Digital storing, filing, analysis and distribution of coaching material and games in Basketball.

Tsamourtzis E*., Mavridis G ., Karipidis A.

Department of Physical Education & Sport Sciences, Democritus University of Thrace, 69100 Komotini, Greece

It is a common desire of both basketball athletes and coaches to have a visual approach of their efforts, as much as the efforts of their opponents. The aim of this study is the digital storing, filing, analysis and distribution of basketball material, to many users simultaneously, through high-speed networks. To make this possible, we have to apply the following: 1) Record and digitalize video images of basketball trainings and games, 2) File and classify on a data base, 3) Reproduction and projection of basketball trainings and games. Presentation using court animation, 4) Selection of the desired extracts, which enables individual observation based on selection criteria of the user, through terminals, for the facilitation of both coaches and athletes, 5) Ability to supply detailed analysis on the strategy of basketball games, 6) Statistical graphs chosen from the video database, 7) Group watching in specialized projection rooms of desirable recorded clips, 8) High-speed access to recorded material in a local network, 9) Search and projection of streaming video clips in websites of controlled and limited users, 10) Ability to supply recorded material in CD/DVD-ROM or VHS. The use of the above system can be of service to a great number of basketball athletes and coaches or an others who may be interested. The application of this system in basketball offers a better knowledge, consolidation and improvement of the abilities of athletes and a better analysis and programming of the trainings and games of a team for coaches.

Keywords: multimedia application, video information system, video analysis, basketball.

1. Introduction

Knowing the need of athletes and coaches of basketball to have a visual opinion of both their efforts and those of their opponents, we suggest a means of managing full-length basketball games on digital video and the sectional distribution of these games in video clips to athletes, based on search criteria, [1] (Tsamourtzis, 2002), [2] (Tsamourtzis, Siskos, 2001).

To make this possible, we have to apply the following:

- Record and digitalize video images of basketball trainings and games, through an RF cable.
- File and classify on a database.
- Reproduction and projection of basketball trainings and games. Presentation using court animation.
- Selection of the desired extracts, which enables individual observation based on selection criteria of the user, through terminals, for the facilitation of both coaches and athletes.
- Ability to supply detailed analysis on the strategy of basketball games.
- Statistical graphs chosen from the video database.
- Group watching in specialized projection rooms of desirable recorded clips.
- High-speed access to recorded material in a local network.
- Search and projection of streaming video clips in websites of controlled and limited users.
- Ability to supply recorded material in CD/DVD-ROM or VHS.

*Corresponding author: e-mail: etsamourtzis@hotmail.com

2. Technical description

For the reception, storing and projection of information, we suggest the following systems, as presented in figure 1.

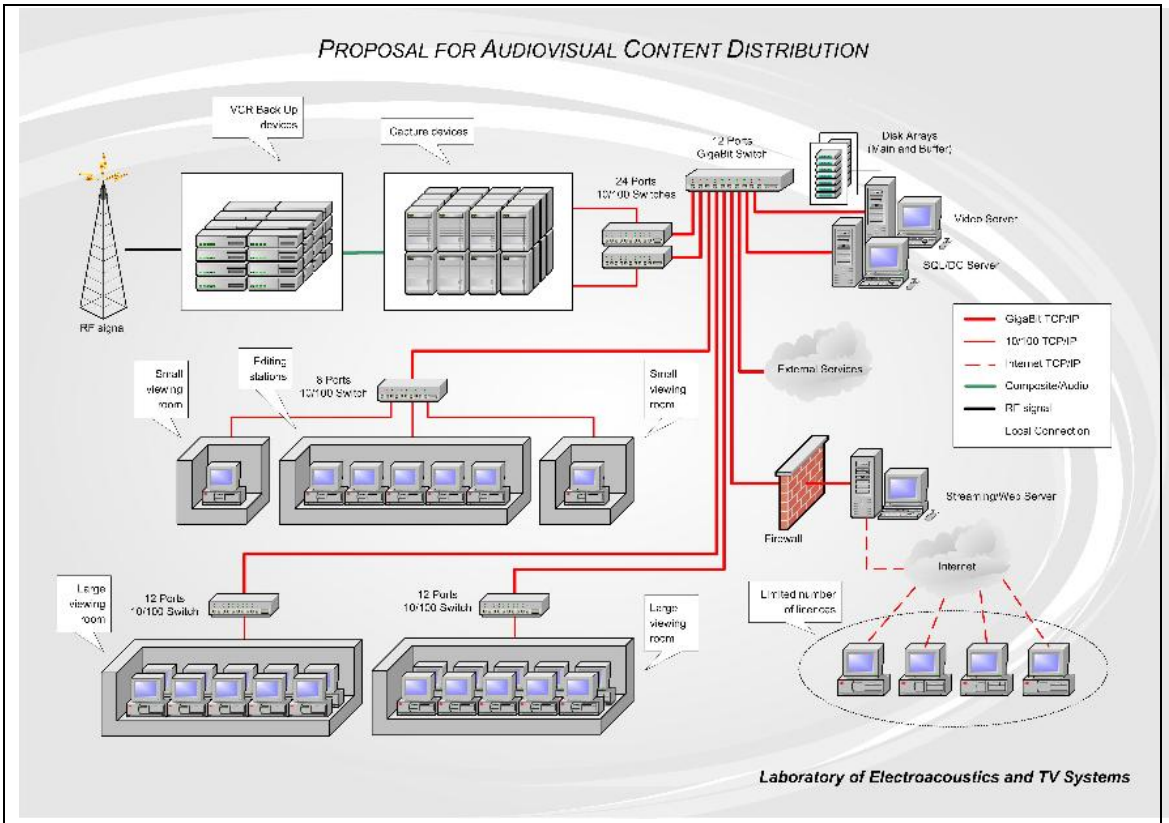

Fig. 1. Technical diagram

More specifically, the technical part of the above system includes the following:

2.1. Recording

From TV transmissions and through an RF cable, the signal is distributed to a VCR, where, on the one hand, it is adapted from RF into AV in order to digitalize it and on the other hand, it is transferred into a magnetic file, to further secure it in safety VHS copies. Next, TV transmissions enter a digital terminal, where they are zipped and stored in the form of files. This procedure takes place during the actual basketball games.

2.2. Filing

The quantity of information to be analyzed depends on the quality of the video files to be stored. After the end of each basketball game, the corresponding video files are transferred through a network to the central server. After confirming their correct transfer and valid storing in the server files, they are deleted from the peripheral terminals.

2.3. Digitalization

Computers with digitalization cards, take over the digitalization of the videos and their transfer to the central video server. These computers are equipped with CD-Recorders or DVD-Recorders, in order to produce safety copies of the data.

2.4. Terminals

There are computers, which enable the final users to pose complicated questions, concerning video clips and project the results of the questions on the computer screen. These computers communicate with each other with a switch 100Mbps, which is connected to the central server at the speed of 1000Mbps, so as to maintain the approach speed of the users to the data.

2.5. Transfer on the Internet

The stored data are transferred to those interested in the form of streaming video, through a web server, which cooperates with the central server.

3. Personal screen room

Athletes are able to enter a room with ten computer systems and use the available computers, to watch the stored game material. The athletes themselves can select anything out of the material, through a flexible and handy graphic environment.

4. Group screen room

Group screening of the stored material can take place in a large projection room. Projections make use of the computer systems, which cooperate with the installed projection engines, and the specialized personnel of our team guide the projection.

5. Supply of tactics analysis of the stored games.

The basic tactics analysis includes a general framework [3] (Tsimpiris, Tsamourtzis, Sfingos, Zaggelidis G, Zaggelidis S., 2006), as follows in figure 2:

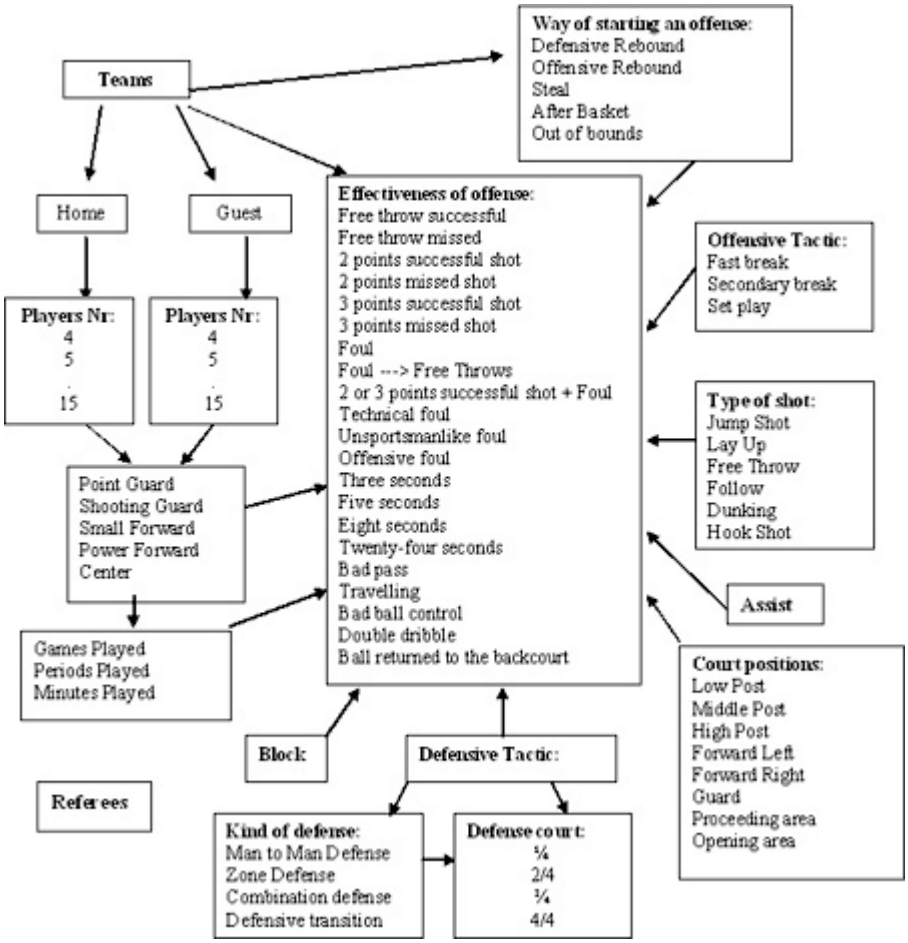

Fig. 2: Form of tactic analysis in basketball.

6. Watching through the Internet

There is a possibility to watch the stored material on the Internet, based on selection criteria set by the final user. This service takes place through an exclusive web server and video streaming. Between the user and the Internet, there is the interference of a firewall. The environment is similar to that of the personal screen room.

7. Material supply in storing means

There is a possibility to record a selection of the stored material on a digital means like CD, DVD-ROM or VHS.

8. Management of videos and indexes

There are three basic categories to manage videos and indexes.

8.1. Index and Video Management System

This application includes a SQL database, to store the incoming Indexes. The base used for the creation of the correlated tables is the MYSQL.

8.2. Index to Data Base

The data entry forms on the basic tables execute the automatic conversion of the Index data to a structure compatible to the MYSQL tables. This program makes use of a special algorithm, which attributes values to the basic fields, referring to names of video files for every recorded event.

8.3. Show Video Information

The front-end environment of the final users is in the form of a web page, written in PHP and using a javascript function for the management of the Video. There is a dynamic communication between the search web page and the central database, so that the users are able to take answers to SQL questions. In this environment, there are two ways to search for data.

8.3.1. Without Indexing

Searching specific video clips, based on the daily schedule of the games. In this way, the final user can search information by just selecting the Day, the Time, the Course or any combination of the above. This use is simple enough for users who are not familiar with computers. So, when a final user selects the Day a game took place, the other fields show automatically the Time and the Course of the specific game. As a result, the desired information is easy to locate within seconds.

8.3.2. With Indexing

Searching specific video clips, based on supplied indexing. In an environment similar to the above, a user is able to locate a piece of more detailed information. For example, he may project all the video clips concerning the efforts of a specific athlete, during the semi-finals or throughout the championship. In this case, searching is carried out according to selections based on the structure of the Index, which has included parameters such as Course, Date, Athlete, Championship or a combination of any of the above.
The results appear successively on the web page and a user can open any video clip and watch it separately. By opening a video clip, the final user can record it with a video recorder connected to the computer or just watch it as many times as he wishes, using the digital buttons on the computer screen.

9. Conclusion

The use of the above system can be of service to a great number of basketball athletes and coaches or an others who may be interested. The application of this system in basketball offers a better knowledge, consolidation and improvement of the abilities of athletes and a better analysis and programming of the trainings and games of a team for coaches.

References

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