Artificial Intelligence as a Supplier of Virtual Reality in Performance Areas as Auditoriums & the Application Sample from Turkey

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Abstract: Artificial intelligence is an important medium in design process by various ways and applications. By the help of artificial intelligence stage design and the contemporary approach in stagecraft by three dimensional view and virtual reality affection is the newly invented with systematic applied principles in set designing. Recently large scale auditoriums are being identified with the quantities concerning computational integration, systematic synchronization of systems in performance activity and also digital technologies and innovations. Artistic images and reflections are composed not only from the aesthetical concepts but also from technological and computational maintenance and hardware which are also called as multimedia. Artificial intelligence is one of the most important tools to conjunct these pieces as one in order to meet the demands of the futuristic solutions in stage design and auditoriums. The analysis of the chosen sample from Turkey will indicate the importance of artificial intelligence regarding architectural approach.

Key Words: - Artificial intelligence, system synchronization, auditorium, multimedia.

1 Introduction

The artificial intelligence is one of the most important medium in performance areas as it is the newly invented, adapted to systems with synchronization ability [8]. This synchronization indicates the high-tech appliances with intelligent adaptations. These qualifications are also one of the main necessities in the interior organization of auditoriums. Human designers create from their design experiences general concepts about the design process at various levels of abstraction, schemas which aid the process of solving new design problems [9]. The design processes of the staging in auditoriums concerning virtual reality are used by indexing into a database of design prototypes based on requirements of the design specified by set designers.

The designer, having committed to a set of design objectives, and a design space and operators, has to make a second set of decisions. One of these involves the choice of a search strategy to use in exploring the space. For example, the designer might employ a random *generate and test* approach to design; or a systematic search through the space or a systematic search guided by an *appropriate* heuristic function that determines the order in which alternative paths are explored (or not explored). Additional decisions might involve dynamic changes to the search strategy based on the information gained during search; incrementally modifying a previous design to meet new objectives or versus developing a new design from scratch; sharing incomplete or partial designs with other interested parties in order to obtain feedback; etc. In all these footsteps the system works with the artificial intelligence suppliers in a dynamic integration with each other in order to identify the necessities of the interior by systematic reference.

The design process, from a computational perspective, essentially involves searching a design space [10]. The design space, in artificial intelligence terms, is a search space. It can be described by the 3-tuple (S,O,G) where S is the start state (which captures the existing state of affairs), O is the set of operators that can be used to transform a state into another, and G is a specification of the desired goal state (e.g., one that meets the design objectives). For example, in a theorem proving task (which involves devising a proof of a theorem, e.g., one that is stated in first order predicate logic), the initial state consists of the axioms, the goal state is the theorem to be proved, and the operators are the logically sound rules of inference. Notice how similar this task is to designing an economic plan or a new drug with certain desired properties.

The result of the design activity, in each of these cases, is a *path* or a sequence of operator applications that transforms the initial state into a goal state. A variant of this formulation captures all the information about the design in the resulting state itself and the design task involves exploring the design space to

identify a state that meets the design objectives. It is also possible to think of the design task in terms of its decomposition into hierarchy of design sub problems all the way down to primitive design problems with known solutions. It is easy to extend this notion of design as search to design as optimization to deal with scenarios in which the objective of the designer is to come up with an *optimal* design or a near-optimal design. Regardless of the particular formulation used, the design problem is fundamentally a search problem.

A critical issue in solving search problems is the choice of suitable representation language for describing the states in the search space as well as the operators used to search the space. It is well known in artificial intelligence that these choices can have a major impact on the effectiveness and efficiency of search [10].

The Artificial Intelligence concept pursues a broad range of topics spanning robotics, vision, knowledge representation, learning, image processing, scheduling, reasoning, decision and information systems, and natural language processing.

One important artificial intelligence research direction at the Beckman Institute examines computational aspects of cognition, perception, problem solving, and so on. These are considered to be implementable if they are to be explanatory in nature rather than simply descriptive [17]. This requirement is often neglected, but can place important constraints on the kinds of theories that should be entertained. Some such constraints are abstract, derived from the fact that computation is necessary in realizing the intelligent behavior. Other constraints are more specific, due to the form of the architecture of the computational medium. Observations and theories of human intelligence become guiding principles for artificial intelligence research helping to refine the cognitive theories.

Another important research thrust examines how computers interact with humans and how that interaction can be made more effective through intelligence on the part of the computer [17]. Computers will be more easily accepted and more useful as tools as they behave more appropriately and predictably when in collaboration with humans. Mobile robots, robotic arms, and various sensing devices are used to integrate sensing, planning, navigation, and autonomous plan execution. Robotic grasping and manufacturing process planning are characterized by uncertainty, complexity, and resistance to conventional formalization.

Computer recognition of human faces is also under study. This is particularly challenging when the perceived image is not explicitly present in the database. Knowledge of prior views of a person and the system's general internal 3-D model of the human head must be combined. Face recognition promises many useful applications, including access control, credit card identification. In related projects, researchers are investigating ways to infer 3-D shape and layout of scenes from visual cues, including texture changes, motion, and stereo differences. Spatial and temporal understanding allows development of schemes for representation, navigation, and animation. These schemes relate to structures and mechanisms that have evolved biologically, such as eye movements, eye accommodation, peripheral vision, and foveal acuity [17].

The many research topics in set designing fall into three broad categories: computerized imaging; image-video transmission, storage, and manipulation; and image and scene modeling and analysis.

Picture 1 The stage with multimedia

Computerized Imaging: This concept deals with the signal-processing techniques and algorithms required to form 2-D or 3-D images from multiple-sensed data sets (17). The objective is to obtain high-quality images from noisy or incomplete data. Applications include improved image formation in medical and industrial CT and MRI scan instruments, higher-quality images of the terrain from airborne or space borne radar, and forming airport runway images when the visibility is poor.

Image-Video Transmission, Storage, and Manipulation: his approach is to find representations of images and video that requires only a small amount of bits to transmit or store, yet are easy to find in a database. There are studies concerning image and video compression by using approaches ranging from wavelets and fractals to ideas from pattern recognition and computer vision. Also under study are methodologies and techniques for image-video indexing and editing. Research in visual perception is essential to this effort because, in many applications,

humans view the images after processing, so the subjective quality is an important performance criterion. Applications include video phone, teleconferencing, and multimedia databases [17].

Image and Scene Modeling and Analysis: A major approach could be categorized as the modeling, analysis, and visualization of human movement [17]. First, 3-D models of the human head/face, hand, and body are constructed from multiple-sensed 2-D images, and then the models are used to do analysis and synthesis.

Vision- and image-based techniques will play a key role in most human-computer intelligent interaction scenarios, such as in collaborative manufacturing product prototyping in a virtual environment, thus making the interaction between people and virtual environments more natural and efficient.

Successful design in novel domains requires substantial creativity on the part of the designer. Creativity involves not only exploration of domains, but modification and extension or transformation of domains by manipulation of domain-specific constraints or by other means. Artificial intelligence explorations of creativity can shed light on creativity in design.

The role of computers in the practice of stage design seems to be increasing constantly. Equally important, however, are the developments in software: design tools are becoming easier to use, and address more directly the needs of product designers. However the move towards computers in the field of stage design is also fuelled by the pressures of a shortened product development cycle (decreasing the time to market), and increases in the automation of production facilities.

The evolution of a product from concepts, through to a set of drawings, or computer models ready for production involves many stages. In the practice of staging design there are classes of computer tools which can be used at all stages of the product development process: including Concept Design, Product Presentation, Prototyping, Production Drawings, Computer Integrated Design, and Design Optimization through Artificial Intelligence.

2 The Formation of the Three Dimensional Views in Stage of the Auditoriums

At this stage in the design process extreme precision is not important (as it is with CAD/CAM or production drawings). Qualities that are more important to look for in your drawing package are:

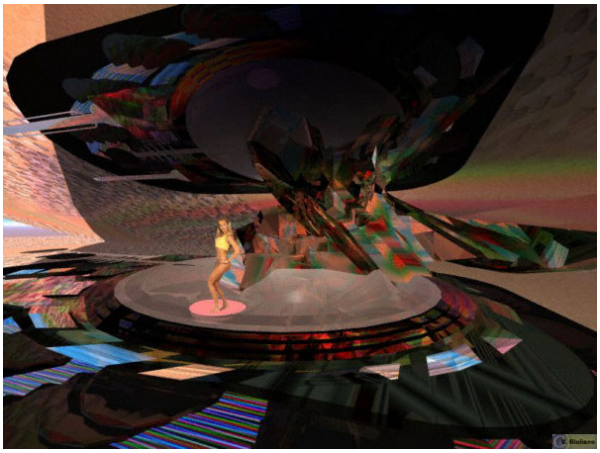
Advantages of 3D modeling and Rendering:

-Multiple views, detail views, and cut away views, can all be easily generated from the model. Illustrating a second view in an illustration package requires just as much work as the first view.

-Computer renderings provide a level of detail and photo-realism difficult to achieve in through illustrations.

-Models can be used in animations, rapid prototyping, CIM, or run through any number of design optimization applications (such as finite element analysis, mass properties, interference checks, or tolerance analysis).

3D modeling allows experimentation with perspective, flare, viewing angle, and lighting to achieve the maximum visual impression.



Picture 2 The virtual stage with artificial intelligence facilities [20]

AI allows textures to be mapped to the surfaces of 3D objects providing a further level of realism, very difficult to achieve through illustration. Computer aided drafting was the earliest application of computer technology in the design business. The programs that excel in this area have a reliability, robustness, and competence yet to be achieved by the new waves of 3D modeling packages. Form Z, for example has limited competence in 2D drafting, as it is missing a number of essential drafting tools. Some solids modeling packages, however, boast dynamic interaction between the drawings and the solid models. Changes to the model are reflected in the drawings and vice versa. This could allow for a much more intuitive way of working, enabling the user to switch back and forth between drafting and modeling throughout the design process. These packages also provide the ability to generate line drawings automatically from the solids models. Sufficient intelligence is incorporated into the program to determine and use

appropriate line types. The user need only indicate the view and the placement of the necessary dimensions.

As designers we should be seeking, and using, the tools that allow us to create the best results, with the least amount of wasted effort. In design, the "Best results" are not the flashiest pictures, but the design which best addresses the needs of the client and the user. Compromising the design intent to accommodate the limitations of the tools we are working with is a common and dangerous occurrence with computer modeling. Every program will have some shapes and designs that are easier than others. We must be careful not to let the computer tools determine the design. That which is flashy, or that which is easy, is not good design.

3 Artificial Intelligence as System Synchronization in Auditoriums

In this work the appliance of Artificial Intelligence in stage designing is being analyzed with a sample from Turkey, The auditorium of Mydonose Showland. Mydonose Showland has been constructed with a capacity of 5000 auditorium style seats. It has a hi-tech arrangeable stages required in the technical riders, 3500 m2 foyer area with shops, cafes and bars, backstage with star rooms, artist rooms, group dressing rooms, orchestra room, catering saloon, offices, toilets in each artist room, first aid room and dimensions which lets long vehicles inside the backstage area. The architecture of the show area has been designed to provide the best acoustic even without using a microphone system. The stage has a height of 27 meters and also has the capacity of changing 46 different curtains electronically [14].

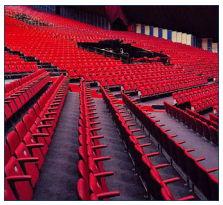
Picture 3 The Exterior of the Auditorium

Picture 4 The exterior by day light

Mydonose Showland is one of the examples of the *Live Entertainment* venues in the world. It's a show center established on the 16000 m2 open and 8000 m2 closed area on the region of the World Trade Center by the Atatürk Airport in Istanbul.

The Showland can contain about 3 500 persons at full loading. As a last resort, its capacity can be increased up to 5 500 persons.

Picture 5 The interior of the The Auditorium [13]



Picture 6 Seating of the Audience

Also there are a lot of free offstage space and many rooms for press in it. Acoustics of the Showland is so optimal, that singers could perform without use a microphone.

Mydonose Showland, the first tent show center in Istanbul was opened in November 1999. This giant tent is set on a area composed of 205 tons steel constructions.

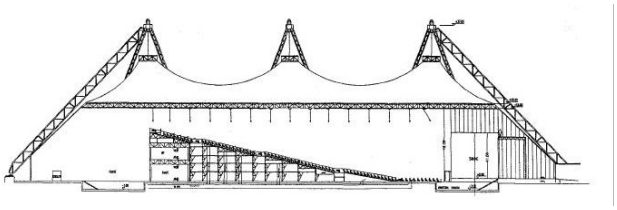


Figure 1 The side view of the Structure of the Auditorium

Picture 6 The general image of the architecture

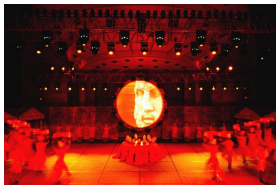
In pictures 7 and 8 the stage during a performance activity is recognized. The general ambience and atmosphere of the stage could be identified as virtual. The success of any staging depends on the capacity of the sustainable usage of technological adaptations with aesthetical reflections in a dynamic relation.

Picture 7 The Stage during the show

Picture 8 Stage with a performance

This is the basic point of the integration of the stage and the artificial intelligence to performance activities by multidisciplinary ways.

Picture 9 The Stage with different images



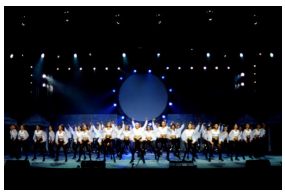
Picture 10 Stage with flexible usage

Picture 11 The Stage with multimedia

Picture 12 Stage with a synchronized system

In the pictures 10, 11, 12, 13, 14, 15 and 16 the same stage is recognized as different images and views. The maintenance of the variable usage is by technical input in control with the different functions of the performance. This process is supplied by artistic reflections of technical synchronization [8].

Picture 13 The Stage with artistic reflections



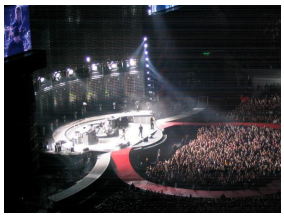
Picture 14 Stage with a variable quantity

Picture 15 The Stage with background

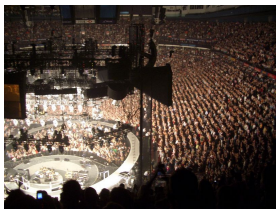
Picture 16 Stage with variable stage

4 The Analysis of the Other Samples

When the samples of the appliance of artificial intelligence in stage design is realized with other samples, the criterion of the organization of stage design is identified regarding; multimedia, virtual atmosphere, the relation of the audience and the stage, the function of the audience etc. These criterions are all the main creators caused by the artificial intelligence adapted to auditoriums.



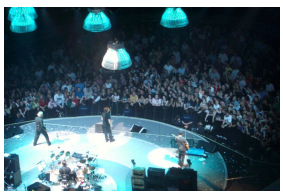
Picture 19 The Stage during the show



Picture 20 Stage with a concert activity

The staging with flexible usages is one of the advantages of the artificial intelligence. The same stage with different usages is so easy if the set designer knows the ability of technical controlling.

Picture 19 The Stage during the show



Picture 20 Stage with a concert activity

This indicates that a designer concerning the architectural data of the space should also be aware of the newly invented technologies in stages served as artificial intelligence.

5 Results and Conclusions

The **results** of this study indicate that

-Artificial intelligence in design process is one of the main necessities in contemporary stage design.

-The contemporary and newly invented technologies indicate that in the future the artificial intelligence will be adapted to stagecraft more than today as the advantages of the system is much more than any type of conventional system.

-It should be a starting point for contemporary set designers to achieve the practical advantages of the artificial intelligence in design process without neglecting the importance of synchronization criteria.

-The designing principles related with the real interior are not as much important as the optimal synchronization of the system creating the virtual.

As a conclusion it could be identified tat in the large scale auditoriums the artificial intelligence is the tool for supplying the **advantages** as;

-The easiest and fastest way to design stage,

-minimize energy while maximizing the efficiency

-capturing the place with virtual facilities

-adapting the computational hardware in stage design with, acoustics, lighting, ventilation and the integration of stage and audience.

-The opportunity of the multimedia affection on stage by virtual means and appliances,

The **disadvantage** of artificial intelligence in set designing are;

-As the whole system is all supplied by computational integrated structure, the tolerance of faults or any programming ability could decrease the qualification of the technical standards.

-In the systems recognized by artificial intelligence, three dimensional views and virtual images could also be activated. These types of images are sometimes carrying a synthetic image which has less aesthetical value.

The basic point is; the planning issues in large scale performances by artificial intelligence methods are the most reliable and optimal quantities of any type of a performance stage with multidisciplinary usage.

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