iaes Institute of Advanced Engineering and Science

International Journal of Informatics and Communication Technology (IJ-ICT)
Vol.2, No.3, December 2013, pp. 190~196
ISSN: 2252-8776

Automated online playlist generation system

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Article Info

Article history:

Received Sep 15th, 2013
Revised Oct 25th, 2013
Accepted Nov 30th, 2013

Keyword:

Music
Playlist
Acoustic fingerprint
Youtube
Entertainment

ABSTRACT

This paper presents an online playlist management system designed to provide easy and intuitive management of audio and video playlists. Playlists can be uploaded, combined, downloaded, but also created online and stored for listening. Sharing of playlists is also enabled. State of the art AJAX technologies have been used to developed a fast and intuitive user interface. Automatic online playlist generation based on recognizing local songs and automated Youtube searching and queuing is also part of the system.

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1. INTRODUCTION

Online multimedia content has been present for a while and is now emerging as the main source of home entertainment. IPTV, Video on demand and pay-per-view services replace deprecated audio-video technologies. The use of Internet services like YouTube enable easy access to multimedia content, but also provide possibilities for developing additional functionalities based on those services.

Our system enables uploading playlists of multimedia links by users for the purpose of manipulating and combining the lists for later consumption. Moreover, it enables importing songs from multiple playlist formats. This feature enables combination of songs that the user has stored on his local drive within a file with a standard playlist format extension such as m3u and gives the user an opportunity to create a playlist that is not created directly from our system. The system includes an automated playlist generation feature. Local songs on the user's computer are recognized and used for searching on Youtube, later to be added in an automatically generated online playlist. Also, being aware that often users would like to see the lyrics of the song being played, we searched for a solution that will cover the broad variety of the music in our system. We tried more lyrics website's such as SongLyrics [10] and A-Z Lyrics [11] which we did not prove effective. Instead, we added a lyrics searcher that covers almoast every song. The lyrics searcher-agregator that is integrated within our system provides results from more than 450 other lyrics websites.

Currently there are few similar playlist management systems. The paper presents a review of YTPlaylist [6] and YouTube Disko [7]. Both of them lack in functionalities when it comes to saving the current playlist and showing lyrics for songs. The first one has a less intuitive user interface, while the second has a well formatted interface, but it has a problem with subsequently playing songs from the created playlist. Other sites that were evaluated required registering of the users, which we found very frustrating for the users. Also, no other system was found that enables import or export of local playlists and getting lyrics for the songs that are playing. Overall, our system has both the functionalities and user interface that other similar systems lack.

2. SYSTEM ARCHITECTURE

The system is mainly based on JavaScript codes and functions from the jQuery library. JavaScript is mostly used for communicating with the YouTube streaming server. YouTube APIs and Tools [4] enable bringing YouTube experience to user developed third party systems. Using these APIs helps integrate and subsequently play songs from a given playlist in an embedded player. JavaScript function calls can be made to play, pause, seek to a certain time in a video, set the volume, mute the player and other useful functions.

Standard playlist format files can also be imported into our system. The main problem with this feature is how to find the name of the song mentioned in the playlist. An M3U file is a plain text file that specifies the locations of one or more media files. It is supported by applications, including media players such as Windows Media Player,iTunes, Winamp and many others. The m3u file contains a specification of the local path of the songs and a URL pointing to a stream on the Internet. Each m3u file provides easy access to this stream. If the song is a part of an m3u or other text based formats it is very likely that they contain meta data about the artist, full name of the song, local path and URL path. If some of those parameters are missing, the name of the song and the artist needs to be found using acoustic fingerprinting [8]. Searching for an open source implementation of acoustic fingerprint we found Echoprint [9] as most suitable for our system. Echoprint is a music identification service that listens to music signals and returns the name of the song.

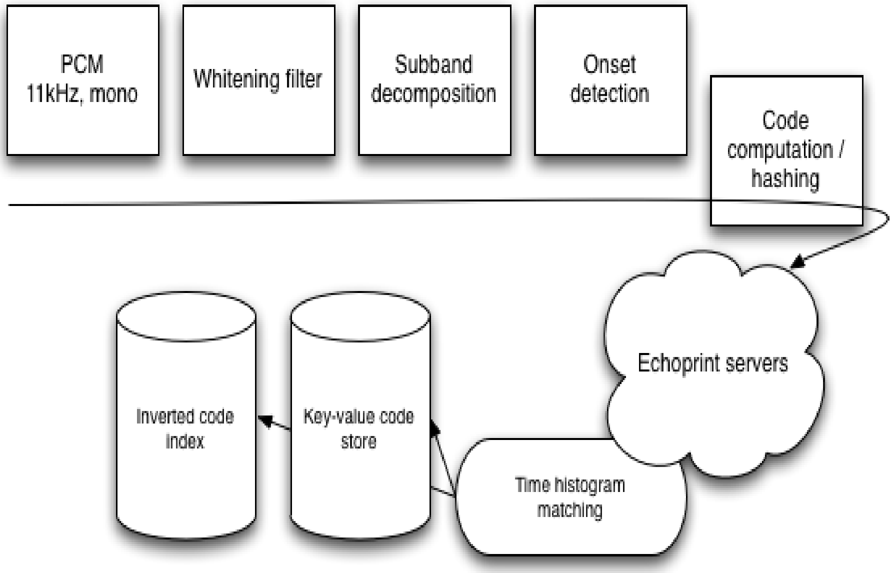

Figure 1. How Echoprint works

Once we have the name of the song, either by the metadata of the playlist or by acoustic fingerprinting, we can retrieve the You Tube video. The name of the song is searched with the You Tube search engine integrated into our system and the result is filtered by a combination of a video with most views and quality of sound. We are using YouTube APIs and Tools to retrieve the quality of sound and views of the videos which result from the given keyword. The user can choose which parameters to be considered in the result. Initially the algorithm will put the video with most views into the playlist . The user can make a combination between views , quality of sound , date of release and other parameters. Using JavaScript we get the most suitable video according to the given parameters.

We use Java (Spring Framework) for saving and reusing the playlist one user has made on his local disk. Java gives a explicit specification of the unique timestamp which is generated for each playlist that is requested for downloading. This is used for the assurance that no two different users will download a playlist from the server that they didn’t make, the unique timestamp enables us to give the users their playlist for downloading even if they request that in the same time.

JQuery is a JavaScript library used to simplify the process of making a user interface. We use JQuery because of the following:

- It is a cross platform library
- It is easy to use and understand

- Most popular library among the developers
- Open source software
- Requires less coding
- Easy to make AJAX call

JQuery is used for organising the playlist using Drag&Drop from the default JQuery user-interface library. Thanks to the concepts of cross platform code our web layout is consistent, we have tested it on multiple operating systems and multiple web browsers including Google Chrome, Safari, Mozilla Firefox.

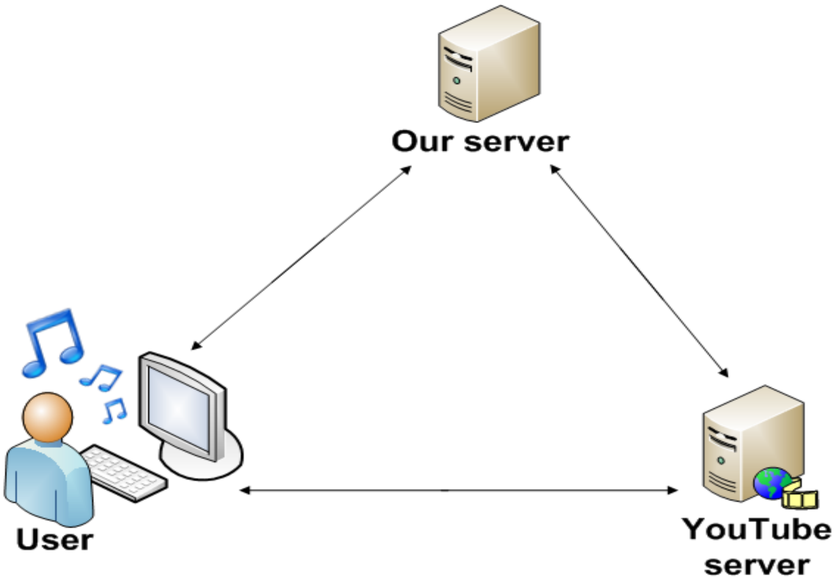

Figure 2. The systems architecture

While searching for an effictive way for finding accurate lyrics for a wide range of song styles and types, we found one interesting system: Lyrster [12]. Lyrster enables searching through more than 450 lyrics websites and enables the user to change the source from which the lyric for a particular song is coming. Our system searches the big pool of lyrics from the Lyster web application by the name of the song and the artist. The search result with the highest ratings given by other users is shown with an opportunity for the user to change the source and view lyrics from other websites as sources. After the user has seen the lyrics for the song, he/she can rate the accuracy of the source and participate in the rating for that source.

Users often prefer a system in which there is no user authentication, out of convenience and e-mail spam protection. We provided most of the features to function this way. However, after the confidence in the system grows, some users want to be able to store their playlists, videos and lyrics online in our database. The profile creation feature enables access to precreated playlists from different computers and playlists sharing, serviing as mini-cloud storage of playlists. We extended our system with PHP and MySQL, enabling users to store their favourite playlists and play them from different places and from various kind of devices. We provided a simple user management system in which after the user has been authenticated, he/she can store unlimited playlists and lyrics and also share them with other users of the system. Sharing is also enabled through social networks such as Facebook, Twitter. The user has an option to log in with Facebook and Google to facilitate the registering process.

3. USER INTERFACE

State of the art AJAX technologies have been used to developed a fast and intuitive user interface. The user interface and it’s performance is essential for the system’s adoption. We made a research in which we found what users demand for such a multimedia online system.
They demanded several important features:

- Simplicity
- Speed
- Player with familiar interface
- Reusing playlist’s
- Manipulating with a given playlist

- Getting lyrics for every song they play
- Using site without making user account
- Search for songs in categories or by name
- Responsive web design

Responsive design is a whole new approach to web design. We are faced with a rapid growth of the smartphone and tablet industry. Facing this trend we adapted our site to various types of devices and various display sizes. Our site is built with flexible layout using a flexible grid, which can be resized dynamically to any width. Flexible grids are using relative length units that are used to declare property values such as width, margin or padding. This leads to a completely dynamic website scaling to every viewport size.
When the user opens the page the first thing noticeable are the top 10 videos for the current week. He is faced with the choice of either using a playlist that he made before from his local drive or make a new one from scratch. If the choice is to make a new playlist, the users can simply Drag&Drop songs into the playlist from:

- The YouTube search integrated on the main page
- Already created playlist from local disk
- Top 10 songs
- Random songs from a given category
- Locally stored playlist's

Our system has a search by category feature followed by an option for shuffle playing so that users can play different sons from one category without being ocupied to search and add songs to playlist themselfs. As long as the user doesn't clear the playlist or clear the cookies in the browser, the playlist that he made before he left the page will remain there every time he visits the page. The concept of Drag&Drop is quite intuitive, very easy to use and very easy to understand. When the user is done choosing the playlist, he can click play letting the system to play the songs in a row. Before leaving the page or clearing the current playlist, the user can save his current playlist for future use. All the parts from the user management are organized in modal windows so that the user can stay on the site and do not interupt a playing song. Part of the user interface is shown on the Figure 3.

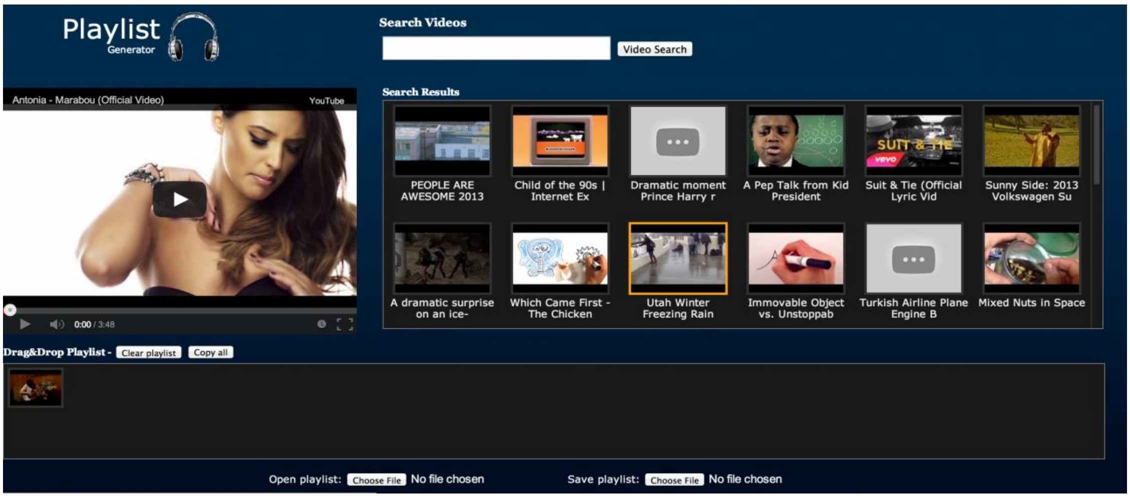
Playlist
Generator
Search Videos
Video Search
Antonia - Marabou (Official Video)
YouTube
0:00 / 3:48
Search Results
PEOPLE ARE AWESOME 2013
Child of the 90s | Internet Ex
Dramatic moment Prince Harry r
A Pep Talk from Kid President
Suit & Tie (Official Lyric Vid
Sunny Side: 2013 Volkswagen Su
A dramatic surprise on an ice-
Which Came First - The Chicken
Utah Winter Freezing Rain
Immovable Object vs. Unstoppab
Turkish Airline Plane Engine B
Mixed Nuts in Space
Drag&Drop Playlist -
Clear playlist
Copy all
Open playlist:
Choose File
No file chosen
Save playlist:
Choose File
No file chosen

Figure 3. Part of the website's user interface

4. RESULTS AND ANALYSIS

The system was evaluated by its initial group of users. Their opinions were assessed using a questionnaire that consists of 15 questions. Each question was in a form of statement graded by the users with one of the grades: Strongly Disagree, Disagree, Undecided, Agree, Strongly Agree. The overall test user group that responded to the questionnaire contained 25 people. We used Google forms [1] to generate a survey form and retrieve the answers.

The evaluation results generally show a positive attitude towards the presented system prototype. Figure 4 shows a graphical representation of the answers for the Accessibility and Navigation questions in the poll. The navigation functionality is extremely positively graded since all functionalities are contained within the homepage. The accessibility has a certain number of undecided grades since not all users had the opportunity to test the application on a touch device, nor did they have eyesight problems therefore were unable to give a valid response to the particular question.

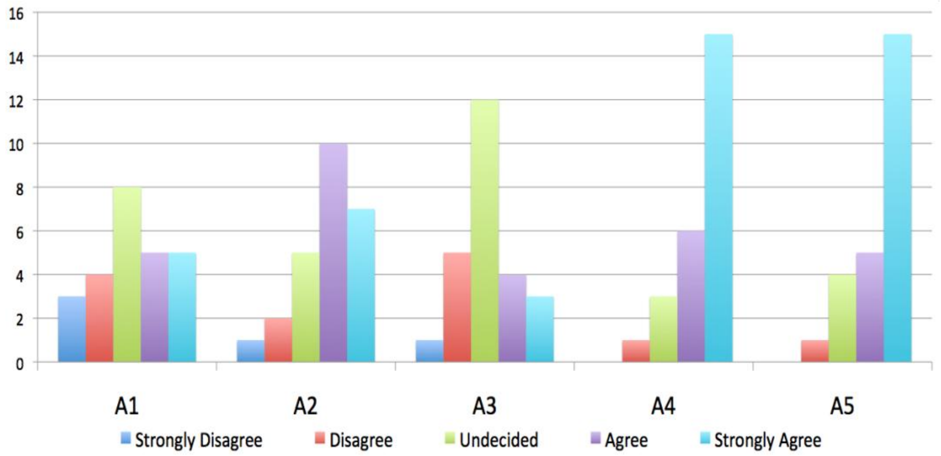

Figure 4. Feedback for the Accessibility and Navigation questions

The graphical representation in Figure 5 shows the answers on the questions on Layout and Learning. An effort was made to fine-tune the interface to be consistent across different most popular browser engines. However, the lack of support by Internet Explorer for new CSS rules, made some small differences in the rendering of the webpage there. As a consequence, the grades on A6 and A7 about the consistency and browser displaying are somewhat divided, although generally positive. The remaining questions had better grades since great attention was paid to the ease of learning and an intuitive interface development.

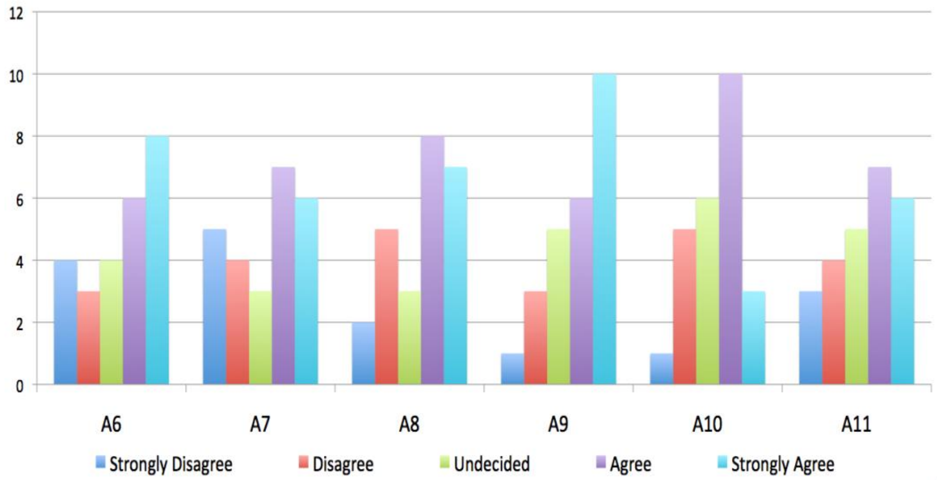

Figure 5. Feedback for Layout and Learning questions

The final overall evaluations of the system based on the responses on questions A12 – A15 are shown in Figure 6. The majority of users, approximately 50%, in each question gave an agree or strongly agree evaluation. The remaining undecided users only commented on the incompletion of the system, while the general idea and progress so far was positively graded.

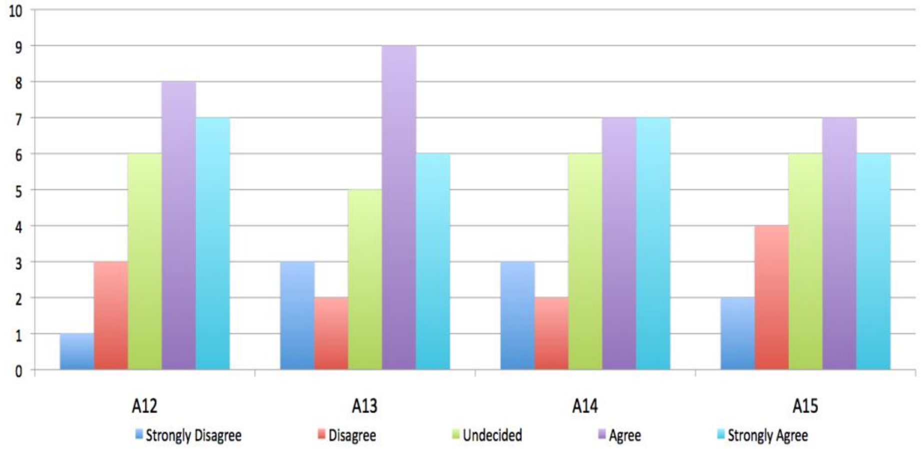

Figure 6. Feedback for Quality questions.

5. CONCLUSION

The system presented in this paper is aimed at enriching the online user experience. Users can create and store multimedia playlists that can be viewed and enjoyed as well as shared. The attractive user interface and the ease of use are expected to bring multiple users to the system.

The initial user group faced with the system prototype was polled to evaluate their user satisfaction and their opinions regarding the system. A generally positive evaluation was received along with remarks aimed at constructive upgrades and necessary changes. It can be concluded that the initial idea and the first steps have been in the right direction, and there is plenty of room for upgrades and additional features such as playlist generation algorithms [2] or even using Youtube as a teaching tool [3] to be added.

ACKNOWLEDGEMENTS

The questions in the survey were as follows:

Accessibility
A1. I can operate the system on a touch screen device
A2. The font size and style is easy to read
A3. The content is readable if you have a disability regarding your eyesight.

Navigation
A4. The major parts of the site are directly accessible from the main page
A5. The site search is easy to access

Layout
A6. My browser displays all information correctly
A7. The site has a consistent look and feel
A8. The expected functionalities are placed in the position I expected
A9. The labels location and format is consistent

Learning
A10. Easy to learn manipulation with songs in playlists
A11. Easy to learn playlists manipulation

Quality
A12. The web design is good and attractive
A13. The site is well-structured and correlates to my requirements
A14. Easy to use
A15. Positive overall evaluation

The answers given by the users are summarised in Table 1.

Table 1. Evaluation results

Q-n	Strongly Disagree	Disagree	Undecid.	Agree	Strong Agree
A1	3	4	8	5	5
A2	1	2	5	10	7
A3	1	5	12	4	3
A4	0	1	3	6	15
A5	0	1	4	5	15
A6	4	3	4	6	8
A7	5	4	3	7	6
A8	2	5	3	8	7
A9	1	3	5	6	10
A10	1	5	6	10	3
A11	2	2	6	8	7
A12	1	3	6	8	7
A13	3	2	5	9	6
A14	3	2	6	7	7
A15	2	4	6	7	6

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