Implementation of Digital Signage for Digital Communication Media

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ABSTRACT

Digital signage is a broad depiction of a new media using a variety of technologies. In general, digital signage leads to an electronic media centrally controlled by a server and can be accessed by the player/client, and the content can be sent to multiple displays at the same time. With a system consisting of a composition of server/PC, monitor/TV, and software, digital signage has the capability to change and edit the message and information. Given the importance of digital signage that has a function as a support in the area of advertising media, the development has been done by many people. Digital signage is web-based software that consists of client and server. Communication between client and server is conducted using a technology called web service implementation with SOAP which allows the exchange of data in the form of XML. Method of developing digital signage software is done using Rational Unified Process (RUP).

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1. INTRODUCTION

In the modern era which is offset by rapid technological advances, the use of digital signage media for most of the people has been common. In addition, the consumer's awareness of the company/organization/institution has become essential that it led to the more effective and efficient delivery of information through new advertising media such as digital media. One of the current flourishing digital media is digital signage. Digital signage is new media with broader understanding that replaces the conventional media with varied applications and technologies. In general, digital signage leads to the electronic instructions which is centrally controlled and can be updated quickly with low cost, and of which message can be sent to hundreds or even thousands of displays simultaneously. With a system that consists of a composition of server/PC, monitor/TV, and software, digital signage has the capability to edit the message and information as an integrated system [1].

Digital signage is a form of information delivery through electronic display media (dynamic). By using CD, plasma, or LED that are increasingly become more sophisticated and affordable, coupled with ease of use, digital signage becomes a trend of delivering information in different parts of the world, as well as conveying information in one direction (a conduit of information to the community) or two-way (giver of information to and from the community) by taking advantage the interactive technologies [2].

This study aims to:
1. Utilize advanced technology to support the advancement of digital media as a promotional media (digital signage).
2. Attract lots of audiences by using digital signage as a persuasive object for a particular brand.
3. Easily inform to various destination points.
4. Improve time efficiency and accuracy in delivering information to various destinations.

2.   BASIC THEORY

2.1. Fundamental of Digital Signage

Digital signage is a form of information transformation through electronic display media (dynamic). Using CD, plasma, or LED technologies which become more sophisticated and achievable over time as well as user-friendly, digital signage becomes a global trend of delivering information. Digital signage is used both in one-way information delivery (giving information to public) and also two-way information delivery (giving and receiving information to and from public) using interactivity technology [2].
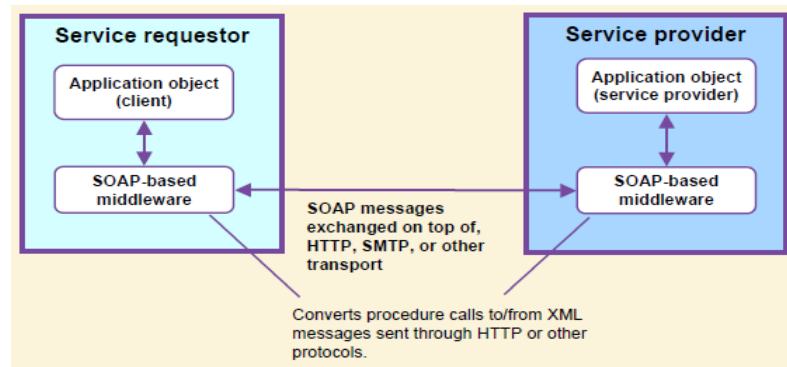

Figure 1. Simple Object Access Protocol (SOAP) [4]

SOAP's role in the web service technology is as packaging protocol for messages used jointly by its users' applications. Specification used is no more than a XML-based regular envelope for information transfer, as well as a set of rules for translation applications and specific data-platform types into XML form. SOAP's design form makes it suitable for a variety of message exchanges in the application

2.2. SOAP

Web service is a system designed to support intercommunication among machineries is a network. Web service technology enables us to connect to various software having different platforms and operational systems [3].

SOAP stands for Simple Object Access Protocol. SOAP is a protocol dedicated to decentralize and distribute information exchange. SOAP is built by HTTP protocol. As HTTP is supported by all browsers and servers, SOAP can communicate using different kinds of applications though operation system, technology, and programming language differences. SOAP acts as a packing protocol for message which is used in group by user applications. SOAP specification is similar to XML-based envelope for transferable information, where a pack of regulation for translation of applications and types of specific platform data is transformed into XML. SOAP form design enables the transformation of various message exchanges in applications.

2.3. SOAP Message

A SOAP message is an XML document that consists of:
- Envelope, identifying XML documents as a SOAP message.
- Header, consisting of information header. This is optional.
- Body, consisting of call and information response.
- Fault, consisting of error message which happened during the process. This is optional.

2.4. NuSOAP

NuSOAP is a library which is used to develop SOAP-based web service, written in PHP. NuSOAP is created by Dietrich Ayala. In developing a web-service-based system, there are two main components, a server as a provider entity and clients as requester entity [5].

3.   ANALYSIS AND DESIGN

A system development is built by using Rational Unified Process (RUP). RUP is a method of software development formulated to ease controlling and developing software quality [4], [2].

3.1. Business Modeling

According to current business analysis, there are obstacles on developing digital signage, detailed in the following:

1. There is no limitation towards unauthorized people. A security system is required to limit the right to access towards unauthorized people who try to access the server.
2. There is less optimal access towards tools as there are no grouping among media for scheduling and media for design layout.
3. There is no documentation towards contents used by administrator (admin)/user.
4. There is no publication / information towards user/admin about available player.
5. Admin has no right to add, change, or delete towards other users so that it creates static image of the admin.
6. There is no synchronizing between server and client.

3.2. Users Identification

System needs two users; admin and player. In system development sensing, system is the actor.

3.3. Requirements Analysis

The previous study by Davis had successfully collected several important requirements used to design a new business analysis [5], [7]. The requirements are described in detail below.

3.3.1. Functional Analysis

Functional analysis is a description of figures included into client-server-based digital signage software. The figures are:

1. Login, used for security to make the home page inaccessible to random users.
2. Design Layout, used to design any content which is displayed in player (client).
3. Scheduling, admin/user server that is able to schedule when the content is displayed to the player (client).
4. Playlist, a library consisting of any chosen content during Design Layout step.
5. Player Set, a player (client) status which is connected to the server.
6. User Set, a user administrator (admin) in which a user can be added or edited.
7. Web Service Connection.

In addition, the player (client) side has the following:

1. To display connection towards web service.
2. To download any content scheduled by server.
3. To display successful-downloaded contents.

3.3.2. Digital Signage Performance

Digital signage is capable to enable the interaction between server and player (client). Data communication between client and server uses SOAP as web service which enables to exchange information in XML format.

3.3.3. Use Case Diagram

The design of business processes and requirements for the new system is modeled with a UML diagram as use case, activity, sequence, and class diagrams [4]. This paper shows the use case diagram only [6] Overview of the functionality that is expected to occur between the users and the system is illustrated below:
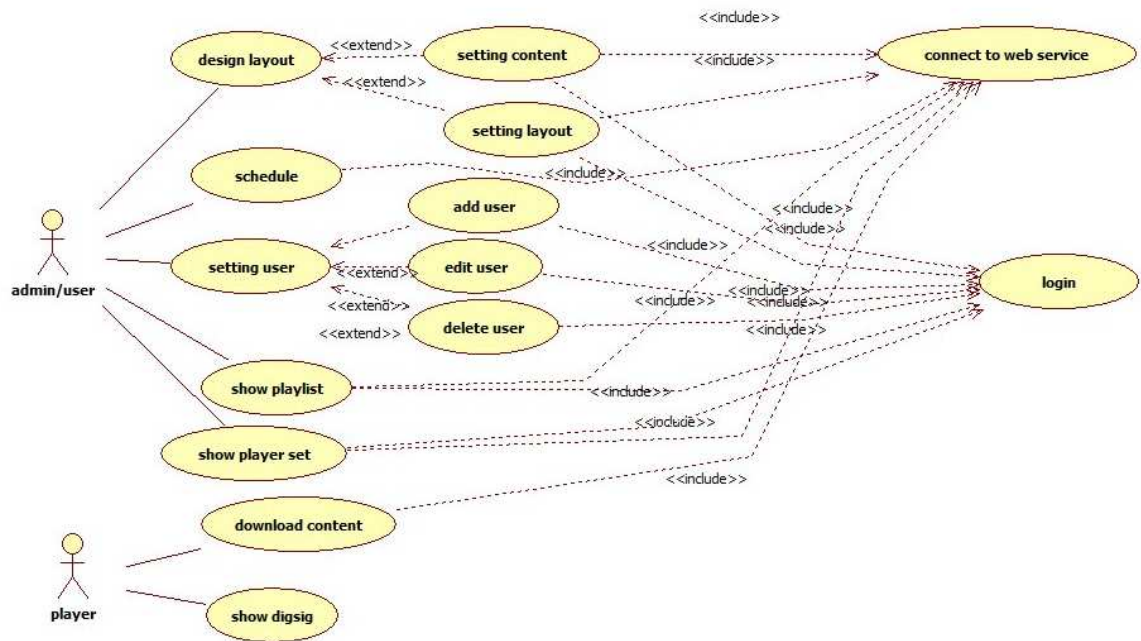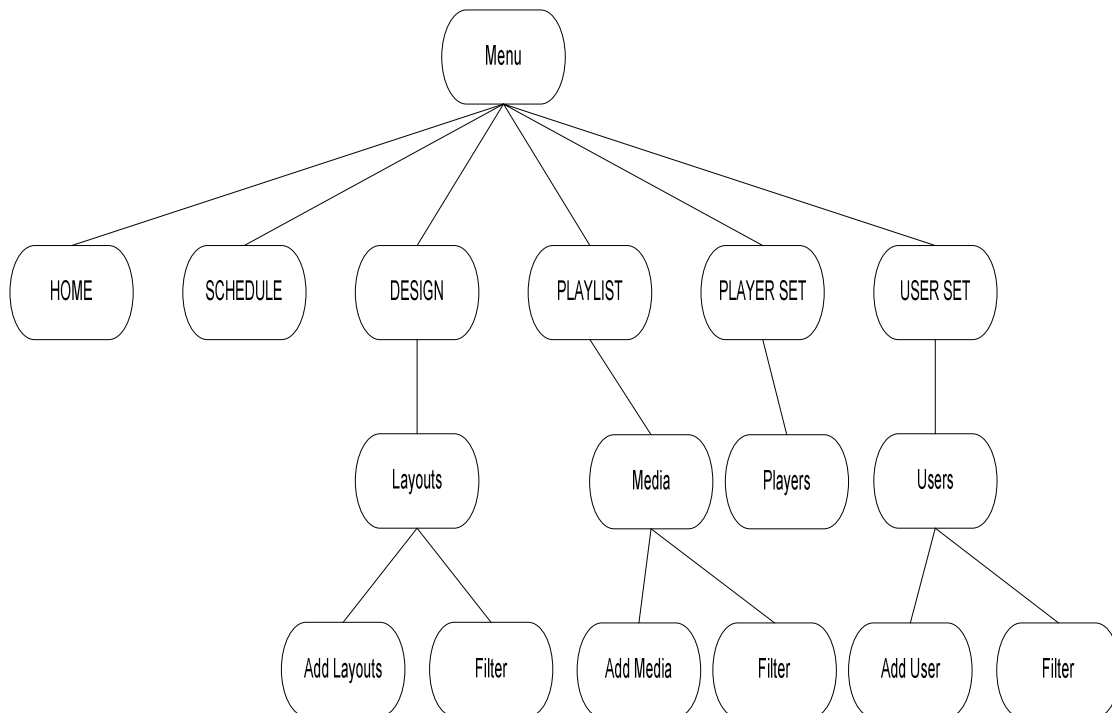
Figure 2. Use Case Diagram

3.4. Design of Navigation

The digital signage software uses Hierarchical Model structure, in which the main menu is the central of navigation linked to all the features of the software.

Figure 3. Design of Navigation for *Server Digital Signage*

4.   CONCLUSION

The results based on the digital signage's software development for web-based client server, several conclusions can be drawn, i.e.:

1. The development uses SOAP as a web service that connects communication between client and server which enables communication of data using XML.
2. The software is complemented by supporting tools that refer to the menus featured on the server. On the other hand, tools / menu on the client side is not available because at this point the client only serves as a medium to show the contents that has been scheduled on the server.

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