

Considerations on Providing Emergency Alerting Information in Digital Signage Services

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Abstract—It is very timely service to provide disaster information via digital signage. In this paper, we describe considerations to provide disaster information derived from the KMA (Korea Meteorological Administration) and the NEMA (National Emergency Management Agency) to the digital signage terminal through a national disaster information center.

Keywords— digital signage, disaster information, emergency alerting

I. INTRODUCTION

Development of Information and communication technology and the decline in the price of the display of signage was to replace the existing signage with digital signage [1,2]. In recent years, advertising effectiveness of four major media, including TV, radio, newspapers, and magazines has been decreased. Therefore, advertisers discovered other media such as digital signage.

In general, most people outside of the home, is facing digital signage media, and the proportion is growing. Digital signage is readily accessible media by generation alienated from information and communication equipment (cellular phones, DMB, laptop generation, etc.). Therefore, it's very timely service to provide disaster information via digital signage [3, 4].

Therefore, in this paper, we describe considerations to provide disaster information derived from the KMA (Korea Meteorological Administration) and the NEMA (National Emergency Management Agency) to the digital signage terminal through a national disaster information center.

II. COMPONENTS RELATED EMERGENCY ALERTING

Emergency alert service is intended to reduce the damage by disaster (a weather alarm such as earthquakes, tsunamis, typhoons and torrential rain and emergency disaster such as fire breaking, etc.)

Emergency Alert Service of digital signage is associated with National Disaster Information Center, Digital Signage Service Providers, and Digital Signage Terminal.

- National Disaster Information Center: National Disaster Information Center receives the disaster information and it determines dispatch of emergency alert and grade of disaster alarms.
- Digital Signage Service Providers (DSSP): DSSP manages digital signage contents and plays a role in distribution and transmission of digital signage content based on the particular contract policy. It also analyzes to derive the effect of providing information through the user behavior from digital signage terminal. In addition, it receives an emergency alert request received from the National Disaster Information Center and sends the request to digital signage terminal.
- Digital Signage Terminal: Digital Signage Terminal displays the digital signage content received. And, it provides audience information collected through a variety of sensing and recognition method to DSSP [5]. It also displays disaster information.

III.COMPOSITION AND ROLE OF NATIONAL DISASTER INFORMATION CENTER

National Disaster Information Center is composed of KMA (Korea Meteorological Administration), NEMA (National Emergency Management Agency), Disaster Information Receiver, Disaster Warning Decision Processor and Emergency Alert Messages Generator.

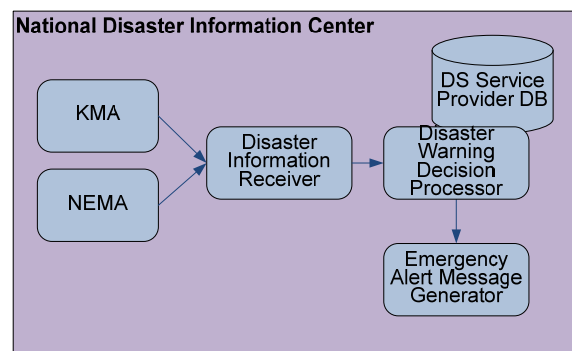


Figure 1. National Disaster Information Center

Disaster Information Receiver within National Disaster Information Center receives the disaster information from KMA (Korea Meteorological Administration) or NEMA (National Emergency Management Agency).

And, Disaster Warning Decision Processor determines dispatch of emergency alert and grade of disaster alarms.

Emergency Alert Messages Generator creates the message including the following information.

1. ID
2. Specify the propagation region (e.g, Nationwide, Seoul, DaeJeon, YuSeong, etc.) and the propagation target (e.g, Fishermen, transportation workers, etc.) of the emergency alert message
3. Contents of disaster information
 - Priority: normal, urgent, very urgent
 - Level: national level, regional level
 - Disaster trigger time, disaster area, specific disaster message (specific disaster message is available text other than audio, image, video, etc.)

IV.COMPOSITION AND ROLE OF DIGITAL SIGNAGE SERVICE PROVIDER

Digital Signage Service Provider is composed of Digital Signage Content Processor, Contents Play Controller, Audience Management Processor and Playlog /Report Generator.

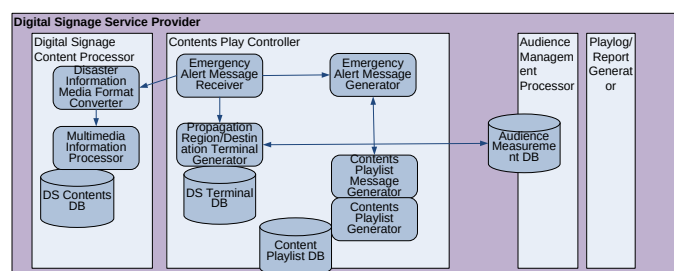


Figure 2. Digital Signage Service Provider

DSSP manages digital signage contents and plays a role in distribution and transmission of digital signage content based on the particular contract policy. It also analyzes to derive the effect of providing information through the user behavior from digital signage terminal.

In addition, it receives an emergency alert request received from the National Disaster Information Center and sends the request to suitable digital signage terminal after reviewing the following steps.

Emergency Alert Message Receiver transfers to the appropriate processor after reviewing the following features of emergency alert message received from National Disaster Information Center.

- Emergency Alert Message Receiver transfers emergency alert message to Disaster Information Media Format Converter in order to convert media type

contained in the specific disaster message to available format supported by the Digital Signage Terminal.

- Emergency Alert Message Receiver transfers emergency alert message to Propagation Area/Destination Terminal Generator in order to create targeted Digital Signage Terminal list.
- Emergency Alert Message Receiver transfers emergency alert message to Emergency Alert Message Generator in order to derive how to transport emergency alert message based on the emergency alert priority (normal, urgent, very urgent, etc.).

In Disaster Information Media Format Converter, media type (text, audio, image, video, etc.) contained in the specific disaster message is converted to available format supported by the Digital Signage Terminal.

- First of all, Disaster Information Media Format Converter inspects. And, if media type (text, audio, image, video, etc.) contained in the specific disaster message has a difficulty to display in Digital Signage Terminal, Disaster Information Media Format Converter converts it to a format that can be supported by Digital Signage Terminal. Default media type is a text.

Propagation Area/Destination Terminal Generator determines how Digital Signage Terminal will receive the emergency alert message depending on propagation region and propagation target contained in the specific disaster message.

- Propagation Area/Destination Terminal Generator derives the terminal list that satisfy the conditions 'Location address of Digital Signage Terminal is true of scope of propagation region (e.g, Nationwide, Seoul, DaeJeon, YuSeong, etc.)'.
- Propagation Area/Destination Terminal Generator derives the terminal lists that satisfy the conditions 'Class of Audience Info DB (and type of Digital Signage Terminal) is true of scope of propagation target (e.g, women, junior and senior high school students, college students, etc.)'
- List of digital signage terminal derived in the previous two steps are the target of emergency alert message.

Emergency Alert Messages Generator determines how emergency alert message will be transferred to digital signage terminal depending on priority of disaster information.

1. In case of 'very urgent': DSSP request to abort the current display contents from digital signage terminal and it wants to display disaster information contained in emergency alert message immediately.
 - These kinds of messages are true of messages careful of the weather, including earthquakes, tsunamis, typhoons and torrential rain or fire breaking news.

- It may be required that DSSP has to push emergency alert message in advance before requesting of play list by digital signage terminal.
 - It may be required that DSSP has to routing mechanism to transfer very urgent message.
2. In case of 'urgent': DSSP request to display disaster information contained in emergency alert message as soon as possible.
 - It may be required that DSSP recommends to placing emergency alert message on the front of play list. The position of emergency alert message within playlist will be adjustable depending on the type of emergency alert message.
 - The position of emergency alert message within playlist is determined by Contents Playlist Generator and Contents Playlist Message Generator.
 3. In case of 'Normal': DSSP request to place emergency alert message into the one of the play list of digital signage contents.
 - These kinds of messages are true of weather forecasts messages, fire prevention information, etc.
 - The position of emergency alert message within playlist is determined by Contents Playlist Generator and Contents Playlist Message Generator.

In other words, DSSP receives an emergency alert request from the National Disaster Information Center and sends the request to suitable digital signage terminal after converting through the above processing.

V. COMPOSITION AND ROLE OF DIGITAL SIGNAGE TERMINAL

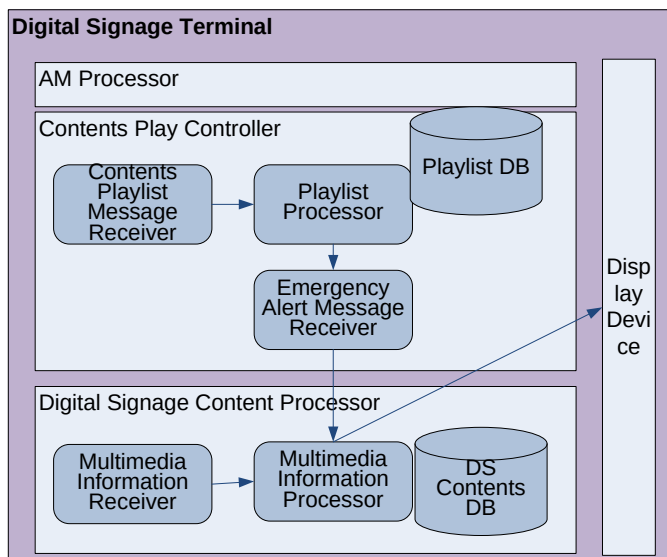


Figure 3. Digital Signage Terminal

Digital Signage Terminal displays the digital signage content received. And, it provides audience information collected through a variety of sensing and recognition method

to DSSP. Digital signage terminal also displays disaster information. Emergency alert message received by Digital Signage Terminal is classified as the following cases.

1. Multimedia Information Receiver can receive emergency alert message through the following path, such as MPEG-2 TS SI. It is true of the 'very urgent' case. Emergency alert message is transferred to the Multimedia Information Processor.
 - Emergency Alert Message Receiver decodes emergency alert message and retrieve related contents and immediately display the disaster information to digital signage terminal.
 - Decoded disaster information includes disaster trigger time, disaster area and specific disaster message. Specific disaster message is available text other than audio, image, video, etc.
 - Multimedia Information Processor can display disaster information with related contents retrieved from Digital Signage Contents DB.
2. Contents Playlist Message Receiver can receive emergency alert message. It is true of the 'urgent' or 'normal' case. Emergency alert message is transferred to the Playlist Processor.
 - Playlist Processor decodes emergency alert message and retrieve the order of playlist through referencing Playlist DB. And then, Playlist processor transfers emergency alert message to Multimedia Information Processor through the Emergency Alert Message Receiver.
 - Multimedia Information Processor decodes emergency alert message and retrieve related contents and display the disaster information based on the order of playlist to digital signage terminal.
 - Decoded disaster information includes disaster trigger time, disaster area and specific disaster message. Specific disaster message is available text other than audio, image, video, etc.

VI. OVERALL PROCEDURE

Figure 4 describes a series of procedures from the occurrence to display of disaster message among National Disaster Information Center, Digital Signage Service Providers, and Digital Signage Terminal.

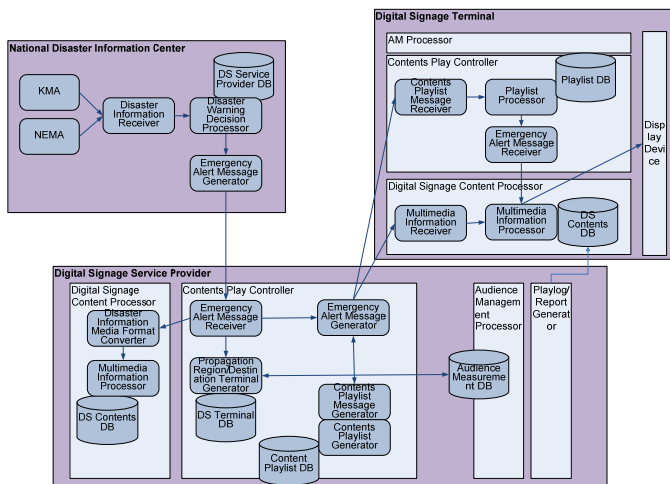


Figure 4. Overall Procedure

VII. CONCLUSION

Digital signage is readily accessible media by people outside of the home or generation alienated from information and communication equipment (cellular phones, DMB, laptop generation, etc.)

According to this paper, after recognizing the emergency alerting message, digital signage terminal can display the emergency alert message as an available media format depending on propagation region and propagation target. Thus, it can provide disaster alerting service targeted to the digital signage terminal or audience.

VIII. ACKNOWLEDGMENT

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REFERENCES

- [1] ABI Research, [http://www.abiresearch.com/press/3687-Digital+Signage+Revenue+to+Approach+\\$4.5+Billion+in+2016](http://www.abiresearch.com/press/3687-Digital+Signage+Revenue+to+Approach+$4.5+Billion+in+2016)
- [2] Global Industry Analysts, <http://www.strategyr.com/pressMCP-6741.asp>
- [3] ITU-T Watch Report, <http://www.itu.int/en/ITU-T/techwatch/Pages/digital-signage-standards.aspx>
- [4] Draft new Recommendation ITU-T H.DSS-AM, "Audience measurement for digital signage services"

- [5] TTAK.KO-07.0046/R3, Interface Standard for Terrestrial Digital Mult Broadcasting (T-DMB) Automatic Emergency Alert Service

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