Chapter - II
Architecture for Multimedia Production System

2.1   Introduction

Audio is a striking and effective part of multimedia. The rate of audio is increasing over the web. The audio encoders and compression formats are responsible for a tremendous growth of audio getting stored on web. Journalists in media communication use various applications for audio journalism. Audience prefers audio over textual communication due to capacity to create an imaginative world in their perception through the audio. Audio is very effective in enabling this imagination than text or images. Majority of audio audiences prefer audio communication over any other mode because, they can continue their routines to get the audio. They can continue their household activities, tasks, driving, etc.

Audio journalism is mainly implemented with the RADIO broadcasts. In the last decade, it was observed that, there is a measurable growth in audio listeners through the web. There are many applications that allow uploading audio media. There are various gadgets, equipment which enable end user to record and upload audio easily.

Patterns are the abstractions that can be used to reduce redundancy of fields like architects, software development, and methods of teaching/learning [35]. The relation between problem and solution can be considered as design pattern [36].

2.2   Audio from web

The uploaded audio files are on the web for retrieval in the form of continuous streams. The file servers store these file in compressed forms. They also use encryption/ decryption programs as needed. These audio files are the recorded sound files. They are data files with tune and beats information. These files need music players for decryption and decompression. There are online

players and offline players for playing these recordings. Various proprietary and open source applications are available as per need. In multimedia journalism, the recorded clippings over the web are to be downloaded for playback, editing or joining. At the time of audio joining process due to silence or due to non-timed cuts a delay occurs between two clippings. Various media personnel from various locations send the audio clippings. Sometimes, teleconferences, phone calls, songs are made part of the whole multimedia presentation. The algorithms developed for joining audio files should consider the delay problem and they should have controlled signal synchronization signals for exact joining of the audio files.

2.3   Applications for text to audio

Text readers or text to voice applications are used by a wide range of users. Visually impaired readers get benefit from these applications. Various screen reader applications are also developed. The textual matter is received as the stream input by these applications, then, the words are matched with a library of recorded words' spoken format. The audio file is then played accordingly. For some, unavailable audio representation, artificial intelligence algorithms are implemented to pronounce the words as per combination of characters.

These applications are very useful for listening online content of newspapers. Proper Application Program Interface (API) or modules can be developed for reading the news, online text, books, etc.

2.4   Combination of audio with other media

Audio is an important part of multimedia presentations. Audio is useful for creating imagination of the scenes. Only text or images are not that effective in scene imagination. Many a times, audio needs to be integrated with other types of media such as images, text, animation, etc.

2.5   On-demand audio

➢ Audio repositories

The audio content or music files are kept on the audio libraries. The searching is managed by the software specially designed for the purpose. They are equipped with retrieval algorithms, compression algorithms and playing tools also. Broadly they can be categorized as free and paid. In free repositories, the access can be also further classified as controlled or uncontrolled. The algorithm we propose in this research can be tested for the production of such audio repositories.

➢ Wish lists/ Playlists

These are the lists of interest shown by end user for the selected files. User selects the music file and keeps it in the playlist, and, then these files are played sequentially. The architecture proposed in this research can be customized for the interface related to the file handling. For the gap between music files to be played can be controlled by inclusion of controlled synchronization signal in the audio joiner algorithm.

2.6   Conversion of analog audio to digital audio

➢ Digitization of audio

The audio format of analog needs to be converted into digitized form for further processes and communication. The communication systems have transformed their technology to the digit forms. Broadcast systems, playback systems have restructured their techniques and methodologies to a digitized form. Hence, the audio digitization has become a need.

➢ Losses

The conversion process of analog to digital has to undergo a process, wherein the chances of losses may occur. The audio equipment may not be compatible or properly configured for the conversion process. They may produce some losses in the conversion process.

> **Noise**

Due to equipment malfunctioning there are chances of noise insertion into audio files. The noise may come due to non-proper devices. Some background sounds can also be noise in the audio.

2.7   Social media audio

The audio on social media has to consider need of synchronization signals, various paths of packet transfer of files across various networks, size and retrieval system.

2.8   Linear multimedia production

In the multimedia production architecture development simulation helps in interpretation of the steps of multimedia object integration. The linear multimedia production features the object interaction and integration. The object precedence algorithm is crucial in deciding the sequences and duration of different multimedia objects.

Different types of patterns, systems and conventions have a vital role at fundamental level. Convergence of media and other forms do exist in case of combining and integration of different facets of multimedia production [37].

2.9   Controlled Synchronization

Algorithm with controlled synchronization signals has been proposed in this research. The architecture for multimedia development, if enabled with the synchronization signal, will definitely help in reducing the efforts and resources required for multimedia production. The proposed architecture will be known as Multimedia Architecture Design Pattern (MADP). The Multimedia growth is tremendous in its diversity and usefulness [38].

As the processor assigned to the task of broadcast or at receiving user, the scheduling allocates processor to the defined task. The controlled signal for synchronization is provided for this novel model.

wait time (twa) for audio

& wait time (twv) for video

Processor Scheduling (tP) -> (twa) (twv) and Control Signal

2.10 Multimedia Object Identification

Multimedia Object identification is a process of developing modular objects of multimedia. These objects if handled separately and efficiently will reduce the overhead of multimedia systems to a large extent. Following are some facts, features and descriptions of modular objects. CSI and CCM are the two perspectives of different instruction mode and technology for multimedia development [39].

Multimedia production needs resources having specialization in multimedia architecture development as a multimedia application developer [40]. The Multimedia Analysis and Retrieval System (MARS) can be used in the retrieval systems. The ultimate aim is to define a simple mechanism for modularization of objects [41].

➢ **Adjacent pixel have relative color values**

The common basic technique of object identification in multimedia production is to identify the adjacent pixel, and, to get the details of color values. The adjacent pixels have relative color values. It is very important and useful fact while storing the information of pixel in database. Processing software if equipped with a dictionary of all color values and adjacent pixel color schemes, the transfer process of files will be compressed, processed, broadcast with reduced efforts and resources.

Modular objects of multimedia are needed to be formed. In objects, the texture patterns and modular objects will have color and pixel information of adjacent pixel similar. There exists a modular object which will take care of the adjacent pixel information.

Figure 2.1: Relative Color Schemes

> **The objects of a same region will have texture effects**

The texture mapping is a major process of computer graphics. Texture mapping algorithms have been developed. Texture can be understood as the relative similar pattern of designs, shapes, etc. In object identification, the textures are identified and processed as single entity. Texture processing algorithms have special programming power of creating patterns effectively. Different type of patterns should be treated differently. Modular objects have Pixel Size information, Shape coordinate values, Colour details, Hue quantity and Luminance factor. The algorithm sets and retrieves the values as required.

2.11 Role of Multimedia

Multimedia plays a vital role in

> **Groupware**

The intension of multimedia is to involve audiences as participants in the multimedia software. The inclusive feature of the software for multimedia makes it as a groupware. The group of software for relative different applications collaboratively together lets audience take part in the multimedia. Journalists can treat themselves as a role player in the groupware multimedia.

> **Video on demand services**

The recorded multimedia services are the backbone of Video on Demand (VoD) services. The user choice based selection of videos as per his interest is provided with the multimedia. The electronic media industry production includes the short film making, documentary production, story episodes, etc. VoD has become a popular service through the television network.

> **Video conference**

Multimedia interaction between two or more electronic equipment or workstations is the video conference. Video conference is a very popular and widely used multimedia broadcast system by the media personnel. Group discussions, expert reviews, panel meetings are the major tools of video

conference technology. The purposes and objectives are met with the video transfer protocols over the network. The session creation and monitoring over a live video conference takes help of multimedia production systems for smoothening of the multimedia production at different workstations.

➤ **Entertainment systems**

Entertainment systems comprising areas of home theatre, cinema, music systems, audio-video playback and recording systems are the integral parts of human entertainment systems. These are the systems with multimedia software and the equipment producing multimedia audio-video. Gaming applications do fall in category of multimedia entertainment systems. Multimedia covers a big portion out of the total entertainment systems.

➤ **Teaching / Learning**

Academicians are setting up a platform for multimedia based education. The teaching learning processes enabled with multimedia have a winning edge over regular teaching practices. The impact of multimedia enabled methodology for learning is beneficial.

2.12 Combination and Integration

Multimedia production is a complex activity with consideration of different parameters at the time of production. Audio and video processing capacity and system requirement consideration has to be taken care while combination and integration of the multimedia objects. The intended effect of the multimedia can be obtained after the proper execution of combination and integration algorithms. The multimedia production architecture needs to consider these aspects.

2.13 Controlled Synchronization Signal Algorithm

In carried out work, a Controlled Synchronization Signal Algorithm for multimedia architecture design pattern is proposed. The algorithm for proposed prototype is:

1. Requirement Analysis

Object Identification is the initial step of requirement analysis. It has following features:

i. Object Specification

Specify the objects/ components that comprise the tool/ module. The complete listing of the objects/ components will enable the categorization of them and their classification.

ii. Object Occurrence

The object occurrence and duration in the story is to be known well in advance. The occurrence will decide whether to make the appearance of the object/ component to be visible or not. The object precedence must be clearly defined for their interaction [42].

iii. Object modularity

In the multimedia architecture development, modular objects will reduce redundancy in development. Tiny objects like frames, backgrounds, music modules, characters are in the multimedia. The advantage of modular object is that, structured and controlled multimedia can be developed.

iv. Integration Parameters

These identified objects need to be integrated based on the integration parameters; location, duration, timing, relevance, etc. The integration information is necessary for deciding the sequence of the frames and multimedia generation. The object integration becomes proper if the logical mapping of synchronization is defined properly [43]. Synchronization issues can be kept into consideration while defining integration mechanism.

2. Object Synchronization

One of the major steps of requirement analysis is to formulate a mechanism for Object Synchronization. Once the objects are identified and their integration parameters are defined, the synchronization or actual integration process takes place. Different multimedia objects have different processing

speeds and different system resources requirements. The synchronization information formulates a mechanism for each object about its occurrence in the multimedia production and the duration of that object.

i. Object Selection

Once the objects have been identified as the modular objects and their information is recorded, the selection of objects has to start. As the objects of same relevant region might have the common or look alike features in the form of texture effects, the selection sequence of object integration has to be developed accordingly [44].

ii. Component Relay (Baton Relay)

Multimedia components or objects are the bundles full of information, data and their Meta information. The different objects while broadcast or playback has different characteristics of system requirements. Some objects travel at a larger speed and other objects need more time to complete their travel. A kind of race occurs during the object production.

iii. Control signal

The control signal in this phase is the representation of a baton similar that of the relays. The components are added with control signals for the smooth execution of multimedia production. The next step is of verification of the objects and the sequences of the objects.

3. Design Formation
i. Script writing

If the multimedia production is related to a story or a sequence of frames, the script is the architecture of the multimedia. The script is the template of the frames or objects to be incorporated in the multimedia. The storyboarding technique helps in deciding the objects, aspect, media integration, etc.

ii. Multimedia Aspect Preparation

In the multimedia aspect preparation, the control signal at this place will decide the aspects of multimedia objects. The size, resolution and aspect ratio information will be assessed before integration with the control signal.

4. Multimedia Generation

The objects are now ready for interaction. Control signals will mix the objects in desired sequence.

5. Example Substitution

The Object integration and control signals acting as the completion signal for each step will substitute the objects at a proper place. Based on the design and the template decided the multimedia production will begin.

6. Validation

Validation is a process to check whether intended output is obtained out of multimedia or not. The multimedia architecture should yield the right multimedia. Validation process once completed, the producers can guarantee the right multimedia production. Complete multimedia with its all objects and components has to go through the validation process.

2.14 Flowchart

As shown in the **Flowchart 2.1**, a multimedia architecture has been proposed based on the features of pattern designing. The architecture aims for effective multimedia production [45]. There are five steps namely requirement analysis, design formation, multimedia generation, validation and example substitution.
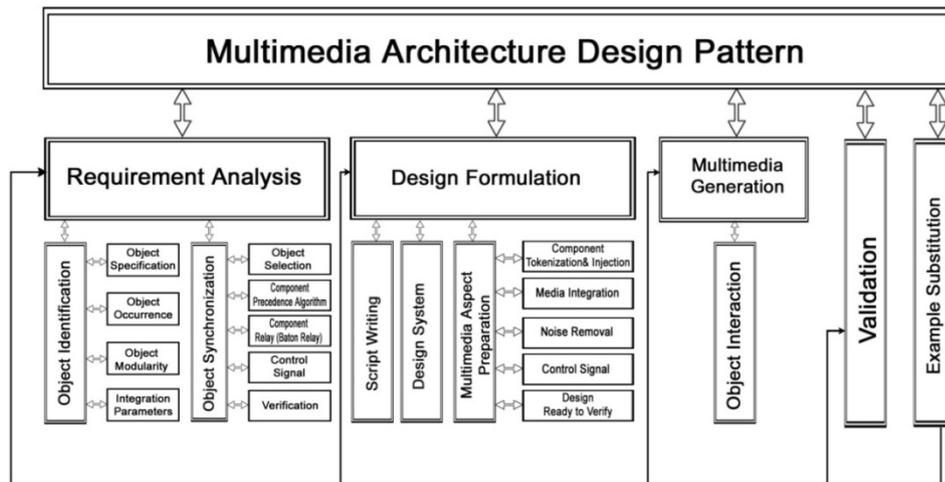
Flowchart 2.1: Design pattern enabled multimedia development architecture

The development process begins with requirement analysis and feasibility. This step has to be engineered properly so that, the production development architecture will be designed effectively. The phases of object identification and object synchronization are important for further processing. The objective of the requirement analysis is to understand the required multimedia product features as much as possible. Based on the requirement a design formation begins. The script and multimedia aspect decides the structure of the design required for multimedia. In the third step the multimedia generation begins by integration of the objects decided and their sequences. These integrated objects are then validated against the requirements. The last step is of the example substitution which generates the multimedia product.

2.15 Concluding Remarks

In this chapter a multimedia architecture has been proposed. The features of multimedia objects are discussed. The significance of multimedia and its architecture in reference with journalism has been described. The role of multimedia in journalism is illustrated. An architecture enabled with pattern designing and controlled signals is presented in this chapter. Concepts of patterns, pattern designing and their benefits are elaborated in this chapter.

The architecture of multimedia development is proposed to identify the measures, parameters through which multimedia presentation can be made effective. The role of multimedia production and multimedia presentation is very important in mass communication and journalism. The multimedia production architecture enabled with pattern designing has substantial contribution in multimedia in social media.