

# MPEG-4 Contents Authoring for Interactive DMB

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## Abstract

Interactive DMB contents are provided by MPEG-4 scene description. The abundant interactions of the user bring on the high bit rate of MPEG-4 scene description. But DMB system has low bandwidth and limited bit rate. So we need new authoring method for MPEG-4 scene description. In this paper, we proposed a seamless authoring method for the DMB environment. It can generate BIFS information tinily and dynamically. The research result can be used by DMB system for a seamless MPEG-4 contents transmission.

Keyword : Interactive DMB, MPEG-4 scene description

## 1. Introduction

DMB transmits contents in environment of low transmission rate. When provide interactive contents, the abundant interactions of the user bring on the high bit rate. The Interactive DMB system uses MPEG-4 by contents standard. MPEG-4 contents is broadcast change into MPEG-4 TS packets which are transmission stream format [1-4]. One packet have fixed 188 bytes and 184 bytes payload except header [2]. MPEG-4 scene description information should be expressed to BIFS data of suitable bit rate in payload size that is at a disposal. Therefore, to transmit interactive contents in DMB environment, new authoring method for contents should be studied.

There are two methods that authoring MPEG-4 contents. One is fixed priority authoring method [3] and another is selective priority authoring method.

In fixed priority method, user could select BIFS size wanting at given priority order. But user (contents

provider) can provide contents according to priority order wanting directly and not given priority order. So this paper suggest algorithm that support adaptability in DMB contents.

First, to support adaptability in DMB contents, offer as can select priority order for object to user. And provide selection of priority order about attribute of node that exists inside object. This work makes to utilize MPEG-4 contents smoothly in interactive DMB.

This paper is organizes as follows. Section 2 presents the MPEG-4 contents authoring method for interactive DMB. Section 3 presents adaptability support of DMB contents, and section 4 presents the conclusions.

## 2. MPEG-4 contents authoring for interactive DMB

MPEG-4 contents for interactive DMB is expressed by scene description. BIFS that is MPEG-4 scene

description that describe user interaction information has text description form that draft VRML [5, 6].

Before authoring MPEG-4 contents, this scene description's analysis should be preceded. In this section, we explain for analysis of MPEG-4 scene description and present fixed priority authoring method. Use this and when some among script reduces BIFS's size in abbreviated form, can forecast reducing byte number as quantitative. Figure 1 is showing some of BIFS information about video object. For example, if erase translation information, 9 bytes are decreased.

### 2-1 Analysis of MPEG-4 scene description

To analyze interactive DMB MPEG-4 scene description, measured script that display geometry object and media object, script that display user interaction information and time information of object byte number that is encoded particularly.

```

DEF Transform2D1000 Transform2D {
    translation 0.00 0.00      -9bytes
    scale 1.00 1.00          -9bytes
    rotationAngle 0.00      -5 bytes
    children [                -1 bytes
    .....

    texture Movietexture {   -1 bytes
        url 3                 -3 bytes
        speed 1.0             -3 bytes
        loop false            -3 bytes
        startTime 000         -3 bytes
        stopTime 23.96        -3 bytes
    }
}
    
```

Figure 1. Example of MPEG-4 scene description

### 2-2 Authoring of MPEG-4 contents scene

Interactive DMB contents does not change initial scene and scene description's size must amount to minimum. Need prioritizes for part to be erased in initial scene among information in original scene description to do. Fixed priority method is as following.

#### Execute Rename process.

Rename process is process that define newly name of ID that display each node in MPEG-4 contents. Because dominate 1 byte per ID length character; can shorten whole BIFS size changing by 2 characters.

#### Delete default value

Erase first default value plain that become play even if do not describe in object node field. Default value means values that offer basically in DMB player.

#### Remove interaction information.

Find out scenario scene whole time. Object that must become play certainly to initial scene includes. And object that do not become play by remove of interactive information erases.

Figure 2 is showing event that image is created according to user's click in original contents. But event does not execute in figure 3. This is because event article was erased automatically according to fixed priority method

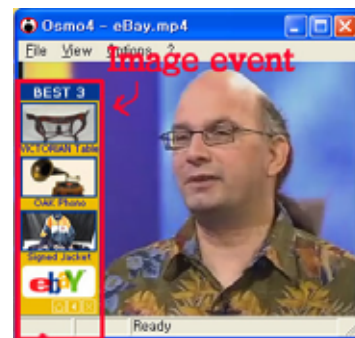


Figure 2. Original MPEG-4 Contents

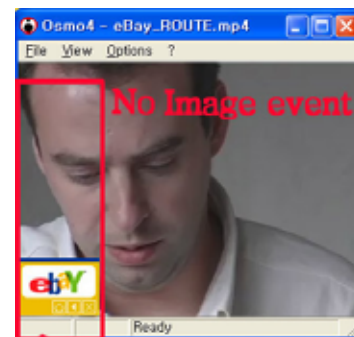


Figure 3. MPEG-4 contents by fixed priority method

This scene description's authoring is attained by given priority order. Contents provider can not provide contents as accommodative in circumstance. Also,

problem that whole algorithm must change if priority order changes is had. Suggest method that supports adaptability of DMB contents in next section to solve these problems.

### 3. Adaptability support of DMB contents

When provide contents in interactive DMB, contents provider can handle priority order as differ according to contents. To solve this request, we suggest selective priority order algorithm that support adaptability in DMB contents. Figure 4 is showing whole algorithm.

#### Inputs BIFS size (*InputSize*).

Later, BIFS size should be decided automatically by statistical numerical value which is not user's input.

#### Check the input size and current size

Execute rename process if current BIFS size is bigger than input size. On the other hand, terminate process if current BIFS size and input size is same or current BIFS size is smaller than input size.

#### Offer selection of priority order of object and event.

MPEG-4 contents has object of video, audio, geometry object (rectangle, circle), image, text etc.. Give priority order of object that shows to contents provider visually and priority is selected high. Select together priority order of event with object.

To display object information, video and audio, image information must load in SCR file. Reads url value of BIFS text's video, audio, image and finds the value in SCR file.

Priority selection about object is achieved first, but it is attained on the last that erase actuality object. Give high priority order about selecting first object and when authoring is gone, avoid being erased. Check preferentially that object is not erased even if was not selected. The BIFS size is bigger than input size when authoring ended, erase object according to object priority order.

```

Value CurrentSize;
Value MAX; // sequence number for non-selected
objects
Object[] Objects; // Video, Audio, Image, Polygon,
Text, Event.etc.
Function SelectionalPriority(InputSize){
if(CurrentSize <= InputSize) return;
CurrentSize = Rename(InputSize);
SelectObjects(Medias);
// By user, increase from 1 if selected. if not selected,
selection=MAX.SortObjects(Medias); //By non-
descreasing selection number sequence

// from non-selected object to the first-selected object
for(each object in Medias)
{
    delete by object.info();
    if(fit to the Size)
        break;
}
}

```

Figure 4. Selective Priority algorithms

#### Attribute of node that exists on object inside

Authoring about scene description is attained finding attribute of node that exists on object inside.

Each node has delete impossibility information and deletes possibility information. Delete impossibility information is if erased the information, whole object is value that is not played.

Delete possibility information means information that can display attribute of object and control object. This means do not influence in refreshing of object even if erase.

Selection by node attribute is consisted of bottom up method. In scene description, texture and geometry value that display the most internal attribute like appear in table 1.

Table 1. Data of Texture and geometry

		Delete impossibility information	Delete possibility information
Texture	Video	url	speed, loop, startTime, stopTime, repeatS, repeatT
	Audio	url	pitch, speed, startTime, stopTime

	Image	url	-
	Text	size	family, horizontal, justify, language, leftToRight, spacing, style, topToBottom
Geome- try	Rectan- gle	size	-
	Circle	radius	-

Contents provider can choose among delete possibility information. Erase default value excepting selected node attribute. Provide selection by LineProperties, Transform 2 Ds and Material 2 D if selection about texture and geometry ends.

Figure 5 shows contents when selects priority order of event highest and selected priority order by image about next object, video, audio, rectangle order.



Figure 5. MPEG-4 contents by selective Authoring method

#### 4. Conclusions

This paper introduces the fixed priority MPEG-4 scene description authoring method. And we propose adaptability contents authoring method as accommodative according to contents. When used fixed priority method, BIFS size reduced as 1588 bytes change into 1470 bytes in 3058 bites. And when used selective priority method, it became 2230 bytes because 828 bytes decrease in original contents size 3058 bites.

Selective priority authoring method did not decrease much BIFS size than fixed priority method. However, it can authoring contents dynamically on user's request. May use to transmit contents more efficiently in actuality interactive DMB applying this.

On the other hand, When contents is played, we can not know how much delay time happens if transfer to what size. This is statistical data which is after interactive DMB broadcasting is enforced in some degree because actuality server client is created. If such statistical data is obtained hereafter therefore, authoring of scene description of contents may be achieved more efficiently.

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