IT PROJECT

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INTRODUCTION

Project motivation:

Surveys provide important information for different kinds of research fields, e.g. marketing research, psychology and sociology. In fact, successful surveys can be achieved by gathering the opinion of a large number of people belonging to the population of concern. However, collecting the opinions of such a large number is not an easy work; especially if we're considering collecting the data using papers. This process takes a lot of time, besides many mistakes could be made by people responsible for gathering the data from survey papers. Thus, we need to consider new methods that provide results we seek in both fast and efficient way.

On the other hand, Mobile phones became a very important part of one's life; statistics showed that in 2010, cell phone users hit over 4.8 billion worldwide. Moreover, Bluetooth is a very important easy to use, free and normally available technology in every mobile phone, laptop, and other handheld devices.

Thus, mobile phones combined to Bluetooth technology could be strong candidates to be used to gather the opinion of an approximately large number of people in an enclosed environment like auditorium, college, company, and student campus.

Project aim:

The main purpose of the project is to develop a client-server application that provides the way to collect the answers of people participating in a survey using their mobile phones.

OVERVIEW

System Components:

The system contains the following components:

1- Client Application: a mobile application through which the client will choose a survey and vote for it.
2- Server Application: which provides an interface to create and publish a survey; it also provides a statistical view of survey results as charts with the ability to save the results -for further studies- in a very common and widely used format like Excel sheet format.

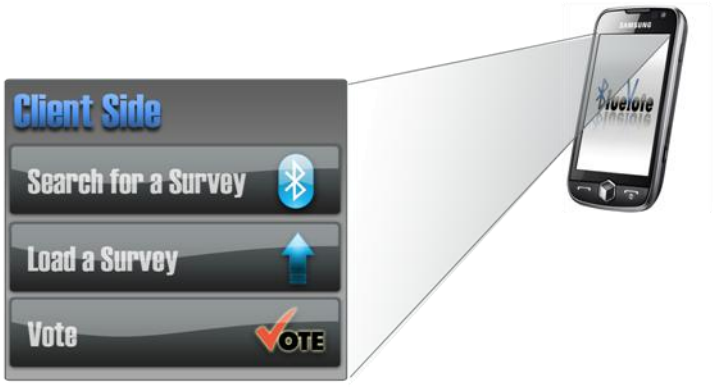
The following figure shows an overview of the system:

MAIN FUNCTIONALITIES AND FEATURES

The following figure describes the main functionalities of the system starting with the server side application, followed by the client side application features.

Server side Application:

Client side application:



System components and specifications:

Server application:

In this section we are going to present the main functionalities provided by server application

1- Creating a survey:

The application allows the user to create a custom survey. It allows user to:

- Fix the desired number of questions;
- Categorize questions into group of questions.
- Choose questions type: multiple response or single
- Set the number of answers for each question.

User can also save the survey he created for further use. In fact, saving the survey can be done at different levels i.e. user can either save the survey before voting or during the voting process, in this case not only the structure of the survey is saved but also the current results. This allows resuming a previously published survey in case the user wants to raise the same survey to different separate groups.

2- Securing a survey:

The truthfulness of the people casting their votes is an important factor in running a survey. On one hand, sometimes voter should be anonymous to ensure clients truthfulness; on the other hand, the system should guarantee that each client votes only once to prevent replication of unnecessary data. Another important point is to ensure that the survey is addresses to the concerned group. Thus, the system should provide the ability to handle client passwords to prevent irrelevant clients from participating in the current survey.

3- Creating a question template:

The need for providing question template is described in the following: if a survey consists of 20 questions for each 5 answers are required (very good, good, normal, bad, very bad). The user could consider such a question as a temple that could be applied to other questions which have the same type, in

the same survey. Moreover, the user can save the question template to use it in other surveys

4- Publishing a survey:

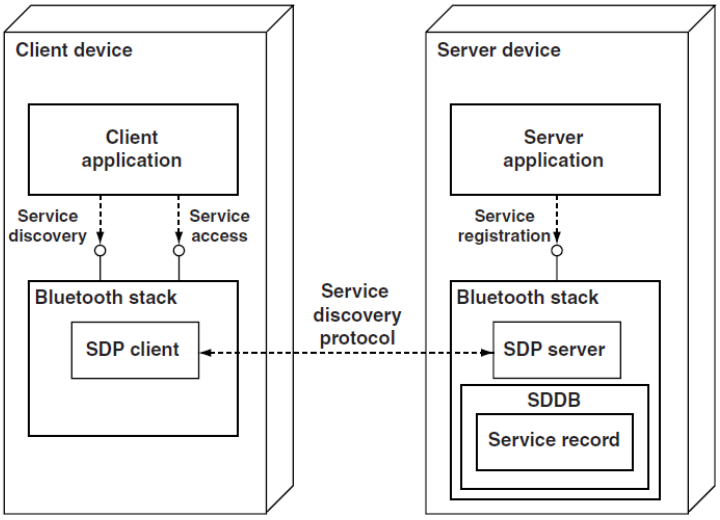
Since the server is using Bluetooth technology, publishing a survey is implemented by defining a Bluetooth service that contains important information of the survey like its name and level of security.

This service should be available for remote users by:

- Describing a service record that describes the service;
- Adding the service record to the service discovery database (SDDB) of the server.

Clients should be able to discover the registered service using (SDP) Service Discovery Protocol which is a Bluetooth protocol for discovering services provided by a Bluetooth device.

The following figure shows the Bluetooth components involved in service registration and discovery.



After registering the survey service in the server's SDDB, clients can connect to the server and acquire that service simultaneously.
Server application provides publishing the survey for a specific user-defined time or it can be stopped on user's demand.

5- Displaying results:

Server application provides a statistical view of the survey results using bar charts for the results of each question raised in the survey. These charts can provide quick and easy-to-read results, and can also be saved as image files.

6- Exporting results:

The main purpose of this process is to provide the data collected from participant votes in a common and widely used form that could be useful for further studies.

Microsoft excel is a very well known application that allows data analysis and data manipulation using tables and formulas, that's why generating the results in excel-formed file would be of great use for future analysis.

The application is able to save results in excel format. The results are exported under the form of a table containing the complete and detailed results of each participated client. In addition, total results for each question are displayed with bar charts.

7- Saving data:

In order to prevent loss of data (client votes) during the voting process, especially if the server application stops suddenly, the application frequently saves a backup file that contains the ongoing survey structure with the current results. This process is triggered if the results of the survey are modified from the last backup.

Loading a backup file will re-load the survey with all the votes casted by clients before the failure. This allows administrator to re-publish the survey again and continue the voting process with the rest of clients.

Client Application:

In this section we mention the main functionalities of the client side application.

1- Survey Service discovery:

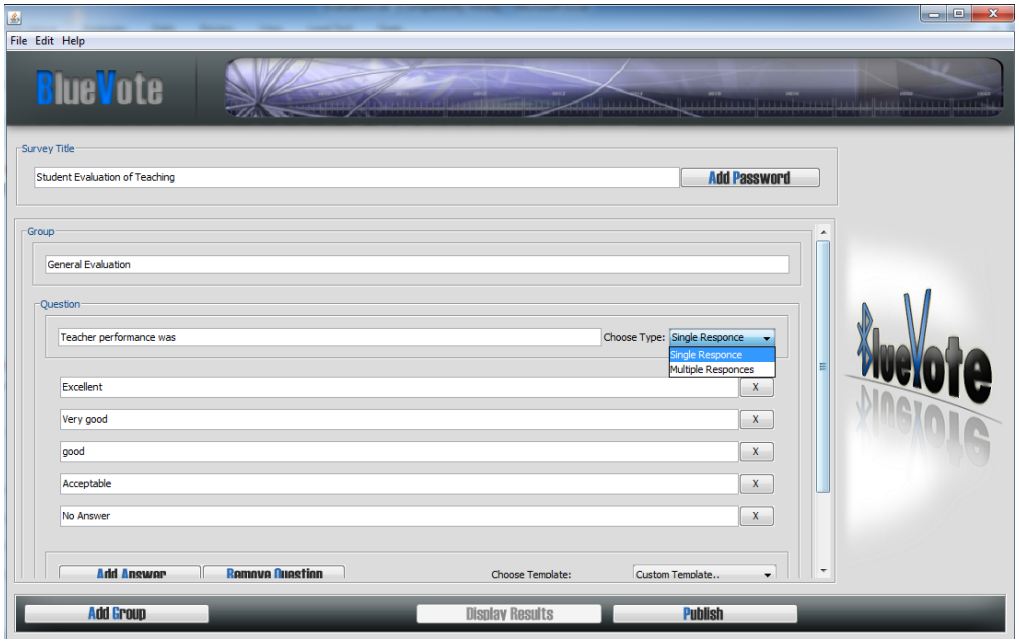
The client searches all the nearby Bluetooth devices seeking a specific service defined in the server, surveys from multiple servers can be seen by the client. This operation is done using SDP as defined in figure-2.

2- Loading a survey:

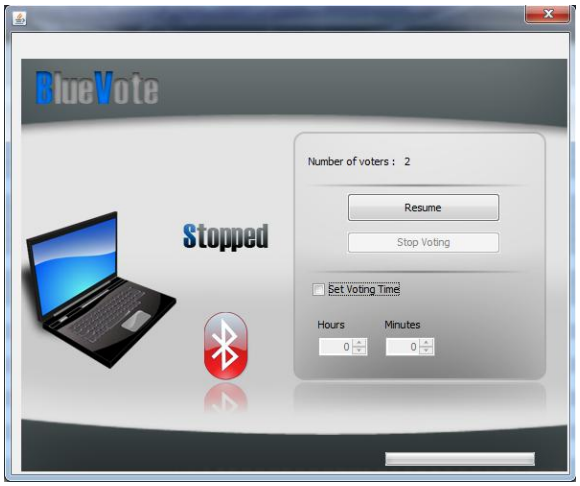
The client selects the desired survey, then contacts the server raising the selected survey in order to get survey questions.
In case the survey was secured the client should enter a password which is sent with the survey request.
The questions are displayed on the mobile application in a way that can be easily answered by the user and sent back to the server.
We note that a user cannot reload a survey that he already voted on.

System functionalities Screen Shots:

1- Survey window:

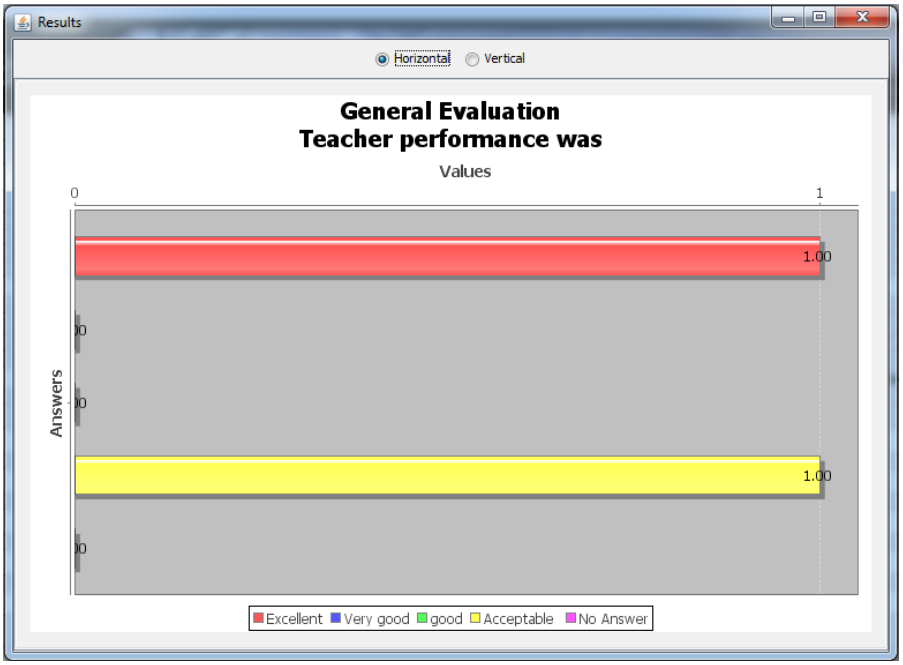


2- Publishing windows:

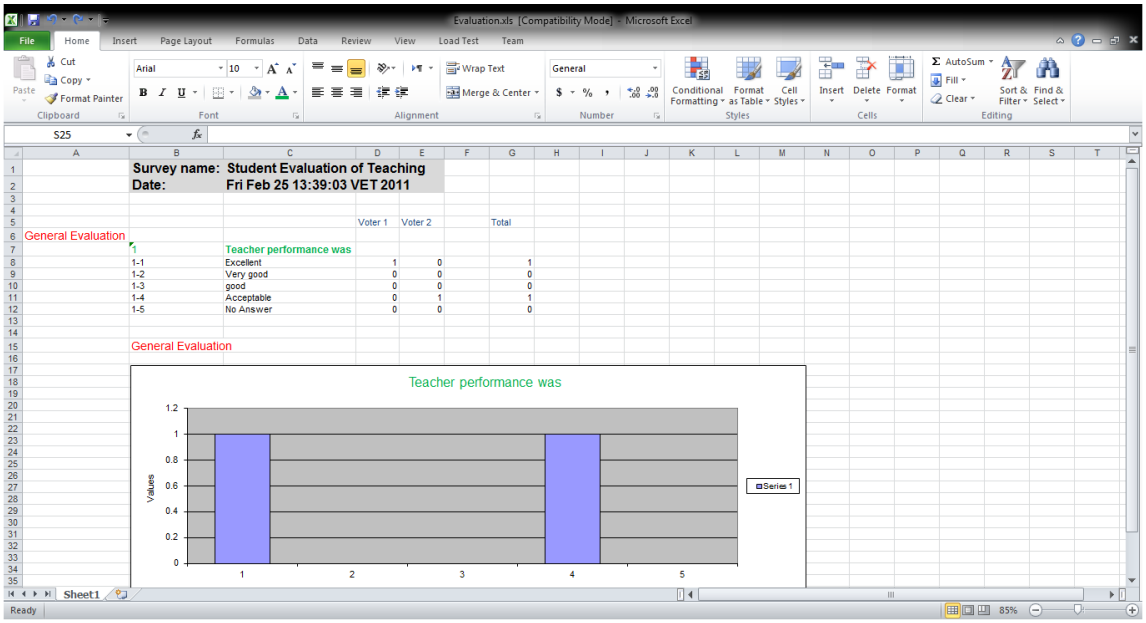


3- Results window:

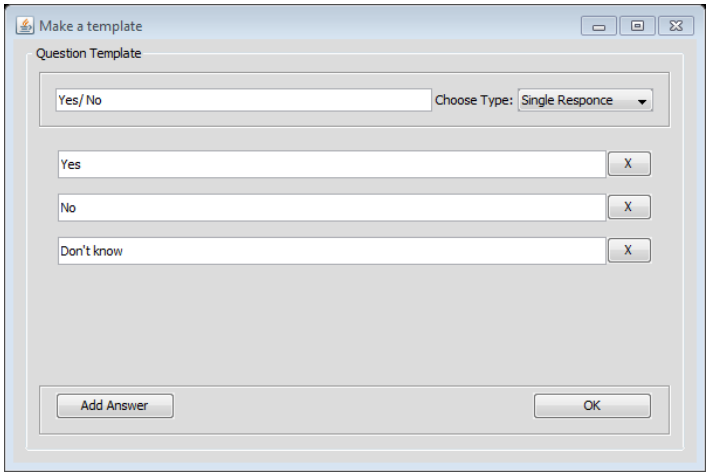
1-1- Chat Results:



1-2- Excel results:



4- Question Template:



Non-functional requirements:

1- Generality:

The program allows user to make a survey for any purpose (University, Company, etc.).

2- Portability:

Using java as a programming language made the program able to run on any Operating System.

3- **Usability:**

The application provides user-friendly and easy-to-use user interfaces. User should be able to learn how to run the program in less than one hour.

4- **Performance:**

The system can run efficiently with multiple users and multiple servers.

5- **Support several input languages**:

User can create a survey in many languages like English, Arabic, and French.

USED TECHNOLOGIES

Platforms:

1- NetBeans 6.9.1:
NetBeans is a cross platform Java IDE which is now a product of Sun Microsystems, which helps the development of java applications.
This platform was mainly used for developing the project.
2- **Adobe Photoshop**:
Adobe Photoshop is the main tool for designing the GUI's backgrounds.

Languages:

1- J2SE (Java 2 Standard Edition):
used for developing the server application.
2- J2ME (Java 2 Micro Edition):
used for developing the client application.

Other:

1- **Bluetooth:** is the main communication technology between servers and clients.

2- **Microsoft Excel:**
We used excel files as a standard output to provide a basic form for further studies.