

HTML5 Platform Independent Mobile Application using Location-based Service

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Abstract: The increasing use of wireless Internet and smartphone has accelerated the need of location based services. Smartphones, especially iPhone or Android, stimulate growth of location-based service and mobile web computing. There are increasing demands and requests for application developers to support both smart platforms, simultaneously. Thus, we develop platform independent smart application which is exchangeably executable for those two platforms. Our application provides the usefulness during the self-registry of real estate. It supports and increases the degree of user experience and convenience in HTML5 applications. In this paper, we show the design and implementation of a application which is able to calculate the amount of capital gain tax.

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1. Introduction

While successful for complicated mobile applications, such programming styles significantly differ from those used in smartphone application development, making it is difficult for smartphone developers to adopt them. Some systems support programming transparency with a unified OS abstraction or distributed runtime system, mostly based on a virtual-machine approach to hide ISA variances. This approach, however, proves to be inefficient on resource-constrained sensors. Especially, there are several native applications in platform of either iPhone or Android. But, there is no HTML5 based applications that can help us checking capital gain tax relief from a smartphone. That is the reason why we started to design and implement a working version of HTML5 based capital tax checking application.

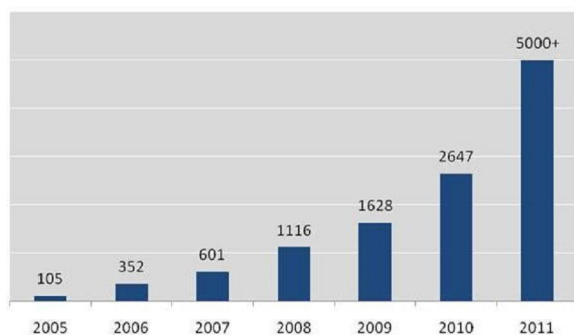


Figure 1 Popularity of REST open APIs

Figure 1 shows the popularity of REST open APIs between 2005 and 2011. We can see that the necessity of REST open API is getting bigger in decade. REST web services are getting more popularity rather than SOAP web service. This is because of the difficulty of using the SOAP based web services. REST web service was firstly introduced by Riedling. REST web service is more convenient than SOAP web services on smartphone applications.

In this section, we show the design a smartphone application of capital gain tax relief checking. Before we go into more detail, we first take a look at the HTML5 based hybrid architecture for smart applications consisting of elements of both native and Web applications. Especially, we focus on the case of the self-registration of real estate in South Korea. Foreigners and Korean nationals have to make a real estate registration when acquiring and disposing of real estate in the South Korea. However, the method to register acquirement/disposal of a real estate is complicated. So in many cases we take this procedure by agents such as certified tax accounting agents. Nowadays many people try to register the real estate by themselves because the agent cost is too expensive and the procedure is not as complex as ordinary people cannot do themselves. Therefore, in this paper, we first describe the capital gain tax and we next provide the HTML5 application to calculate the amount of capital gain tax.

2. Calculation of Capital Gain

The Capital gain rates are designed to encourage long-term investing. Most people can get a significant advantage from holding stock investments for more than one year: The taxable gain is computed by deducting the following from the gross amount: necessary expenses (acquisition costs, improvement costs, transfer costs, and other capital expenditures), special deduction for the holding period, and standard deductions for capital gains. There is no inflation-adjustment of capital gains. A special deduction from the gross amount is also given for long-term holding and the deduction rate depends on the number of years the property was held:

Table 1 The tax rates in case of the transfer of land/building in general

Special deduction for capital gains holding period deduction	
3~4 years	10%
4~5 years	12%
5~6 years	15%
6~7 years	18%
7~8 years	21%
8~9 years	24%
9~10 years	27%
Over 10 years	30%

Table 2 The tax rates in case of the transfer of a house per a household

Special deduction for capital gains holding period deduction	
3~4 years	24%
4~5 years	32%
5~6 years	40%
6~7 years	48%
7~8 years	56%
8~9 years	64%
9~10 years	72%
Over 10 years	80%

A capital gain deduction of 2.6 million won per year is given without regard to the amount. However, special deduction for long-term holding or capital gain deduction is not allowed for unregistered real estate. In this paper, we make a HTML5 based smartphone application which is able to check whether the taxpayer take the advantage of pay capital gain tax relief or not. This is very important because

Gains arising from the transfer of land, buildings, or rights thereon, stocks, and other assets specifically enumerated in the Income Tax Law shall be taxed separately from global income. This separation was created to stabilize real estate prices and for tax purposes. Capital gains may be classified

into the following three categories: (a) Gains arising from the transfer of land, buildings. (b) Gains arising from the transfer of rights to real estate such as surface rights, leaseholds, or rights to acquire real estate; or (c) Gains arising from the transfer of stocks. Gains on transfer and the amount of capital gains are calculated as follows:

Step 1) Get a registration certificate, a copy of the resident registration from transferer

Step 2) Get a certificate of transferer's seal impression from transferer, document certifying the domicile

Step 3) Keep a bill of sale contract, power of attorney

Step 4) Fill information into a registration request form

Step 5) Get a cadaster, a register of building from regional office

Step 6) Pay an acquisition tax and buy a revenue stamp(a tax stamp) in a bank

Step 7) Get a bond for home buying depending on the declared value

Table 3 The amount of gains on transfer

Gains on transfer = Selling price - Necessary expenses
Amount of capital gains = Gains on transfer - Special deduction
for long-term possession of land and buildings - Capital gains deduction
Necessary expenses include acquisition costs, costs of installations or

Figure 2 The announced price of multi-unit house

Then, the buyer or transferer has to go registry office within a location of the goods with the followings : 2 duplicate of contracts, 2 duplicate of transaction deed of immovable property, 2 duplicate of registration request form, a certificate of transferer seal impression, a power of attorney, a cadaster, a register of building.



Figure 3 The screen for an announced price of multi-unit houses

3. Utilizing Location based service for filing tax

Many applications using GPS, particularly handheld applications, require low power in order to preserve battery life. The primary components that dissipate large amounts of power are the GPS. Moreover, the use of smartphones becomes pervasive. These smartphones are equipped with location sensing capability to enable LBS. Existing module platforms including Android do not employ techniques similar to our designs to improve power dissipation of LBS, although application developers partially adopt similar concepts. As users are increasingly adopting a wide variety of LBS on smartphones, since typical smartphones are equipped with multiple types of sensors, applications that take advantage of these sensors are booming, and many existing works attempt to detect an extract users' states and context based on the readings from these sensors. Many approaches have been proposed to combine the information obtained from sensors including accelerometer, audio, GPS, camera, and so on.

In this paper, we make use of GPS in order to look for nearby point of interests. For example, we assume that a person attempt to file an acquisition tax by himself/herself without help of tax accountants. Then, he/she has to go to tax office in his/her region, submit the tax file, and pay the acquisition tax. We can easily see that tax filing process is very deadline/time critical task. So, we have to visit several sites(bank, tax office, and regional office) within a very short time period.

In this paper we take a location based service approach for finding the most efficient routing paths. This method is also useful for validating the routing path. This is important because filing tax should be processed within a very short time. To this end, we make use of the proximity service as shown in Figure 4.

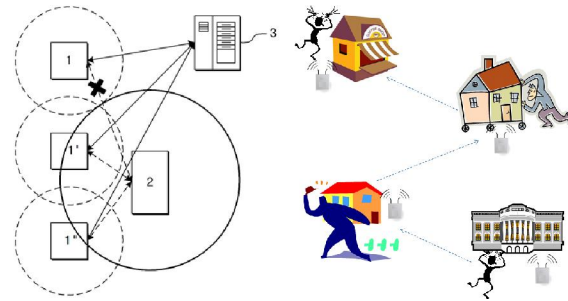


Figure 4 proximity service

The proximity service is supported by the HTML5 sencha touch and native development tools. This paper used the service on the HTML5 Sencha touch. If we go to four sites step by step, then we have to find the first site than others. Our location based application leverages us to go proper site on time. So, This application provides us the correct guidance for filing tax.

Table 4 REST Open API lists

http://embed.cbnu.ac.kr:8080/RestExample/apis/example/insert/No=123&Name=MinChoi&Time=213912423&Rer=Min&Etc=1&apName=Android5699
http://embed.cbnu.ac.kr:8080/RestExample/apis/example/account/No=123&Name=MinChoi&userDate=201401091248&userEtc=sdldk&Num=1&ethAddr=929193FF113&user=N
http://embed.cbnu.ac.kr:8080/RestExample/apis/example/getList
http://embed.cbnu.ac.kr:8080/RestExample/apis/example/add/userNo=201321323&Name=MinChoi&usertype=OI&Etc=sdldkfj&grade=3
http://embed.cbnu.ac.kr:8080/RestExample/apis/example/getParticipantList/Num=1&Date=20123213
http://embed.cbnu.ac.kr:8080/RestExample/apis/example/getAbsentList/Num=1&Date=20123213
http://embed.cbnu.ac.kr:8080/RestExample/apis/example/getNamebyuserNo/no=201321323
http://embed.cbnu.ac.kr:8080/RestExample/apis/example/ProximityCheck/userNo=201321323
http://embed.cbnu.ac.kr:8080/RestExample/apis/example/getTemporalAbsentsList/userNo=1

3. HTML5 based Design and Implementation

Current smart application development approach is tightly dependent on each mobile framework such as android or iphone. Once a smart application is developed, it only runs onto the platform. This limitation results in wasting the development cost because one source multi use is not allowed. We have to develop or compile the same applications for each platforms. However, future trend for smart application developments is platform independent. This is because device fragmentations exists even within an android platform. For example, there are numerous number of android devices in the markets.

We make use of the Restlet library which is a open source project based on servlet programming model. The library meets the Java Specification Request(JSR) 311 standards. The Restlet framework is composed of two main parts. First, there is the "Restlet API", a neutral API supporting the concepts of REST and facilitating the handling of calls for both client-side and server-side applications.

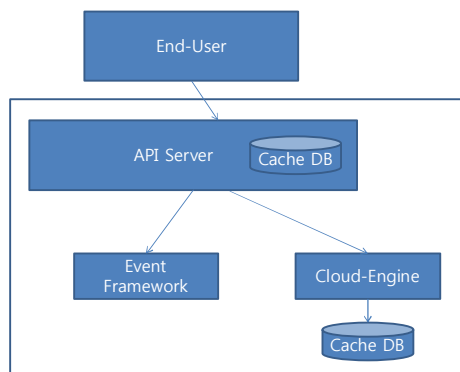


Figure 5

The position of new API server can be depicted in the following diagram, and it has such major features:

In this section, we show an overall architecture of our capital tax calculation application. First we take a look at the HTML5 based hybrid architecture for smart applications. A hybrid application (hybrid app) is one that combines elements of both native and Web applications. Native applications are developed for a specific platform and installed on a computing device. Web applications are generalized for multiple platforms and not installed locally but made available over the Internet through a browser. Hybrid apps are often mentioned in the context of mobile computing. Hybrid application has the following features: 1) Can function whether or not the device is connected, 2) Integration with a device's file system, 3) Integration with Web-based services, 4) An embedded browser to improve access to dynamic online content. Most

applications could be considered hybrid apps. Web apps, such as online banking services, typically store some content locally; locally stored native apps, such as Microsoft Word, also interface to the Internet.

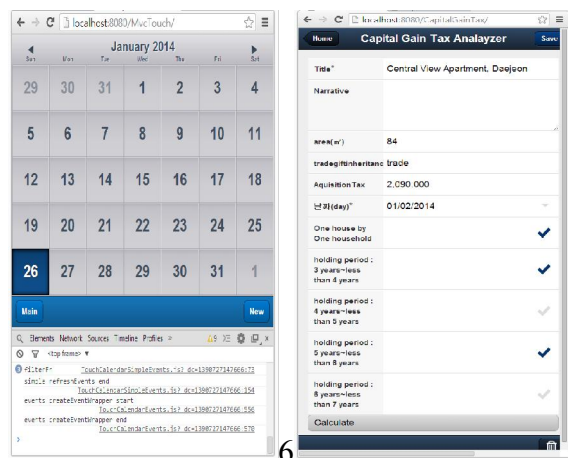


Figure 7

4. Discussions

In this paper, we developed platform independent smart application which is exchangably executable for Android and IPhone platforms. Our application provides the usefulness during the self-registry of real estate. It supports and increases the degree of user experience and convenience in HTML5 applications.

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