Web-Seminar polling mechanisms for computers , laptops and smart phones.

T. C. Girona while at Astronomical Institute Utrecht

<toni.castillo@fa.upc.edu>

June 19, 2011

Abstract

This brief report will explore the basic requirements for allowing professors and students to use a web-seminar polling system, from any computer or laptop and focusing above all on smart phones -Iphone, Ipad, Android-like, etc -. We will discuss about the existing tools out there and we will present some approach in order to deploy this tool.

Contents

1 Introduction

The main idea is to make seminars more interactive. In order to do so, we need some sort of a tool capable of dealing with web-polling mechanisms. Below, we will describe how this tool is supposed to work:

1. The professor prepares a new poll for a certain seminar.
2. The students who attend the seminar use their smart phones or laptops to vote.
3. The professor gathers all the votes and presents them on a big screen in the form of statistical data.

To complete such a task successfully, we will discuss in the next sections and subsections about what sort of tools and technologies we can rely on, and what changes are mandatory on those same tools and libraries to achieve our goal.

1.1 Requisites

This tool has to fulfill these requirements:

- Capable of being correctly displayed on a small screen, like the ones on smart phones: Iphone, Ipad ...
- Its interface has to be deployed using the web, and it has to be accessed the same way.
- Students will be allowed to use it anonymously from their smart phones, laptops or computers.
- It is mandatory to prevent students from voting twice per poll.
- Professors have to prepare the polls in the easiest way possible.
- Professors can gather statistics from the polls and project them on a big screen - typically in Auditoriums -.
- All gathered data can be keep for further analysis.

1.2 Tools we need to deploy such a solution

Below, there's a list of software, libraries and tools we will need in order to deploy such a software solution.

- The Apache web server. Where the tool will be deployed.
- A smart phone emulator to test the web-poling system. We will discuss briefly about this matter in section 4.

2 An approach

Next, we will present our first approach in order to describe how things can be done right before analyzing different tools available on the web which can solve our problems.

Our solution's technical requirements will be:

- PHP web programming language.
- Use of XML files to manage the polls.
- Use of the JQuery Mobile API[6].
- It will not use a Database.
- It will be deployed on the Department's web server home directory.

2.1 Using the solution

We will link how this tool is supposed to work with our technical requisites:

1. A professor creates a poll. This poll will be be defined using an XML file. It can be generated either using an ASCII editor and then uploaded to the web server or we can develop a latex template. It is feasible to add a basic form on the web server to help professors doing so.
2. Once the poll has been generated and it is placed on the web server, the professor can point at it using the URL this way:

   http://www.astro.uu.nl/.../polls/poll.php?id=*poll_id*,

   where *poll_id* will be the desired poll to be used.
3. From then on, the professor during the seminar can ask the audience to use the poll and vote. In order to do so, all students will use their own smart phones or laptops to connect to the same URL as described earlier. This poll-rendering interface will be re-formatted in order to be suitable for small screens using custom CSS files.

4. It is mandatory to prevent students from voting twice. That can be easily arranged using php sessions programming facilities. The students cannot access the statistical information from any poll, either.

5. When the votes have been given, the professor can show the audience the poll's statistics by opening the same URL adding a new parameter this way:

   https://www.astro.uu.nl/.../polls/poll.php?id=*poll_id*&stats,

   It will contain basic information concerning percentages. For instance:

   YES: **25%**

   NO: **60%**

   –: **15%**

   It is feasible to show this information using graphs of some sort. Obviously, it is mandatory to present some sort of authentication screen before allowing the professor to actually see the statistics. Therefore, it is better to encapsulate this URL using the TLS encryption layer plus Apache's basic authentication. It can be easily adapted to any flavor of authentication mechanism set up in the Astronomical Utrecht Institute already.

6. After the polling, all information can be stored for further reference. The data is saved right in the XML file. The professor can keep the XML file in the web server or remove it from there and save it elsewhere. Finally, the professor can decide when the poll is closed - that is, no further votes can be done -.

2.2 Problems to deal with

In order to deploy this tool, we will have a look at what we can find out there close enough to solve our problem. There are lots of scripts which have been developed already so that a quiz, a test or a poll can be implemented on a website with little effort.

The main problem here will be to adapt any previously developed solution which can suite us well enough so that can be used from a small screen, like the ones the smart phones have: Iphone, Ipad, etc.

According to Safari's developer page[4] , we have to alter the style-sheets for our php solution, that is, the CSS files. So, we have to bear in mind that should not be out there some sort of a developed tool allowing us to do exactly what we need, we can alter the closest one slightly, and then develop its own style-sheets accordingly.

The best approach is just to use the Jquery Mobile API[6], as briefly described in section4.2.

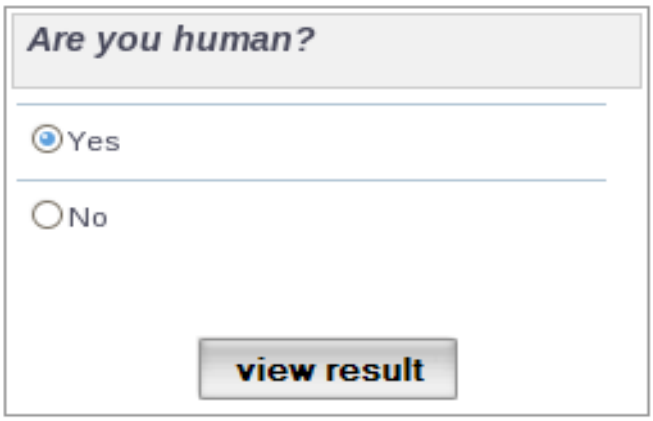

Figure 1: ZokiePoll: A poll in action.

In the next sections we will analyze some of these tools, focusing on its advantages and what would be necessary to change in order to achieve our goal.

3 Analysis of the closest tools available

3.1 OpenSource solutions

3.1.1 ZokiePoll[2]

ZokiePoll can do most of what we need. It is basically a web-poll system, and can be easily adapted to our requirements without great effort.

Features

- The polls are generated by creating XML files.
- It has basic statistical information.
- The polls can be used anonymously.
- Its web-interface is really simple, easy to adapt through CSS files.
- Could be deployed quickly on a web server running Apache.

To do

- As soon as any user has voted, the statistics are shown.
- Small changes in its code are required in order to choose a different poll-file dynamically.

```
1 <root><poll>
2 <id>3</id>
3 <question>Are you human?</question>
4 <variant><text>Yes</text><votes>16</votes></variant>
5 <variant><text>No</text><votes>2</votes></variant>
6 </poll></root>
```

Figure 2: ZokiePoll: The XML-poll configuration file describing a sample-poll

Figure 3: ZokiePoll: Statistical information gathered from the previous XML file.

- There is no auth mechanisms, so any user accessing the URL could see the statistics.
- There is no session control, so any user can vote more than twice.
- It is a bit tricky: we have to alter its behavior in order to impede any user from opening the poll and just seeing the statistics.
- Its whole mechanism is based on session cookies.
- We have to add additional XML tags to a XML-poll description file in order to indicate whether this poll is still open - and, thus, allowing students to keep voting - or it is closed - no further votes are permitted.

ZokiePoll on line demo We have prepared an online demo for testing purposes. This demo is "as it is", so there are no changes in its default behavior yet. So, the online version has the basic capabilities described earlier.

http://elantris.upc.es/utrecht/zokiepoll/zpoll.php

Once the user has voted, a session cookie is stored on the browser, impeding that same user from voting again. In this case, the script shows the

Figure 4: ProQuizz V.2: A poll in action.

statistics. It is obvious that the user can just delete this session cookie by hand, so then the vote could be done again.

3.1.2 ProQuizz V.2.[3]

This tool has been designed in order to add quizzes to a website. Then, it is more than just a poll-web system. It is relatively complex, and has facilities for testing and authentication mechanisms. It requires a MySQL Database also. Its look and feel is better than the previous tool, but that means it would be a bit hard to adapt for the smart phones.

Features

- The polls are generated by using the tool by itself, through a web-based control panel for Administrative purposes. It requires a MySQL database.
- More statistical information is shown compared to ZokiePoll.
- Its look and feel looks better than ZokiePoll.
- It can be used either for web-polling or quizzes.

To do

- We have to deal with MySQL database, there is no XML configuration file. It would be too hard to change its behavior.
- We have to change its code in order to allow anonymous vote.
- We have to modify the administrative control panel in order to allow the professors to create their own polls in the simplest way possible.

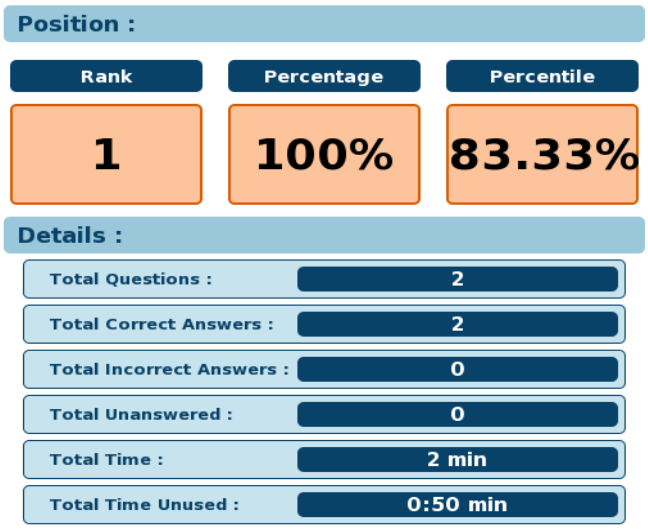

Figure 5: ProQuizz V.2: statistical information after a poll.

ProQuizz online demo We have prepared an online demo for testing ProQuizz as well. It is available here:

http://elantris.upc.es/utrecht/ProQuizv2b/login.php

These are the right credentials to log in: **astrogst** / **mickey_mouse**. This user has administrative privileges.

3.2 Commercial solutions

There are commercial solutions ready to be used from a smart phone. These solutions do have a cost. Below, a brief list of their main characteristics:

- All data will be stored in their web servers.
- They do have a cost.
- Some of them are linked to social networks, allowing the polling mechanism to be used from Twitter, FaceBook, etc.

Below, we will cite some of these commercial solutions to consider:

Poll everywhere[10]
http://www.polleverywhere.com/how-it-works

Doodle[9]
http://www.doodle.com/
Doodle can be used freely. We will discuss further about it below.

Figure 6: Doodle: participating on a poll from a smart phone running Opera browser.

Doodle Doodle can be used as a free web polling solution. It is for free. Apart from using it in order to keep synchronized schedules among different participants of a certain project, it can be used just to poll:

- It does have an option to close the poll.
- It can invite other users by email to participate on the poll.
- It supports anonymous voting.
- It can force a user to choose only one option per poll.

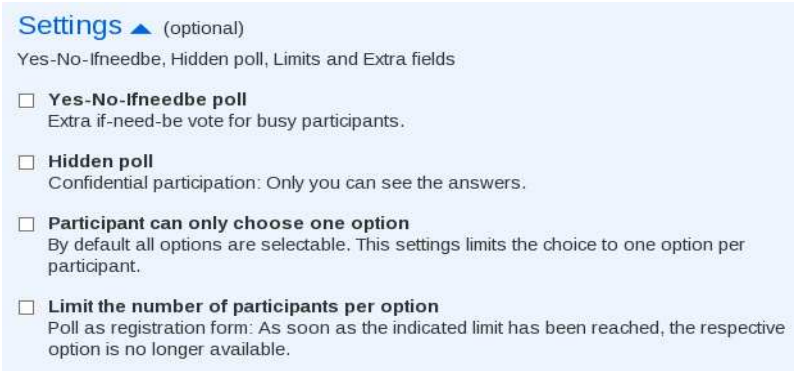

Figure 7: Doodle: setting up the poll's options.

- The statistics can be made hidden, just to the professor owning the poll.

It is suitable to use it directly on smart phones. Google just takes care of it.

All the options can be easily configured from the website. Due to its rendering facilities adapted for smart phones, even the poll's creation mechanism is suitable to be done from them.

Finally, we can have a look at the statistics screen, rendered either on a smart phone or an actual computer or laptop. This screen will be available as soon as the poll is closed.

This solution has few issues, listed below:

- The statistics screen does not deal with percentages.
- It shows all the names for the participants. Of course they don't need to be the real ones.
- A user can vote more than once.

4 Smart phones emulators and APIs

In order to test our Web-polling mechanism, we have to deal with different flavors of smart phones, like Iphones, Ipads, mobile phones, and so on. We need a common framework to test them all.

There are some online emulators available for that precise purpose. We will discuss briefly about them.

4.1 Opera Mini Emulator[5]

Most of the smart phones and mobile phones include Opera. Certainly, this is not the default case for Iphones and Ipads, which have Safari instead. Obviously, it can be installed, but we cannot rely on this. However, it is

Figure 8: Doodle: The statistics screen for a closed poll.

Figure 9: Mini Opera Emulator showing google's website.

suitable to use this online emulator in order to check how our solution is going to work on an Opera-based browser smart phone.

According to this website[8], Opera Mini Browser can run pretty well in most devices.

4.2 JQuery Mobile Framework[6]

This is not an emulator by itself, but it is absolutely useful. It consists on an API[7] developed purely in JavaScript to allow developers to create any kind of web page suitable for any sort of smart phone in a very easy and comfortable way, without having to deal with the low layers of the Style Sheets[4] at all.

Thus, our solution can be easily adapted - from a rendering's point of view - using this API, and then it can be tested on an actual emulator, like the previous one concerning Opera-based smart phones, though according to this API, there is no need to do so because the web page will be rendered just the same, either on a computer or on a smart phone.

We did some basic code changes to the original ZokiePoll's[2] sources using this very API. There are a few changes in order to render its contents the same way either on a computer or on a smart-phone. We have an online demo as well to test the end result. It is important to remark that this solution is "as it is", that is, there is no changes in its default behavior. The demo is available here:

http://elantris.upc.es/utrecht/zokiepoll.jquery/zpoll_jq.php

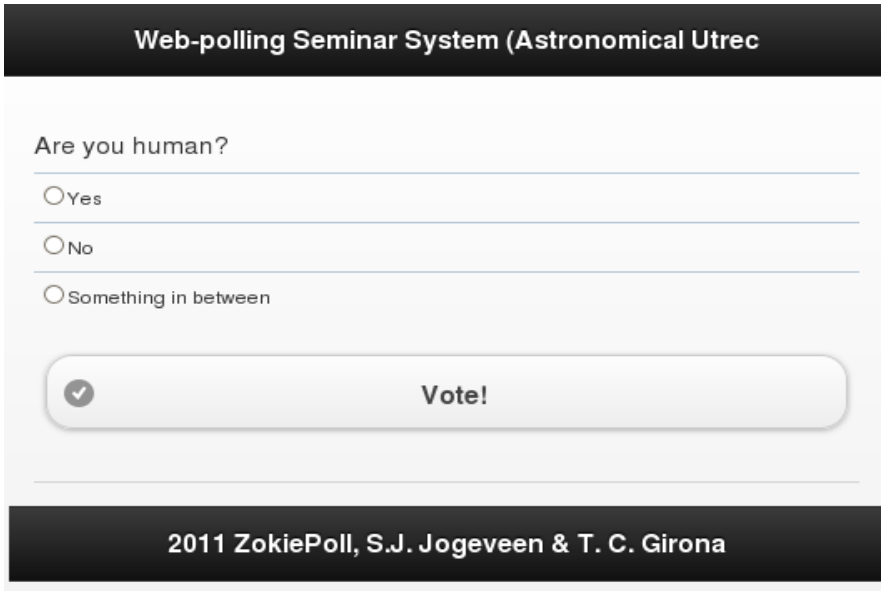

Figure 10: Zokie Poll: A poll with the JQuery Mobile API rendered on a computer.

5 ZokiePoll code changes

In this section we will show some basic code changes in order to adapt ZokiePoll[2] to fulfill our approach, according to section 2.

So, we have an online demo ready to be tested using either Smart Phones or standard computers and laptops here:

http://elantris.upc.es/utrecht/zokiepoll.tcg/

But now, we have to deal with certain parameters passed to the ZokiePoll php script. Let's have a look at them.

5.1 Voting

To open a poll and vote, we have to enter the URL this way:

http://elantris.upc.es/utrecht/zokiepoll.tcg/zpoll_jq.php?id=*pollid*

where *pollid* is the poll we want to vote for. Example:

http://elantris.upc.es/utrecht/zokiepoll.tcg/zpoll_jq.php?id=5

After voting, this script will not show us the statistics, just a confirmation message telling us we have voted already.

Figure 11: Zokie Poll: The same poll shown before rendered on a smart phone.

In order to avoid the user from voting again, all is handled using session cookies. This behavior has not changed at all, but we care about which polls the user has voted for in order to allow this same user to vote for other ones without getting this confirmation message. It is feasible, for testing purposes, to vote again for the same previous poll by deleting the session cookies.

5.2 Closing a poll

We have added an additional name-space inside the XML poll description file in order to allow the professor to close a poll. When a poll is closed, no further votes are allowed. Still, the professor can gather its statistical information, as described below.

<closed>true</closed>

So, by adding this XML name-space to the XML poll description file, at any time, a professor can control whether this poll is suitable for voting or not. It is perfectly feasible to remove this XML name-space from the file in

order to re-open the poll again.

When a poll is closed, any user trying to open its URL will get a message telling so.

5.3 Statistics

To project the statistics for a certain poll, the professor has to open its URL this way:

http://elantris.upc.es/utrecht/zokiepoll.tcg/zpoll_jq.php?id=*pollid*&stats

Example:

http://elantris.upc.es/utrecht/zokiepoll.tcg/zpoll_jq.php?id=5&stats

A web-form is shown. The professor are due to log in before accessing the statistics. These credentials are stored in an ini-like password file (see below). If the professor is validated and allowed to see the statistics for a certain poll, they will be rendered using the JQueryMobile API to fit perfectly on a smart-phone screen. Obviously, they still can be projected on a bigger screen.

The kind of authentication mechanism implemented has to be encapsulated through a TLS connection because it is passed to the web-server using a standard POST method. Apart from this kind of basic way of authenticating users, it is feasible to alter its behaviour so that other ones can apply.

5.4 Authentication

5.4.1 XML namespaces

Certain changes are required to allow authentication mechanism for a certain XML poll description file. Particularly:

```
<stats>
        <user>username1</user>
        <user>username2</user>
        ...
        <user>usernameN</user>
</stats>
```

In case a XML poll description file has no <user></user> directives, there will be no allowed users to see its statistical information. It is feasible to add as many <user></user> entries as desired, in order to allow multiple users to see the stats.

Figure 12: Zokie Poll: Authentication web-form to see the stats.

5.4.2 The ini-like password file

The ini-like password file is defined in the **poll_config.php** ZokiePoll main sources script file. To generate a new encrypted password, it is feasible to use this URL:

http://elantris.upc.es/utrecht/zokiepoll.tcg/encrypt.php?str=*pwd*

The password will be encrypted using a call to the *crypt()* system call. A normal user and password credential pair has the form:

user = password

5.5 ZokiePoll altered sources

http://elantris.upc.es/utrecht/zpoll.tcg.tar.bz2

References

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[3] ProQuiz V2
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[5] Mini-Opera Live Emulator
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[10] Poll EveryWhere.
http://www.polleverywhere.com/

[11] Using the JQuery API: page templates
http://jquerymobile.com/demos/1.0a1/#docs/pages/docs-pages.html