

# SIMPLE APPLICATION OF ANDROID-BASED SMART PHONE FOR FOREST FIELD SURVEY

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**ABSTRACT:** Smart phone's recent performance is remarkable development that improves the quality and amount of information that can be processed. Accordingly, individual user can easily handle the space and location information by using your smart phone. With this motivation, Android application of forest field survey and location information is designed and implemented as the prototype, in this study. At design stage, using open API of Android, Java Development Kit(Java SE 6 Update 26) and Android Software Development Kit(revision 12). Our results have been implemented on the Android-based smart phone.

## 1. Introduction

Recent surge in smart phone users in the fields of mobile telecommunications, with smart phone's applications(app) have increased their interested and practical use. In particular sales of smart phones were up 74 percent year-on-year and accounted for 25 percent of overall sales in the second quarter of 2011, up from 17 percent in the second quarter of 2010(<http://www.gartner.com>). But curiously despite the rise of non-expert group available app development few have attempted to address app development for the expert group(Kim, K. and K. Lee, 2011).

Forest field survey was actual measurement in the survey directly by the field because of the need to fill in the field note value again, in conjunction with automatic extraction of forest parameters is not. In addition, in order to obtain various forest parameters, investigator have a lot of equipment(GPS equipment, ruler, Haglof and so on) there is a problem that needs to be moved. The purpose of the present paper is to offer implementation of Android-based smart phone applications with forest field survey note.

## 2. Development Environment

**Table 1. Development environment used in this study.**

Environment	Version
Operating System	Ubuntu 11.04 32bit
Android Platform	Android 2.3.3 (API level 10)
Android SDK Tools	Revision 12
Java JDK	1.7.0
Eclipse	Classic 3.7

Leading smart phone OS(operating system, OS), Google and Apple are the obvious winners in the smart phone ecosystem. The combined share of iOS and Android in the smart phone OS market doubled to nearly 62 percent in the second quarter of 2011, up from just over 31 percent in the corresponding period of 2010(<http://www.gartner.com>).

This development was based on the Android is based on Linux Kernel ver. 2.6, and the system was using Android-Kernel-2.6.32.9. Basically, Android is based on the Linux Kernel architecture, such as Libraries, Android Runtime, Application Framework and have Applications. Detailed Application Frameworks provide Activity Manager, Window Manager, Concept Provider, View System, Notification Manager, Package Manager, Telephony Manager, Resource Manager, Location Manager, XMPP Manager and so on. Development tools to provide Android Debugging Bridge(ADB), Android Development Tools Plugin(ADTP), Android Asset Packaging Tool(AAPT), Android Interface Definition Language(AIDL) and so on(Kang, S. and K. Lee, 2010).

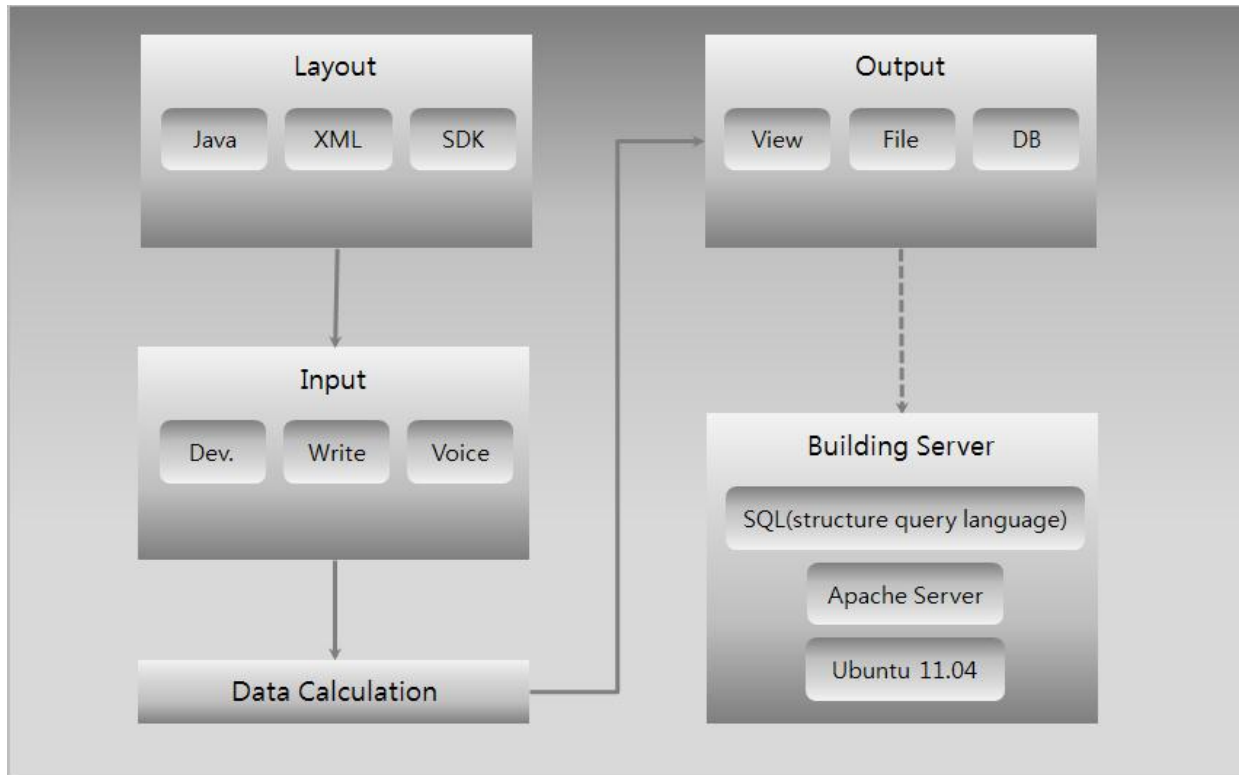
Using the Java programming language and tool based on open source Eclipse Integrated Development Environment(IDE) was used. More information about the environment used is shown in Table 1.

### **3. Development Methodology**

As mentioned earlier, the current forest field survey is very inefficient because of automatic extraction of forest parameters was not conjunction. Therefore, this development is the operation using the forest parameters and the operation results and obtained forest parameters are sent to the server to improve efficiency of forest field survey. The overall program flowchart is shown in Figure 1. In this development has implemented a test version of some module that Layout, Device Input, Data Calculation, View Output.

The system Layout based on View Class of Android system library by referring to forest field survey forms was developed. Class include Text View, Frame Layout, Linear Layout and Table Layout was used. Written in Extensible Markup Language(XML), the Layout source by parsing the output to the screen of Android Virtual Device(AVD) was designed(Hunter et al, 2004).

The main class inherited Activity class, and the main class was one of the screen to represent. Also, it's a required part of the screen switching were separated using Flame Layout. Flame Layout class is a kind of Layout as sub-class of the View Group to during the execution of child



**Figure 1. Program Flow Chart**

to manage. So, main class has advantage that only the available child views of the overall overlap views can optionally appear.

Data Calculation modules were used in the expression refer to Korea Forest Service is enrollment · weight table and stand harvest table(www.forest.go.kr). Operation module for testing, using an expression Enrollment wood, and expression is as follows :

$$V = \left(D + \frac{L' - 4}{2}\right)^2 \times L \times \frac{1}{10,000}$$

V = Volume (m<sup>3</sup>), D = Diameter of breast(cm), L = Height of tree(m), L' = Height of tree (Threw out units of 1 digit). Figure 2. Is a part of source code.

#### 4. Results

Using the above method was implemented as shown in Figure 2 Android-based apps. Using the EditText widget can receive input data consists of a Layout, and EditText widgets for the input of data when you touch the input date type was limited to a number type.

```

Button.OnClickListener mClickListener = new Button.OnClickListener() {
    public void onClick(View v) {

        switch (v.getId()) {

            case R.id.prev_button:
                if(mPage3.getVisibility() == View.VISIBLE)
                {
                    mPage2.setVisibility(View.VISIBLE);
                    mPage1.setVisibility(View.INVISIBLE);
                    mPage3.setVisibility(View.INVISIBLE);
                }
                else if(mPage2.getVisibility() == View.VISIBLE)
                {
                    mPage1.setVisibility(View.VISIBLE);
                    mPage2.setVisibility(View.INVISIBLE);
                    mPage3.setVisibility(View.INVISIBLE);
                }
                break;

            case R.id.next_button:
                if(mPage1.getVisibility() == View.VISIBLE)
                {
                    mPage2.setVisibility(View.VISIBLE);
                    mPage1.setVisibility(View.INVISIBLE);
                    mPage3.setVisibility(View.INVISIBLE);
                }
                else if(mPage2.getVisibility() == View.VISIBLE)
                {
                    mPage3.setVisibility(View.VISIBLE);
                    mPage1.setVisibility(View.INVISIBLE);
                    mPage2.setVisibility(View.INVISIBLE);
                }
                break;

        }
    }
};

```

**Figure 2. Part of the main source code.**

Input data before being transferred to DB is output to the screen for user can check to entered data has been entered correctly. In addition, solid wood volume estimate equation was used as a operation module but it is simply for testing the module. Enter the species of trees before sending the input data to a server and input value is initialized when send data to server.

## 5. Conclusions

In this paper is beginning step of research for the advancement of forest field survey technology. So further research is needed such as improved user interfaces of forestry workers to work directly from the field and operations module development.

In addition currently developed apps based on smartphone is hard to escape the client level. Because of in order to maximize the efficiency of the smartphone app for advancement of forest field survey technology, the study of client level applications as well as development of information to build and process the server is required.

Future development real content through evaluation of expert will contribute to maximize the efficiency of forest field survey.



Figure 3. Results from a system run by AVD.

## References

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