Potentials Benefits of Applying Three Dimensional Hologram Technology (3DHT) in The Hotel Industry

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Abstract

Major progress has taken place in the field of ICT usage in hotel industry. Scientists are working very hard to provide an advanced technology, which can benefit them in many areas. 3D Hologram Technology (3DHT) is one of the most creative of these solutions. 3DHT is not common technology in hotels industry; it is so virgin technology in hotels industry. The research presents essential information about 3DHT, in order to understand the importance of this technology in hotels' departments. A survey has been carried out on a sample of hotels department managers in Cairo. Findings show that, 88.67% of respondents confirmed that 3DHT will be useful, 91.33% of respondents confirmed that Interactive 3D holographic menu will make guests take a good decision about food selecting. 95% of respondents mention that using 3DHT in conferences will add a competitive advantage to hotels. 96% of respondents stated that 3DHT will be a good technology in guest room.

Keywords: 3D Hologram Technology (3DHT), Hotel Industry, ICT.

Introduction

According to Chin &Kim (2015), 3D holographic projection is a rapidly rising technology, with every business desperately trying to get their product to stand out from the competitors. Chaudhari et al. (2015), states that 3DHT plays an serious part of providing human cues of stereopsis, motion parallax and ocular accommodation, thus improving upon understanding, realistic production and efficient 3D rendering. He adds that, in general, people do not like to wear any tools over their eyes, hence one important element of three dimension show, and make holography steps in and differs from previous 3D imaging innovations. This is not everything, but also another need for holography is the use of unobtrusive equipment combining manipulation and feedback of 3D objects in space. Making the virtual world more realistic and interactive is an objective achievable through this technology.

Fuhrmann et al. (2009), mention that holograms have fun applications for entertainment and eye-catching purposes in amusement parks and art exhibitions and used most often as security devices on credit cards, clothing and tickets. Chaudhari et al. (2015), adds that 3DHT is very efficiently used in medical diagnosis, weather forecast, advertising, animation, virtual reality, a number of museums and so forth. Recently, 3DHT allows taking any images from one location and transmitting it to another location, where the hologram can be viewed with the real-time dynamic 3D display and with naked eye, which called telepresence. In fact, 3D holographic technology continues to improve, there are many applications of the technology that demonstrate its capabilities and potential that may have a great impact on our lives (Lee, 2013).

By using 3DHT, real people can be filmed giving a speech, dance or presentation for example, and then be projected as 3D holograms. Holographic special effects can be added in post-production to make a life-like person beam into the room, Star Trek style, or have their product appear and spin above their head at the click of their fingers (Elmorshidy, 2010). 3DHT has great importance to preserving the environment, lies in reduction the air pollution caused by aircraft, which burn hydrocarbon fuels, something which is considered one of main reasons for global warming. Prince Charles confirmed this fact in a green energy conference in Abu Dhabi . He chooses to appear as a hologram instead of appear in person, by long haul flight, to reduce more than 15 ton of carbon dioxide, the greenhouse gas which is causing global warming. As the 3DHT, Prince Charles left the audience with the words: "I am now going to vanish into thin air, leaving not a carbon footprint behind" (Gholum, 2010).

Literature Review

Hologram Concept

The concept of holography is comparatively new, regardless of the fact that the root of the word “holography” is old. The hologram and holography was created in 1947 by Dennis Gabor, a Hungarian engineer/physicist working on the Thomson-Houston Company's electron microscope in England (Elmorshidy, 2010). According to Lee (2013), holographic technology is loosely based on illusion known as " Pepper Ghost " was first used in the theatres of Victorian across London in the 1860s to produce realistic ghosts on stage, hidden from the audience's view through a series of optical projections, where the actor wear ghostly costume and stand facing an angled plate of glass. Thus, the audience will be able to see the glass, but not the actor directly. This technique involved placing a huge sheet of plate glass on stage at a 45 degree angle, together with screens and special lighting.

With the development of the laser in the 1960s, the first static three-dimensional holograms were created in 1962 (Lee, 2013), by scientists in both the United States and the Soviet Union (Ghuloum, 2010), and the rainbow 3D holograms commonly used on credit cards that can be seen with the naked eye came to existence in 1968, and the first moving 3D holograms were produced in 1972 (Lee, 2013). Since the 1980s 3DHT has advanced notably owing to low-cost solid-state lasers that became easily accessible for consumers in devices such as DVD players (Ghuloum, 2010).

According to Christie (2002), the word hologram is possessed of the Greek terms, "holos" for "whole view " and "gram" meaning "written" . From the viewpoint of Choi et al. (2015), the word "holos" meaning (perfect) and "gram" meaning (pictures), and means "a perfect picture". They add that a hologram is a 3D image seen as a real cubical picture. Creating a hologram means producing 3D images using the interference effect of two lights, which is made when two laser lights are crushed.

Choi et Al. (2015), indicated that the principle of a holographic image is dividing light emitted from a laser in two ways, making one of them flash the screen directly, and another flash the object that should be seen and of various intensity, density, or profile structures. So, to make a multi-dimensional image, it requires an object (or an individual) that you need to record, a laser shaft to spark upon the item and the recording medium; a recording medium with the best possible materials expected to elucidate the picture and a transparent environment to enable the light beams to intersect (Alhayki & Shah , 2016). Today, 3D holographic projection uses a holo-projector, which projects large scale, high-resolution images on different surfaces, focal distances with the help of a relatively small scale projection device (Chaudhari et al., 2015).

Classification of Holograms

According to Choi et al. (2015), a hologram can be classified into three types; 1) Embossing hologram, For mass-produced object, used as prevention of forgery, 2) Color hologram, Used for products such as galleries, multi-recording, three-primary colors laser beam. 3) Computer hologram, Utilized in three dimensional hologram video productions. Making images by translating sliding mesh to pixels. 4) Head-up-display, Used as a screen display technique, reflect the light effectively. According to Kulkarni & Makhija (2014), a Hologram when looked from diverse angles, projects different perspectives. It normally looks like a glittering picture or smear of colors and if cut in half, each half involve of whole views of the full holographic image.

Holography and Technologies

Communication network are the backbone of modern information societies and today's globalized economy. Their importance has grown to an extent that bears comparison with other technological milestones (Hans & Bullinger, 2009). The amount of data needed to transfer and project a holographic environment or real time hologram is huge. Hence, one of the barriers to holographic environments becoming reality is the Internet speed requirement. Internet 2 is designed as a research and development tool to help develop technologies that ensure the internet in the future can handle tomorrow's applications, and is now being used to deploy advanced applications and technologies that might not be possible otherwise with today's internet, Much of internet 2 research is focused on speed, internet 2 networks are currently in the process of being upgraded to support 8.8 Tbps. This high bandwidth (that is, a large number of bits per second) and speed network is necessary to transfer large amount of data that telepresence will produce, because good quality telepresence needs about 1.2 gbps. As a result of internet 2, telepresence will enable users in different geographic location to come together in a simulated holographic environment to interact. To users, it would appear as if they are actually interacting, communicating and meeting each other in person at a common location (Morely, 2013).

- **Display technology**

Displays can be largely classified into direct-view or projection. Projection displays which commonly categorized as front-projection and rear-projection types depending on the optical path used , is producing larger images from electronic signals, and less cost than is normally achieved by direct-view technologies, so it is offer an economical solution to large and high-resolution information displays (Kim, 2006).

Three dimension projection display

There are more than 50 kinds of 3D display systems developed up to now such as Stereoscopic projection display, Auto stereoscopic projection display, projection integral display, Fresnel lens projection display, DFL projection display and holographic projection display. But they can be largely categorized as stereoscopic and auto stereoscopic 3D display systems depending on image separation methods. In the stereoscopic 3D display system, the viewer is required to wear special glasses such as polarized or shutter glasses for separated reception of the left and right images on the eyes. But auto stereoscopic 3D display systems can present 3D image to the viewer without a need to wear any special glasses. (Kim,2006).

Three dimension holographic display

Generally Holograms are 2D canvas which can display 3D objects.They can be found them in many places in real life such as credit cards and driving licenses. There you can see 3D object in 2D sticker and depending on the angle you look at it you can get different views, same as in real 3D object. Those holographic stickers are difficult to reproduce and used to indicate originality of products. Using the same underlying fundamental concept laser devices can create 3D images in thin air. This technology is new experience to us. Every time we see a reproduced image its 2D and there is a screen. Even in Wi-Max 3D, still there is a screen. But with Laser hologram there is no physical screen. It juts appear 3D objects in air (Vignesh & Saravanajothi , 2012).

Recently Harold R. Gamer have constructed a system that projects true dynamic 3D holographic images from computer-generated holograms utilizing the lowest orders of diffracted light from a laser illuminated, a holographic display, which is totally different from the stereoscopic and auto stereoscopic approaches, has been regarded as one of the more attractive approaches for creating the most real illusion of observing volumetric objects. It is because the holographic technology can supply high-quality images and accurate depth cues viewed by human eyes without any special observation devices (Kim , 2006). Display real 3D images in air won't be adequate to deliver a great user experience. There has to be motion sensor which can understand hand gestures. When you combine this kind of motion sensor to a Holographic display, you will be able to actually touch a 3D object (Vignesh & Saravanajothi, 2012).

An important element of CGH display systems in many applications is user interaction with the image. Researchers have developed intuitive interfaces using voice, gesture, and haptic. The synergistic effects of 3D sound can also be exploited to facilitate image interaction and modification (Slinger et al., 2005).

- **Haptic technology**

According to Mazuryk & Gervautz (1996), the haptic technology is like a feedback system. In order to be able to interact with a hologram, haptic technologies play a main role, acting as an intermediary between the human and the holographic environment. According to Hoshi & shionda (2016), when one touches the projected hologram, one feels the sensation of touching it due to the pressure created by using ultrasonic waves. The participants hand is tracked with the use of the control sticks from Nintendo's Wii gaming system.

- **Audio displays**

Sound can powerfully enhance the human perception ability. As an addition to the visual information, auditory information can offer several benefits like: 1) additional channel of data passing, 2) perception ability of information that is outside of visual display, 3) alert or focus signals that attract the user or warn him/her, 4) spatial orientation cues. In VR, however, more convincing three dimensional auditory displays can be used to simulate distance, direction, material and spatial information about the environment (Mazuryk & Gervautz,1996).

Application of holography in various fields

Communication by 3DHT

According to Ghuloum (2010), success to transfer individuals from one place to another without the need to travel. This seems like a scene from a science fiction movie or T.V show. This phenomenon has already taken place in American elections in 2008, when correspondent CNN, Jessica Yellin, in Chicago, was `beamed up` into Wolf Blitzer's studio in New York with a very realistic display using 35 high-definition video cameras (Lee, 2013). In 2008, Bill Gates, chairman of Microsoft Corp, appear very realistic as a Hologram at the "World Congress on Information Technology" in Kuala Lumpur Convention Centre, while his presentation was prerecorded in Seattle (Elmorshidy, 2010). According to Kulkarni & Makhija (2014), in 2012 BJP's prime ministerial candidate Narendra Modi used the advanced 3D hologram technology during his election, to address voters over 53 locations in Gujarat simultaneously. Narendra Modi is captured in a 3D Aspect with a Special Hi-Definition Camera on a specially built Stage and then Projected "As Is" at several remote locations "At-A-Time".

Recently, Cisco and Munsion Systems performed the world's first real time 3D holographic telepresence video presentation. In other words, two men interacted live on a stage. But one was physically present in India, and the other was a life-size 3D holographic projection from California. Telepresence allows you to create live "in-person" experiences by combining telecommunications with advanced imagery. And when that imagery is 3D holographic technology, the experience is truly remarkable (Elmorshidy, 2010).

Holographic Data storage

Holographic storage considers one high – capacity storage possibility. Holographic drives record data on to holographic discs or holographic cartridges. Over one million bits of data can be stored at one time in single flash of light. Holographic storage system are very fast. Much more data can be stored on a holographic disc or cartridge than on a CD, DVD of the same physical size. Holographic data storage systems are particularly suitable for applications in which large amounts of data need to be stored or restored quickly , but rarely changed , such as for business data archiving , high speed digital video delivery, and image processing for medical ,video and military purposes (Morely, 2013).

Common photography only records the color and brightness of the light, while information about the distance between the camera and recorded objects is lost. When you look at the photo, your brain therefore judges the distances according to its viewing habits. In contrast, a hologram additionally contains spatial information. This is made possible by the following effects: if one object is further away from the viewer than another, the light coming from that object has to have set off earlier in order to reach the viewer at the same time as the light from the closer object. The hologram records this phase difference in addition to the brightness in an interference pattern (Hans &Bullinger, 2009).

Holography in Education and training

Holography being in its infant stage has not being widely used in education. Three-dimension holograms technology allow students to be educated by a "virtual teacher" who could be many kilometers away. The process is more advanced than video conferencing in that the hologram teacher appears to be in the classroom, and can see and speak to the pupils as if they were all in the same room (BBC News, 2000).

3DHT also enhances the educational process by bringing famous characters to life again from the past, and they speak about themselves and/or explain something as an assistant teacher (Fisher et al., 2014). Imagine, for example, learning relativity from a hologram Einstein, philosophy from Bertrand Russel, or give guest lectures across the world by using hologram. Also, in Seoul's Alive Gallery Project, holograms and 3-D animation technology fetch 62 world-renowned masterpieces of Western art to life again(Cho, 2008).

Military Training

The Defense Advanced Research Projects Agency recently has completed a five-year program called "Urban Photonic Sand table Display" that creates a real-time, color, 360-degree 3D holographic display to assist battle planners, allowing them to view a large-format, interactive 3D display without having to wear 3D glasses (Darpa, 2011).

Entertainment and concerts

- ***In the musical industry***

Holography is being used for concerts. In this case, the musicians can be far away in New York while performing in several cities around the world. (Fisher et al., 2014) for example, in 2011, Mariah Carey performed live on five different stages in five different countries simultaneously as a hologram (Lee, 2013). Bands have used hologram of dead musicians who come on stage (Fisher et al., 2014). After more than 60 years of the jazz singer Billie Holiday death, she is returning to Harlem's famed Apollo Theater as a hologram at the Coachella music festival in 2012. The idea apparently isn't to re-create Holiday for concerts but rather as part of a permanent educational installation at the historic theater. "Billie is going to be able to talk about the history of the Apollo. She can sing some songs and take questions from the audience in an interesting way. Michael Jackson died in 2009, he is returning back as a hologram at the Billboard Music Awards in Las Vegas (sky News, 2016). Real people can be filmed giving a speech, dance or presentation, for example, and then be projected as 3D holograms. Holographic special effects can be added in post-production to make a lifelike person beam into the room, Star-Trek style, or have their product appear and spin above their head at the click of their fingers (Elmorshidy, 2010).

- ***In sports***

Japan is offering to broadcast all matches in 3D holographic display in stadium around the 208 member nations of FIFA if it could have hosted the 2022 world cup. In reality, it means one can walk up to the nearest football in one's city, to watch live holographic 3D images of matches taking place in Japan. These matches will be seen right on the pitch in one's locality and around the world like it is being viewed in the original stadium in Japan. This will give viewers watching in different stadium around the world an illusion of being in Japan (Mauk & Metz, 2016).

The Methodology and Data Analysis

In order to answer the study questions as well as achieving the objectives, a survey has been carried out on a large sample of hotels manager departments in Cairo, and therefore, the questionnaire has been utilized as a data gathering technique. A questionnaire was distributed to 30 department managers working in various hotels in Cairo, thus constituting a random sample. The survey was conducted during the period of the 1st January 2017 to 5th March of 2017. All questionnaires were returned, this meaning that the sample had participated with 100%.

Results and Discussion

Table 1: Concept of Holographic

The concept of Holographic	Totally agree	Agree	Nutral	Dis- agree	Totally disagree	Mean	Std. Deviation	Chi-Square	%	Ranking
Tech enables us to live in a virtual world and interact with it	12	13	5	0	0	4.23	0.72	3.800	84.67	5
Is a technology that using laser and tools to display 3d image of the subject.	15	13	2	0	0	4.43	0.62	9.800	88.67	2
Hologram is a technology that utilizes the physics of light diffraction to create optical illusions of solid three-dimensional objects or scenes.	18	9	3	0	0	4.5	0.68	11.400	90.00	1
Is a technique that allows reconstruction of objects in the air to look as if they are quite real?	9	15	4	2	0	4.03	0.85	13.467	80.67	8
A technology that allow creating 3d images of the subject as if it's real.	72	69	36	3	0	4.17	0.75	8.400	83.33	6
It is a technology allows us to create 3d image of any subject and transfer it from place to another place around the world.	102	65	34	9	0	4.24	0.84	8.867	84.76	4
It is amazing technology allow us to live in a virtual environment and feel as if it's real.	119	79	31	11	0	4.28	0.78	3.600	85.50	3
Technology display 3d images floating in the air by using some equipment.	62	38	9	9	2	4.06	0.92	13.867	81.11	7
Technology makes us see unreal subject as if its real but we can't touch it.	12	9	6	3	0	4	1.02	6.000	80.00	9

The aim of table (1) is determine how the respondents understand the concept of holographic technology, the results shows that this concept differ between hotel employees, the researcher gave them different definitions, and each of the respondents explained the meaning of technology Hologram according to his knowledge and practical experience as follows: 90%of respondents say that Hologram is a technology that utilize the physics of light diffraction to create optical illusions of solid three-dimensional objects or scenes.

While (88.67%)of respondent say that holographic technology is a technology that using laser and tools to display 3d image of the subject, while (85.5%) say that holographic technology is amazing technology allow us to live in a virtual environment and feel as if its real, in the other side. (84.76%) say that holographic technology is a technology allows us to create 3d image of any subject and transfer it from place to another place around the world. (84.67%) say that holographic technology is a Technology enables us to live in a virtual world and interact with it. (83.33%) say that hologram is a technology that allows creating 3d images of the subject as if it's real. (81.11%) say that it is a Technology display 3d images floating in the air by using some equipment, (80.67%) say that it is a technique that allows reconstruction of objects in the air to look as if they are quite real. (80%) say that it is a technology makes us see unreal subject as if its real but we can't touch it. These findings come in line with those of Chin &Kim (2015), who indicated that a hologram is a three dimensional recreation of an image created using light imagery floating in space giving perspective and depth.

Table 2: Usage of Hologram in front office

No	Front Office Dep.	Totally agree	Agree	Nutral	Dis- agree	Totally disagree	Mean	Std. Deviation	Chi-Square	%	Ranking
1	3D Holographic information desks will be useful in contact with hotel's guest.	8	13	6	3	0	3.87	.937	7.067	77.33	4
2	3D Holographic information desk will increase guest satisfaction.	8	9	13	0	0	3.83	.834	1.400	76.67	5
3	3D Holographic information desk will save guest time and efforts.	12	13	5	0	0	4.23	.728	3.800	84.67	3
4	Change hotel environment by three- dimension hologram technology (3DHT) will support guest experience.	14	9	7	0	0	4.23	.675	2.600	84.67	3
5	3DHT will be a good to technology organize hotel's vehicles and determine directions for drivers.	15	12	3	0	0	4.40	.675	7.800	88	2
6	3DHT will be useful for front office	15	13	2	0	0	4.43	.626	9.800	88.67	1
Average mean							4.17				

The results in table (2) report that 88.67% of respondents say that 3DHT will be useful for front office, while 88% say that 3DHT will be a good technology to organize hotel's vehicles, and determine directions for drivers, while 84.67% agree that hotel environment will be changed by 3DHT which will support guest experience. Also, 84.67% agree that 3DHolographic information desk will save guest time and efforts. 77.33% say that 3D Holographic information desks will be useful in contact with hotel's guest. 76.67% say that 3DHolographic information desk will increase guest satisfaction. The findings agreed with Elmorshidy (2010) and Chaudhari et al. (2015), that holography can project large-scale, high-resolution images onto free space, claimed that surfaces, focal distances with the help of a relatively small-scale projection device. A hologram can be seen without obtrusive equipment; thus, viewers can see the three-dimensional virtual characters without eye wear or headgear, this concept is called Auto stereoscopy.

Table 3: Usage of 3 DHT in food and beverages department

No.	Food and beverages Dep.	Totally agree	Agree	Nutral	Dis- agree	Totally disagree	Mean	Std. Deviation	Chi-Square	%	Ranking
1	Eating dinner each night in different country will support guest experience (is an unforgettable experience)	11	8	7	4	0	3.87	1.07	3.333	77.33	7
2	When guest dine with all of his favorite celebrities dead or alive at hotel's hologram restaurant, it will gain guest attention and increase restaurant's sales.	12	9	6	3	0	4	1.02	6.000	80.00	6
3	Changing restaurant atmosphere to express a particular food such as sea food or grilled meat will contribute in improving quality of service.	16	6	6	2	0	4.2	1	14.267	84.00	5
4	Cooking foods in front of guest's table, making guest sure of food quality and freshness.	18	9	3	0	0	4.5	0.68	11.400	90.00	2
5	Cooking foods in front of guest's table is an effective marketing tool.	15	8	7	0	0	4.27	0.83	3.800	85.33	3
6	Interactive 3D Holographic menu (which introduce the dishes picture with all dish details) will make guest take a good decision about food selecting.	18	11	1	0	0	4.567	0.57	14.600	91.33	1
7	3DHT will be useful in food and beverage department	12	14	4	0	0	4.267	0.69	5.600	85.33	3
Average mean							4.24				

The results in table (3) indicate that 91.33% agree that interactive 3D Holographic menu(which introduce the dishes picture with all dish details) will make guest take a good decision about food selecting, while 90.00% say that cooking foods in front of guest's table, making guest sure of food quality and freshness. 85.33% agree that 3DHT will be useful in food and beverage department and agree that cooking foods in front of guest's table is an effective marketing tool. 84% of respondent say that changing restaurant atmosphere to express a particular food such as sea food or grilled meat will contribute in improving quality of service, 80% say that when guest dine with all of his favorite celebrities dead or alive at hotel's hologram restaurant, it will gain guest attention and increase restaurant's sales, while 77.33% say that Eating dinner each night in different country will support guest experience is an unforgettable experience. The findings are in accordance with Bouchard(2013) study which indicated that changing restaurant atmosphere to express a particular food such as sea food or grilled meat will contribute in improving quality of services.

Table 4: Usage of 3 DHT in conferences and concerts

No.	**Conferences and Concerts**	Totally agree	Agree	Nutral	Dis- agree	Totally disagree	Mean	Std. Deviation	Chi-Square	%	Ranking
1	Using 3DHT to fetch musicians around world to performing in the hotel is an interesting event which would have a positive impact on guests and increase its numbers	9	15	4	2	0	4.03	0.85	13.46	80.67	5
2	3DHT will help hotels to reduce carbon dioxide thus save environment.	8	11	11	0	0	3.9	0.803	.600	78.00	6
3	Hologram technology is an effective way to introduce different concerts and movies each night	13	14	0	3	0	4.23	0.898	7.400	84.67	2
4	Using 3DHT in conferences will make hotel's competitive advantage.	23	7	0	0	0	4.77	0.43	8.533	95.33	1
5	3DHT conferences will save time of members.	23	7	0	0	0	4.77	0.43	8.533	95.33	1
6	3DHT conferences and meeting will help managers and businessmen to not incur a high cost of travelling and accommodation	16	7	4	3	0	4.2	1.031	14.00	84.00	3
7	3DHT will be useful for conferences and concerts	16	8	3	3	0	4.23	1.006	15.06	84.67	2
8	Using hologram of dead musicians who come on stage will improve bands and attract guest.	11	10	9	0	0	4.07	0.828	.200	81.33	4
Average mean							4.28				

The results of table (4) indicate that 95.33% agree that using 3DHT in conferences will make hotel's competitive advantage and will save time of members, 84.67% say that 3DHT will be useful for conference and concerts, 84% say that 3DHT conferences and meeting will help managers and businessmen to not incur a high cost of travelling and accommodation. According to Ghuloum (2010), scientists managed transfer of individuals from one place to another without the need to travel. 81.33% say that using hologram of dead musicians who come on stage will improve bands and attract guest. 80.67 % say that using 3DHT to fetch musicians around world to performing in the hotel is an interesting event which would have a positive impact on guests and increase numbers of guests.78% say that 3DHT will help hotels to reduce carbon dioxide thus, saving environment.

Table 5: Usage of 3 DHT in guest rooms

No.	Hologram in guest rooms	Totally agree	Agree	Nutral	Dis- agree	Totally disagree	Mean	Std. Deviation	Chi-Square	%	Ranking
1	Using 3DHT To choose and change the character of the room will help guest to not bored from his room and encourage him to increase his stay duration.	9	12	3	5	1	3.77	1.165	13.333	75.33	3
2	Using 3DHT to change the room fits with the guest nationality, making him feel as if he is in his native original, this will lead to the possibility of increasing length of stay.	8	12	5	4	1	3.73	1.112	11.667	74.67	4
3	Contact guest with his friend and family face to face as if they are in the same place make the guest makes guest feel familiarity and lack of alienation.	20	10	0	0	0	4.67	0.479	3.333	93.33	2
4	3DHT will be a good technology in guest room	25	4	1	0	0	4.8	0.484	34.200	96.00	1
Average mean							4.06				

The results as shown in table (5) indicate that 96% of respondents agree that 3DHT will be a good technology in guest rooms, while 93.3% say that contact guest with his friend and family face to face as if they are in the same place make the guest makes guest feel familiarity and lack of alienation.in the other side 75.33% say that using 3DHT to choose and change the character of the room will help guest to not bored from his room and encourage him to increase his stay duration, 74.67% of respondents say that Using 3DHT to change the room fits with the guest nationality, making him feel as if he is in his native original, this will lead to the possibility of increasing length of stay.

The findings agreed with Lee (2013) in that live 3D holographic teleconference demonstrate the future of business communication, with the interactive and physical engagement of a face-to-face meeting.

Table 6: Usage of 3 DHT in human resource department

No.	Hologram in human resource	Totally agree	Agree	Nutral	Dis- agree	Totally disagree	Mean	Std. Deviation	Chi-Square	%	Ranking
1	3DHT is a good technology that allows making an interview with the applicants to work in hotel from another country.	19	11	0	0	0	4.63	.490	2.133	92.67	2
2	Holography central human resource management is a good way for selecting and recruiting hotels staff.	15	8	1	3	3	3.97	1.37	21.333	79.33	11
3	Holography central human resource management ensures recruiting qualified staff with the necessary skills to do the work that leads to service quality.	15	12	3	0	0	4.30	.915	7.800	86	9
4	Central human resource system for hiring and training will enhance training program.	15	12	3	0	0	4.40	.675	7.800	88	7
5	Depending on specialized trainers for training staff is so expensive.	21	6	3	0	0	4.60	.675	18.600	92	3
6	Depending on specialized trainers for training staff in more than hotel in the same time require a lot of trainer.	10	20	0	0	0	4.33	.479	3.333	86.67	8
7	Depending on specialized trainers for training staff in more than hotel needs a long time.	20	10	0	0	0	4.67	.479	3.333	93.33	1
8	Depending on specialized trainers for training staff, will enhance staff training.	13	13	4	0	0	4.30	.702	5.400	86	9
9	3DHT is a good technology that availability professionals' trainers for training the staff in all the hotels of chain in the same time.	16	8	6	0	0	4.33	.802	5.600	86.67	8
10	Depending on specialized trainers for training staff in more than hotel in the same time, will reduce cost of needed for number of trainers to cover hotels of chain, or travelling cost.	21	3	6	0	0	4.50	.820	18.600	90	5

11	Depending on central professional trainer will reduce cost of rely on many trainers and cost of trainers travelling from hotel to another hotel.	10	17	3	0	0	4.23	.626	9.800	84.67	10
12	3DHT will be a good technology in human resource department	20	7	3	0	0	4.57	.679	15.800	91.33	4
Average mean							4.40				

The results in table (6) indicate that 93.33% say that depending on specialized trainers for training staff in more than hotel needs a long time. 92.67% say that 3DHT is a good technology that allows making an interview with the applicants to work in hotel from another country. 92% say that depending on specialized trainers for training staff is so expensive. 91.33% say that 3DHT will be a good technology in human resource department. 90% say that depending on specialized trainers for training staff in more than hotel in the same time, will reduce cost of needed for number of trainers to cover hotels of chain, or travelling cost. 88% say that central human resource system for hiring and training will enhance training program. 86.67% say that depending on specialized trainers for training staff in more than hotel in the same time require a lot of trainer. 86% say that depending on specialized trainers for training staff, will enhance staff training. 84.67 % say that depending on central professional trainer will reduce cost of rely on many trainers and cost of trainers travelling from hotel to another hotel.

Table 7: Usage of 3 DHT for entertainment

NO.	**Hologram for Entertainment**	**Totally agree**	**Agree**	**Natural**	**Dis- agree**	**Totally disagree**	**Mean**	**Std. Deviation**	**Chi-Square**	**%**	**Ranking**
1	Bring artifacts and other notable museums around the world into the hotel will attract guest.	20	7	3	0	0	4.57	.679	15.800	91.33	3
2	Borrow artifacts from national museums are impossible because of problems related to security, small size and storage issues.	17	7	6	0	0	4.37	.809	7.400	87.33	4
3	Using 3DHT in gaming will make it more reality so, it will attract guest.	26	4	0	0	0	4.87	.346	16.133	97.33	1
4	3DHT is suitable for entertainment	20	10	0	0	0	4.67	.479	3.333	93.33	2
Average mean							4.62				

The results in table (8) show that 97.33% say that using 3DHT in gaming will make it more reality so, it will attract guest. 93.33% say that 3DHT is suitable for entertainment, 91.33% say that Bring artifacts and other notable museums around the world into the hotel will attract guest. 87.33% say that Borrow artifacts from national museums are impossible because of problems related to security, small size and storage issues. According to Bouchard (2013), the guest be able to choose his room from a variety of room selections, such as, Beach, Jungle, Winter, Safari, Under the sea and many more. Once guest selects his preferred theme, his whole room is transformed.

Table 9: Usage of 3 DHT in security

No.	Security	Totally agree	Agree	Natural	Dis- agree	Totally disagree	Mean	Std. Deviation	Chi-Square	%	Ranking
1	3DHT is introducing a good solution for problems related by products security.	13	14	3	0	0	4.33	.661	7.400	86.67	2
2	3DHT provide protection for the precious stuffs.	16	8	6	0	0	4.33	.802	5.600	86.67	2
3	3DHT is affective in case of emergency by provide direction of escape.	13	13	4	0	0	4.30	.702	5.400	86	3
4	3DHT is a useful tool for organize traffic.	11	16	3	0	0	4.27	.640	8.600	85.33	4
5	3DHT is a good technology should use in security	17	10	3	0	0	4.47	.681	9.800	89.33	1
Average mean							4.34				

The results shown in table (9) indicate that 89.33 % say that 3DHT is a good technology that should be used in security. 86.67% say that 3DHT is introducing a good solution for problems related by products security and it also provides protection for the precious stuffs. 86% say that 3DHT is affective in case of emergency by providing direction of escape. 85.33% say that 3DHT is a useful tool for organize traffic. According to BBC (2011), the 3D projection of airport worker Heather Hodson is being used to greet passengers and advise them of the security process at East Midlands Airport. The virtual assistant will tell travelers about current liquid restrictions and the screening process.

Overall, the results showed some interesting points related to the use of 3DHT in hotels. Respondents agree that hologram is a technology that utilizes the physic of light diffraction to create optical illusions of solid three-dimensional objects or scenes.

Moreover, most participants mentioned that 3DHT will be useful in front office. However, most participants mentioned that interactive 3Dholographic menu will make the guest more capable of taking a good decision about food selecting. Also, most participants confirm that using 3DHT in conferences will make hotel's competitive advantage. Most of participants see that 3DHT will be a good technology in guest-room. Also, they confirm that using 3DHT in gaming will make it more reality thus, will attract the guests and most of them agree that 3dht is a good technology should use in security.

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الفوائد المحتملة لتطبيق التكنولوجيا ثلاثية الأبعاد (3DHT) في دعم صناعة الفنادق

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الملخص العربي

هناك تقدم كبير في مجال استخدام تكنولوجيا المعلومات وتعد تكنولوجيا الهولوجرام ثلاثي الأبعاد .واحدة من أحدث ما توصلت إليه تكنولوجيا المعلومات والتي أثبتت وجودها وفعاليتها في العديد من المجالات مثل الترفيه والتسويق والتعليم . إلا أن هذه التكنولوجيا علي الرغم من أهميتها إلا أنها ليست شائعه في مجال الفنادق. لذا، يقدم البحث معلومات أساسية عن تكنولوجيا الهولوجرام ثلاثي الأبعاد وأهميتها واستخداماتها في مجال الفنادق، وعليه تم إجراء مسح على عينة من مديري الإدارات بفنادق القاهرة. وأظهرت النتائج إمكانية وفاعلية استخدام الهولوجرام ثلاثي الأبعاد في عدد من أقسام الفندق كالمكاتب الأمامية والأغذية والمشروبات والحفلات والمؤتمرات وغرف الضيوف والأمن.

الكلمات الدالة: التكنولوجيا ثلاثية الأبعاد (3DHT)، صناعة الفنادق، تكنولوجيا المعلومات.