Assignment 2:
Prototype Mobile Marché

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1. Use case description: Market prices

Many farmers and customers have great interest in an overview of the market prices of the crops that are sold in the region near Accra. Farmers want to know the prices for which they can sell their crops and customers want to know prices to buy the products. Each market has its own market leader who goes to meetings to find out the (average) prices of crops and often the village chief also holds this information. It would be convenient to get this information automatically, since prices fluctuate during the year. At each market a certain size of measuring bowl is used as a standard. For example, a measuring bowl of rice costs 8 CEDI, small tomatoes cost 2 CEDI with one measuring bowl and large tomatoes cost 5 CEDI with another. Because all market prices are fixed (indicated by the market leader), customers can go to the market stall that has the best location and the best quality of products [1].

For these reasons we have designed and build a system that is focused on the customer side of the market, since many customers will go to the nearest market which could be in another village. Often the customer will spend the whole day and a lot of money for transportation to go to the market. In addition, the customers go to the market with some amount of money and find out, while being at the market, that the market vendors do not have the products they need, that the prices are higher than before, and that they do not have enough money to buy all the products. Thus, in such a case the time and money spent by the customer is wasted [1].

2. Infrastructure

In order for the Mobile Marché application to actually function properly several resources are needed. In terms of the infrastructure the existing and novel (Internet access) infrastructure have to be used to successfully access Mobile Marché. The existing infrastructure consists of access to mobile phones and access to GSM networks. Further resources that are necessary are access to a computer (Windows laptop or desktop) and an Internet connection for the server. Furthermore, for Mobile Mraché skilled staff is needed who have programming skills. In

order to install the application the programmer or developer should have the knowledge about how to setup the server and the database, how to change the databases' connection, the knowledge about how to change the flac audio files into sln files, and put them in the correct directory. The software that is used for Mobile Marché consists of a MySQL server and C# Compiler. The resources that are needed are listed below:

- Mobile telephone
- Computer (Windows laptop or desktop)
- Skilled staff: programmer or developer who has the knowledge to
    - Setup the server
    - Setup the database
    - Change the database connection
    - Change the flac audio files into sln files and put them in the correct directory
- Software
    - MySQL server
    - C Sharp Compiler
- Internet connection for the server

3. Black Box Prototype Installation Guide

3.1. Server Part Mobile Marché

The Server part of the Mobile Marché application was developed by using C# (C Sharp .NET) combined with a MySQL database. The application has three main functionalities: (1) the *Data content management*, (2) *Generate VoiceXML*, and (3) *Generate Asterisk*. The description of the three functionalities and a user manual are provided next.

The data content management is a simple data entry interface which allows the user to insert the location(s), market(s), supplier(s), and product(s). The data has to be assigned to the upper category depending of their hierarchical order. For instance: a specific market to a specific location and a supplier to a market etcetera.

With the VoiceXML generator the user would simply click on the generate VoiceXML button after the users is finished with the data entry. The generate VoiceXML generates a XML file in the application directory which is called *test.xml*. This VoiceXML file is mainly related to the first assignment of the project.

The Asterisk generator is the final functionality of the Mobile Marché application. This functionality is more or less similar to the VoiceXML generator functionality since this method has to run after the data is already entered in the data content management interface. An Asterisk text file with the voice files are generated in the application directory after clicking on generate Asterisk button from the main interface. The application can be accessed from the link below:

https://drive.google.com/folderview?id=0B9Diz74nTl93TkhHdHRLeXpTdFU&usp=sharing

3.2. User Manual

In order to setup the service on a Windows platform, MySQL server and a C# compiler have to be installed. There are two ways to use the service:
Located (stand alone) then no Internet connection is needed, the service would be only available on one machine for a small range of users. The advantage of this located way is the possibility to move the system and use it in the field.
The second way is to use the system more globally, which the application has been designed for. Due to this purpose an Internet connection is needed. The advantage of the global way is that by having multiple server connections to one shared database, more users can access the service.
This part shapes the process by listing the needed actions to run the service. First, the user has to import the database to the preferable server. The database can be accessed through this link: https://drive.google.com/folderview?id=0B9Diz74nTl93RGNaUEhRS25aNFk&usp=sharing
After that, changing the connection parameters in the *C_manager.cs* class from the application files are required to fit the new database. The main parameters are the server name, the username and the password.
In case of using Asterisk generator functionality a few more steps should be noticed for the output files. The output of the audio files is generated in a flac audio file. Therefore, a single command would convert the output files to sln files. The command that converts the audio files is listed below:
sox input.flac -r 8k -t raw -e signed-integer -b 16 -c 1 output.sln [2].
Finally, move the audio files to the required directory and copy the Asterisk generated file to the Asterisk configuration file. A sample from the output files are in the link below: https://drive.google.com/folderview?id=0B9Diz74nTl93c1IzUE10RTZ4c28&usp=sharing

The process is also listed below:

1. Install a MySQL server and a C# compiler.
2. Import the MySQL database.
3. Change the connection parameters.
4. Convert the flac files into sln files.
5. Modify the Asterisk configuration file.
6. Move the files to the required hardware (Raspberry Pi).

References

1. Lo, G. (2015) Retrieved from https://bb.vu.nl/
2. Gueret, C. (2015) Retrieved from https://github.com/WorldWideSemanticWeb/BlackBox/wiki/Working-with-Asterisk