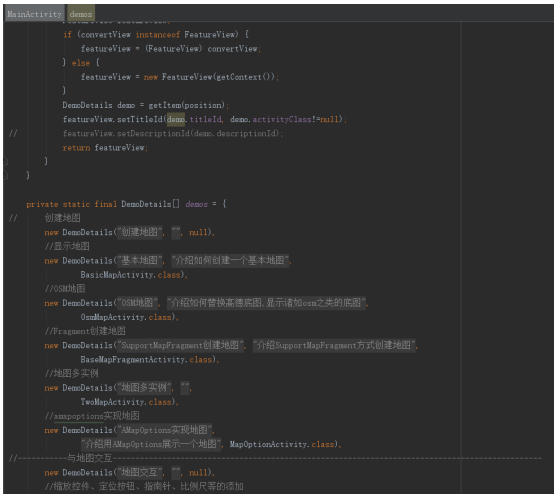
4 Function Implementation

4.1 Location and navigation

There is one advantage of mobile device over PC is that it can be taken with you easily. Therefore, LBS, short for Location Based Service is a technology almost only available on mobile phones. The core of LBS is to locate users. There are mainly two ways to achieve this goal, that is, through GPS and through WiFi. The first method is based on the interaction of GPS hardware inside our phones and satellites. Users can be located precisely in this way but it is only useful outdoors. The second method depend on three base-stations to determine the velocity and then calculate the positon. This way is less accurate but is available both indoors and outdoors. Although android has provided corresponding API support for both two ways, there are some problems in practice. To improve accuracy as well as save time, we choose the third way, using SDK of third companies. And we choose AMAP. The procedure is applying API Key first, then preparing LBS SDK, and finally we can design our own application. Applying for API key:

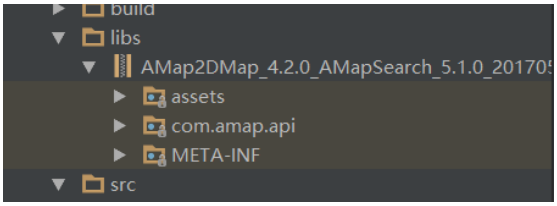


To begin with, we learn from its demo. This is the MainActivity of the demo:



And this is the implementation codes:

After import the libs support, we can use the implementation codes in our app. Libs:



Then if all of them are accepted, we can begin our location. We call some inside method to get latitude and longitude, as well as the exact city and road to tell users where they are in a more acceptable way. The time interval is used to set interval of two location, in this way we can change our position synchronous in the map and show the whole trail we have moved. And the display is below:

Once users press the left button, a complete map is showed;And if they press the right one, it will turn back to the main interface. In the map before, they can zoom in and out by sliding their fingers or press" +" or" - ".

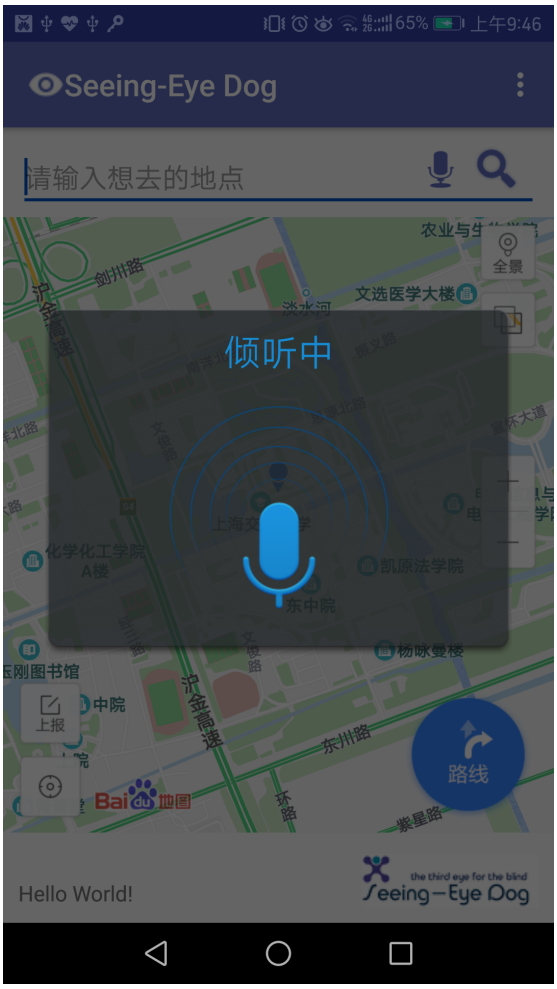
4.2 voice Recognition

This function is to help the blind out of a program to help blind people using voice recognition quickly locate destinations, and through navigation, safety of the blind leading to the destination, travel for the blind to provide maximum convenience. Through the invoking of **hearing Fei voice SDK**, accurate and high-efficiency voice recognition is involved.
It is invoked through the ***initspeech** method shown below.

```java
public void open(View view) { initSpeech(this); }

/**
 * 初始化语音识别
 */
public void initSpeech(final Context context) {
    //1.创建RecognizerDialog对象
    RecognizerDialog mDialog = new RecognizerDialog(context, null);
    //2.设置accent、language等参数
    mDialog.setParameter(SpeechConstant.LANGUAGE, "zh_cn");
    mDialog.setParameter(SpeechConstant.ACCENT, "mandarin");
    //3.设置回调接口
    mDialog.setListener(new RecognizerDialogListener() {
        @Override
        public void onResult(RecognizerResult recognizerResult, boolean isLast)
            if (!isLast) {
                //解析语音
                String result = parseVoice(recognizerResult.getResultString());
                tv.setText(result);
            }
        }

        @Override
        public void onError(SpeechError speechError) {

        }
    });
    //4.显示dialog，接收语音输入
    mDialog.show();
}
```

```java
    /**
     * 解析语音json
     */
    public String parseVoice(String resultString) {
        Gson gson = new Gson();
        Voice voiceBean = gson.fromJson(resultString, Voice.class);

        StringBuffer sb = new StringBuffer();
        ArrayList<Voice.WSBean> ws = voiceBean.ws;
        for (Voice.WSBean wsBean : ws) {
            String word = wsBean.cw.get(0).w;
            sb.append(word);
        }
        return sb.toString();
    }

    /**
     * 语音对象封装
     */
    public class Voice {

        public ArrayList<WSBean> ws;

        public class WSBean {
            public ArrayList<CWBean> cw;
        }

        public class CWBean {
            public String w;
        }
    }
}
```

And the result is satisfactory for the high accuracy and vivid interface.


上午9:46
Seeing-Eye Dog
请输入想去的地点
倾听中
全景
文选医学大楼
化学化工学院
A楼
凯原法学院
东中院
杨咏曼楼
中院
上报
沪金高速
东州路
路线
环路
紫星路
Hello World!
the third eye for the blind
Seeing-Eye Dog

4.3 Vibration Output

This function is designed for blind people. The blind people boasts sensitive Tactile and auditory. However, because of the noise generated by busy traffic on the road, it is practically rather difficult for the blind people to know their location and identify their environment through apps simply by their hearing. For example, if simply focusing on the app wearing a headphone, it is difficult for them to identify the horns of vehicles, which may otherwise be useful for them to navigate. Therefore, the method of **difference-vibration** is implemented.

```
myVibrator.vibrate(new long[]{1000, 50, 1000, 50}, 0);
```

```
myVibrator.vibrate(new long[]{1000, 1000, 1000, 1000}, 0);
```

Figure 1: short vibrate

- Waiting time:1s
- Lasting time:0.05s

```
myVibrator.vibrate(new long[]{1000, 1000, 1000, 1000}, 0);
```

Figure 2: long vibrate

- Waiting time:1s
- Lasting time:1s
- The vibration can achieve its peak.

4.4 UI Design

Since our users are divided into 2 groups—blind and normal people. Ways of input includes **typing input and voice-input**. Their texts are all clearly replaced by icon buttons, to make the interface more attractive, some additional decorations are rejected to make the interface more user-friendly. In the lower right hand corner is our app logo and in the lower left hand corner is user' s command and it also supports voice-input.

Figure 3: main interface

Figure 4: about-us interface

5 Conclusion and Discussion

Our completion of the final project, thanks to the joint effort, is satisfying. We have done something good in the following aspects:

1) use of Amap navigation and location sdk

2) use of the hearing Fei voice sdk

3) vibration method to give messages

This is our first time to experience android development, and naturally, this project has a lot to improve.

1. With no voice output, the use of "Seeing Eye dog" is still not perfectly convenient enough.

2. The functions are limited in numbers and can be more diverse.

6 Summary and Future perspectives

Through this project, we have fully experienced the fun and sense of achievements of accomplishing an visible outcome and fall in love with android development. Limited by the time, many additional functions are not be able to implemented. If added, "Seeing-Eye dog" app will undoubtedly have more practical use and enrich the life of the user groups to a larger degree. We hope to have the opportunity to turn these functions into realities in the future.

1. More services closely related to the life of the blind can be added. For example, the restaurants and entertainment facilities nearby to enrich the otherwise dull life of the blind people.

2. **Personally made service** can be added to be more intellect, and suit users' demands better.

3. **Share function** can be added to enable the blind to share their travelling path among their friends and families

To sum up, technology will improve and enrich people's life. We should tap the potential of the technology to make more products better satisfying the special need of those underprivileged who have long been easily ignored. And only by doing so, can the technology be made full use of, thus eventually changing the world into a better place for all humanity.