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Education and Culture DG
Lifelong Learning Programme
AGREEMENT Number° 2007 – 1968 / 001 – 001

Using wireless technologies for context sensitive education and training

Worpackage 4

Technical working paper

Application description

Course type

The current development has targeted the creation of locations sensitive course that can fully support the face to face education processes. The application is a smart mobile framework that can handle great amount of content and can assign the data to locations.

The courseware itself has been developed by an urban history Professor for art history courses. It contains an overview of old gates' door handles and their connection to the social and architectural context of certain districts in Budapest. The courseware is in Hungarian. The course contains 68 different buildings, which are important for the urban architecture history of Budapest, but not very well known for the public.

Develop environment and development process

The application has been developed with Flash 8 extended with Flash Lite 2.1 update. The Flash 8 does not include GPS gateway that is why we used Kunerilite 0.9.7.1. The Kunerilite works like a Flash extension and provides access to the GPS functions, so we could programmatically use the GPS.

The development process was the following:

1. Collecting course data (Text, Pictures and GPS coordinates)
2. Put the course data into a standard XML data file, and upload to the server

3. Create the application in Flash
    a. Create connection to the XML data stored on server
    b. Display the XML data in hierarchical structure (menu system)
    c. Call Google Maps to visualize the GPS coordinates
    d. Create connection to GPS using Kunerilite plugin
    e. Display real time GPS coordinates (latitude and longitude)
    f. Display phone details (battery level, signal strength)
    g. Create automatic distance calculation from *actual position* and *course data position*
    h. Display the places
4. Test the application in *showcase application* (see version) without GPS
5. Test the *full version application* in the city

Versions

There are two main versions of the final application. The final version number of the application is 1.0.

1. Showcase application

The showcase version of the application requires no GPS, and works all devices which can run Flash Lite 2.0[1]. The showcase application simulates a GPS coordinate within Budapest and uses it as reference point.

2. Full version application

The full version application uses inbuilt or Bluetooth connected GPS, and requires Nokia S60 mobile device[2]. This configuration can read the real time GPS coordinates, and uses these as reference points.

Installation

Showcase application

1. Connect your mobile device to your PC
2. Run your device manager application (eg. Nokia PC Suite)
3. Install Flash Lite on your mobile device (If it is not installed yet or the version is older then 2.0. Recently bought devices have pre installed Flash Lite plugin)
   You can find the install packages on the Adobe Flash Lite site.
4. Copy *doorhandle.swf* on your mobile phone.

[1] The list of Flash Lite capable devices are in appendix
[2] The list of appropriate devices are in appendix

5. You can start application with opening the doorhandle.swf

Full version application

1. Connect your mobile device to your PC
2. Run Nokia PC Suite
3. Install *doorhandle.sis* on your mobile device
4. Replace the .swf file with doorhandle.swf

Application properties

The application uses online connection to call the course data, and the map pictures. The application was optimized for 240x320 pixel screen size, in other screens the application tries to resize the content.

As mentioned the course data is stored in XML files, so the framework can easily access the required data. The core framework has created with Flash Lite, which is optimized Flash for mobile devices.

The application has intuitive design, and the users can easily browse in the course data. For browsing the users can use the basic navigation buttons, the bottom line texts provide more information about the navigation.

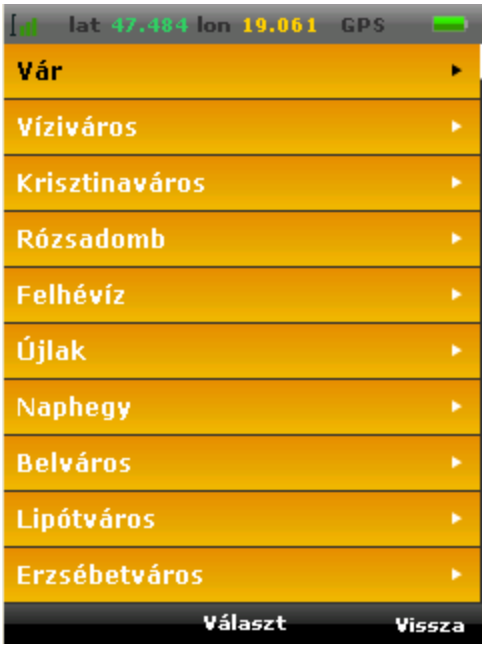

Figure 1 Doorhandle course categories according to course data file

See more screens at the end of this document.

Features

The key features of the application:

- Hierarchical sorted content (the mobile learning content was sorted in several folders, it helps to easily understand the structure of the learning material)

- Server side stored learning content (we can easily update the learning material and upload the changes, no need to update the mobile application on the client side)
- XML based content format
- Multi language support
- Easy update menu and content
- Google maps support (the places are showed with static Google maps)
- Distance calculator (there is inbuilt distance calculator, it calculates the distance from a coordinate, and draws the shortest way to the desired place)
- Multi place support (the users can observe more places on one map)

Test environment

During the development process we used Nokia 6680 for testing purpose. Nokia 6680 has older S60 platform that is why we could test only the showcase application on it.

We chose **Nokia E51** and **Ricaline** Bluetooth GPS for full version testing. For testing we connected Ricaline GPS via Bluetooth, and turned the internet connection on at the application start.

Other showcase application tests were made on HTC P3600 smartphone with Windows Mobile environment, and on Nokia 5310 Xpress Music with S40 platform.

Appendix

Flash Lite capable devices

You can find the complete list of the Flash Lite 2.0 supported devices on the Adobe website[3]. The core application runs on Windows Mobile capable, Nokia, CASIO, KYOCERA, SANYO, SHARP, SONY, TOSHIBA, MOTOROLA and SAMSUNG devices.

Full version capable devices

The full version requires Nokia S60 3rd edition (or above) mobile device. The list[4] of these devices are the following:

Nokia S60 3rd edition

Nokia 3250, Nokia 5500 Sport, Nokia E50, Nokia E60, Nokia E61, Nokia E61i, Nokia E62, Nokia E65,
Nokia E70, Nokia N71, Nokia N73, Nokia N73 Music Edition, Nokia N75, Nokia N77, Nokia N80, Nokia N80 IE, Nokia N91, Nokia N91 8GB, Nokia N92, Nokia N93, Nokia N93i

Nokia S60 3rd edition Feature pack 1

Nokia 5700, Nokia 6110 Navigator, Nokia 6120 classic, Nokia 6121 classic, Nokia 6124 classic, Nokia 6290, Nokia E51, Nokia E66, Nokia E71, Nokia E90, Nokia N76, Nokia N81, Nokia N81 8GB, Nokia N82, Nokia N95, Nokia N95-3 NAM, Nokia N95 8GB

Nokia S60 3rd edition Feature pack 2

Nokia 5320 XpressMusic, Nokia 6210 Navigator, Nokia 6220 classic, Nokia 6650, Nokia N78, Nokia N79, Nokia N85, Nokia N96

Nokia S60 5th edition

Nokia 5800 XpressMusic

[3] http://www.adobe.com/mobile/supported_devices/handsets.html
[4] Refreshed 19. Nov. 2008.

Application screens

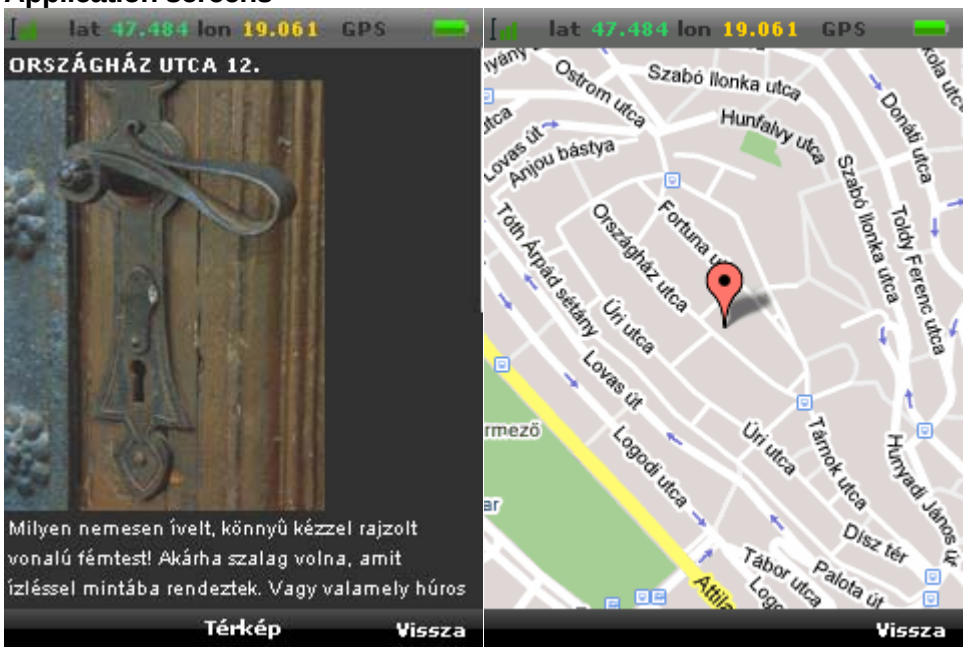

Figure 2 Course content and assigned geographical place to content

Figure 3 Nearest content (calculated distance in km), and route between your actual position and the selected content position

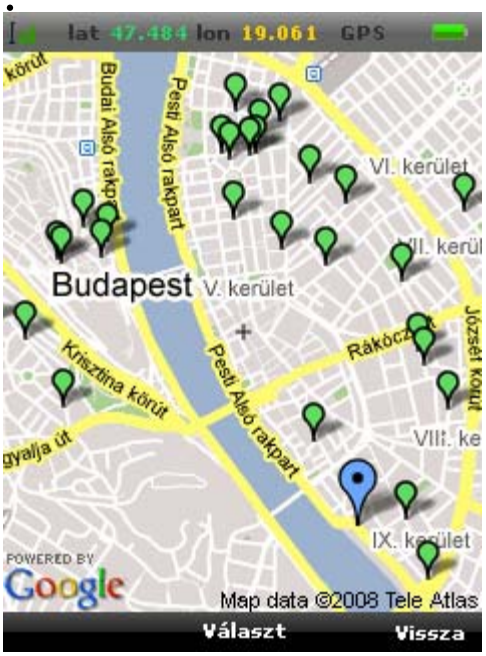

Figure 4 Learning content positions in the city with your actual position