

3D Virtual Animals Tamer in the Circus Using Kinect and Hologram Technology

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Abstract— *Animal's tamers always uses bullhooks, and shackles, so they cannot protect themselves against animal's rebels. HORRIFIC footage has emerged of the shocking moment a lion tamer is killed by one of the beasts during a live show in Egypt 2016. Concerned about animal mistreatment and public safety, a growing number of communities are banning or restricting the use of animals in circuses. The suggested proposal is new trend in using the new technologies like the Kinect and Hologram devices and equipment to simulate the animal tamer in circus to protect him and save the audiences souls.*

Keywords— *Kinect, Hologram, Xbox, Animals Tamer, circus.*

I. INTRODUCTION

There have been hundreds of incidents involving animal attacks and escapes from animal circuses, often resulting in property damage, injuries, and death for both humans and animals.

All the countries are banning bullhooks and Electric prod. James Hamid Sr., a prominent producer of Shrine circuses, has said: As we look into the future, we see all circuses moving to non-animal productions. Many circuses, including Ringling, do not allow video cameras in the arena. In order to avoid publicity, circuses are often quick to settle lawsuits that allege injuries. [1]

Over the last 20 years, both through strict regulation as well as changing public sentiment, performing animal acts have begun to be a thing of the past. There are loads of exciting and innovative productions that dazzle audiences without animal acts. [2] and [3].

So, if we ought to find a new trend to recreate the life fun for the audiences beyond the hazard, fear and dangerous feeling as it is fact or even kind of PHOBIA which is a type of anxiety disorder, defined by a persistent fear of an object or situation. [4] and [5]

The suggested proposal based on how to use the new recent technologies like the Kinect and Holography devices and equipment to simulate or create a 3D visual life images and videos of the animal tamer in circuits out of iron fences dealing with the animals without any direct contact with these animals to protect him also saving the souls for the audiences.

II. HOLOGRAPHY TECHNIQUES

Holography has been used as a tool to determine the 3D motion data of swimming microorganisms. Holography is a much broader field than most people have perceived. Recording and displaying truly three-dimensional images are only small parts of it. Holographic optical elements (HOE) can perform the functions of mirrors, lenses, gratings, or combinations of them, and they are used in myriad technical devices. Holographic interferometry measures microscopic displacements on the surface of an object and small changes in index of refraction of transparent objects like plasma and heat waves. Future photonic devices such as electro-optical chips will undoubtedly incorporate micro-lasers and HOEs for optical computations, free-space interconnects, and massive analog and digital memory systems. [6], [7] and [8]

A *hologram* is a recording in a two- or three-dimensional medium of the *interference pattern* formed when a point source of light (*the reference beam*) of fixed wavelength encounters light of the same fixed wavelength arriving from an object (*the object beam*). When the hologram is illuminated by the reference beam alone, the diffraction pattern recreates the wave fronts of light from the original object. Thus, the viewer sees an image indistinguishable from the original object. There are many types of holograms, and there are varying

ways of classifying them. For our purpose, we can divide them into two types: *Reflection holograms and Transmission holograms*. [9], [10] and [11]

III. KINECT TECHNOLOGY

Kinect is Microsoft's motion sensor add-on for the Xbox 360 gaming console. The device provides a natural user interface (NUI) that allows users to interact intuitively and without any intermediary device, such as a controller. Although Kinect was developed for playing games, the technology has been applied to real-world applications as diverse as digital signage, virtual shopping, education, telehealth service delivery and other areas of health IT. Much has been made of the latency that may exist when player movements are translated into on-screen action. However, developers reckon this lag is down to about a thirtieth of a second. [19] and [20]

Inside the sensor case, a Kinect for Windows sensor contains: RGB camera, Infrared (IR) emitter and an IR depth sensor, Multi-Array microphone, and 3-axis Accelerometer. The resolution of the depth stream is dependent on the frame rate, and is specified by the *Depth Image Format Enumeration*. Similarly, the resolution of the color stream is specified by the *Color Image Format Enumeration*. [21] and [22]

First we need a "stand-alone" Kinect v1 or v2. So, we do not need to buy an Xbox. The target application is a Windows 8.1 Store application for x64 machines (not ARM or x86) so a machine with an x64 architecture is required for development. A required supported operating systems and architectures such as: Windows 8.1, Microsoft Visual Studio® 2013 Community Edition with Update 2 or higher, Microsoft .NET Framework 4.5, Kinect 2 SDK (Currently at build 1409), Kinect 2.0 for Windows device, USB 3.0.

IV. SUGGESTED DESIGN WORKABLE STRUCTURE

A. Kinect Debugging

Debugging the Kinect 2 requires that you meet the system requirements. If you are unsure that the **Kinect is plugged in properly**, you can check a **light indicator** on the power box of the unit (the box which comes from the single cable in the Kinect 2 and results in power and USB 3.0 connections). The Kinect 2.0 itself does not turn on until it is required by an application.

B. Body Mask

It is an application using almost every available feature of the Kinect 2, which assemble a body mask from the Kinect. Here we need to create a body mask in a Kinect for Windows 2 application for Windows 8.1. This task lab and all subsequent tasks are built using C# and assumes you have a fundamental knowledge of the C# language. Also Visual Studio Pro 2013 Update 2 had been used but Community Edition is identical. (See Fig. 1)

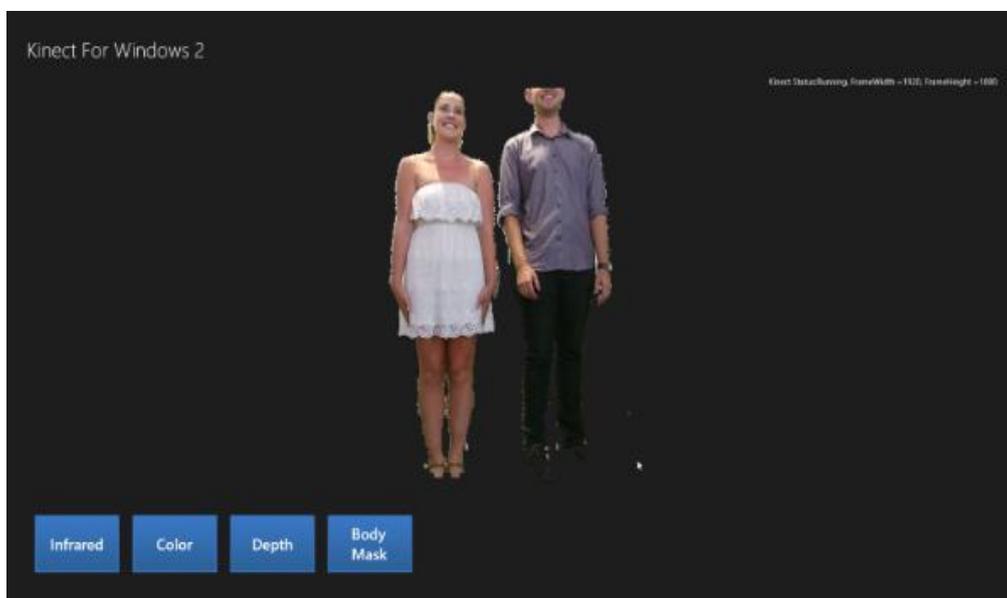


Fig. 1. Kinect 2: Displaying Body Mask

This application is used to retrieve and use the Body Index Frame and others from the *MultiSourceFrameReader*, and use that *frame data* to cut out known bodies in a *bitmap image*.

C. Face Tracking

Here we use the Kinect 2 to get face points, and other face properties, for up to 6 bodies. In this task we use the *KinectFaceStore* library to access the face tracking available in Kinect. All the code to retrieve the face tracking is documented in the samples within the Kinect 2 SDK. This library simplifies the accessing of the face frame for you. This control can also be placed as an overlay on a canvas on top of anything, try combining the face tracking to work with the Background Removal frame or the Body Skeleton frame. (See Fig. 2)

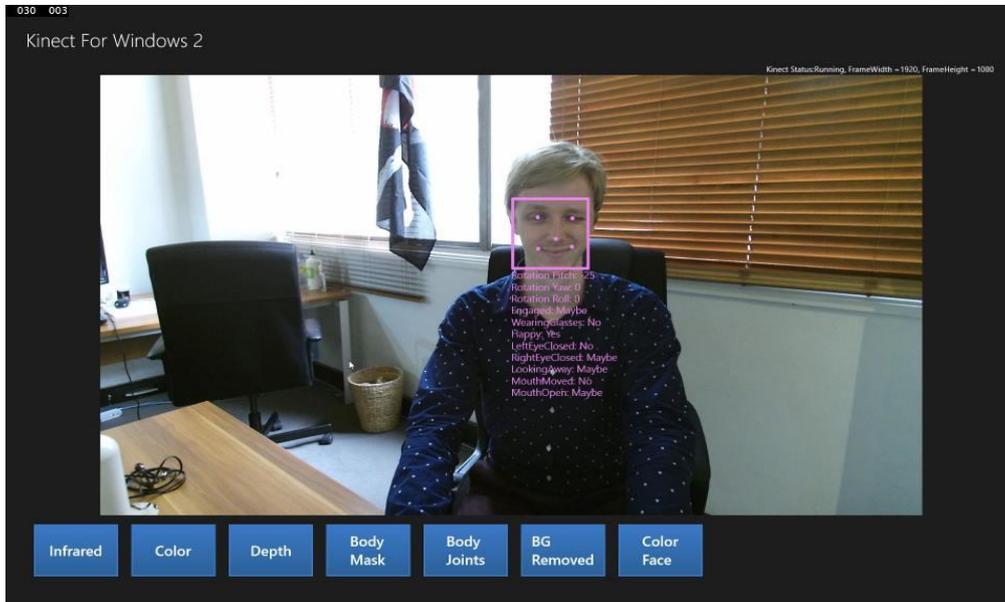


Fig. 2. Kinect 2: Face tracking using the *KinectFaceStore* library

D. Hand Cursor Interactions

In this task we explain how to use the Kinect Input library through new control called the *KinectRegion* to show a Hand Cursor overlaid on an application. In Fig. 3 we can see the use of a hand cursor is extremely smooth and accurate. There are a few more gestures for the hand to replace the scroll feature of the mouse, if you grip your hand on a scrollable field then you can navigate it by moving your hand, like the scrollbar on a mouse but in any direction. It is also a cheaper solution than many expensive and inaccurate touch screens for large panels.

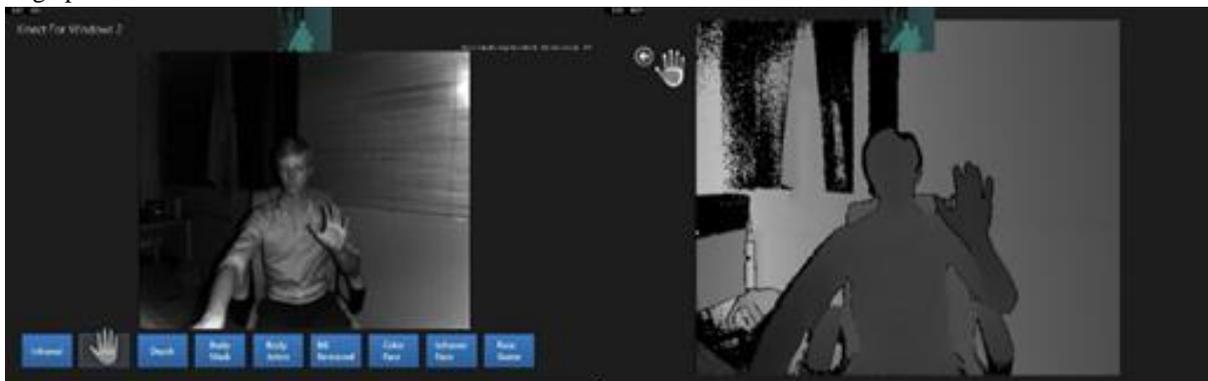


Fig. 3. Kinect 2: Hand Cursor Interactions using the *KinectRegion*

E. Kinect Studio

This task explains how to record and playback data feeds using the Kinect Studio application for Kinect 2. Files generated by Kinect Studio are generally very large, make sure that you have enough hard drive space for this. For example a 50 second clip with the basic recording is ~8.5GB. (See Fig. 4)

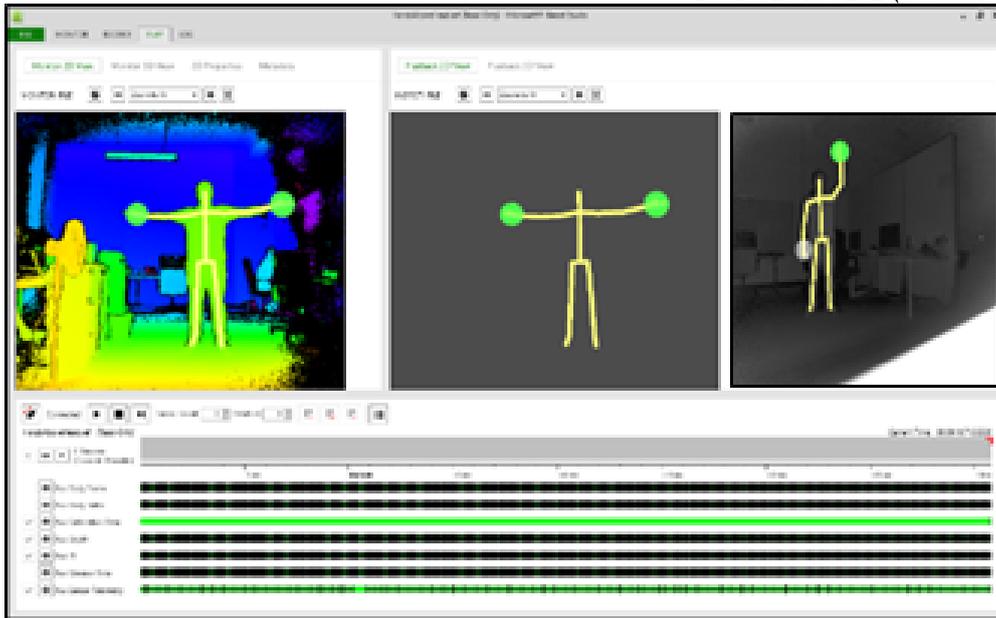


Fig. 4. Kinect 2: Kinect studio using the *Kinect SDK*

F. Gesture Builder

By the end of that task we will effectively build custom gestures using Visual Gesture Builder. We should also have understood how to implement a Gesture Database into the application and use that gesture to take a screen shot. This task describes how to import existing tagged clips into the project and take a screenshot in the application using a gesture. (See Fig. 5)



Fig. 5. Kinect 2: Gesture Builder *Visual Gesture Builder*

V. HOLOGRAPHY AND KINECT COMBINATION

Holographic images are often presented as static images. This project aims at solutions to depict a dynamic 'holographic' image that can be manipulated. First an illusion is created of a generic object floating in mid air by using a Mirascope, a mirror room that consists of two concave parabolic mirrors stacked on top of each other. The top mirror has an aperture in the center to allow viewing inside of the mirror room. [13] and [14]

The generic object that is placed inside the mirascope then appears to be floating in mid-air just above the top mirror. The object can be made dynamic by projecting images onto it, using 2 beamers (one beaming onto the frontal surface of the object and one beaming onto the backside of the object). Subsequently the Kinect, an input device developed by Microsoft, that recognizes movement and gestures, is used to manipulate the image beamed onto the object. Gestures will change the projections beamed onto the object, and therefore changing the illusion of the floating object above the mirascope. [15]

There exists a wide variety of methods to create a hologram, where only some of them are dynamic, thus far there have not been holograms that could be manipulated by gestures onto or around the hologram. The Kinect, an input device developed by Microsoft, that recognizes movement and gestures, is used to manipulate

the image beamed onto the object. Gestures will change the projections beamed onto the object, and therefore changing the illusion of the floating object above the mirascope. [16]

A startup company called VNTANA has created a way to make full 3D holograms of people by using Microsoft's Kinect motion capture hardware. Using gesture control, they can interact directly with holographic objects, such as a celebrity, product or any other object rendered in the digital space simply by moving their hands in front of the display. Immediately after the experience, users receive a branded email with a GIF, video or photo of the experience that they can share on social media. [18]

VNTANA's holographic technology is applicable globally across multiple industries including advertising, retail, business communications, sports, automotive and education. VNTANA's team of designers, engineers, business strategists, system integrators, and creative technologists is dedicated to bringing you the next generation of holographic technology. [23]

VNTANA creates shareable group experiences by placing the digital into the real world. From holographic photo opportunities with your favorite celebrity to gesture controlled drone piloting, VNTANA's technology is at the cutting-edge of Social Augmented Reality without the need for wearables.

VNTANA has main four projects **Interactive Celebrity Hologram** (bring your endorsement deal to life with an interactive hologram), **Hollagram** (Gamify the selfie with VNTANA's Hollagram), **Hologram Digital Display** (window shopping... literally), and **Hologram Telepresence** (expand your influence. be multiple locations at once). [24]

VI. MICROSOFT'S WITH THE KINECT

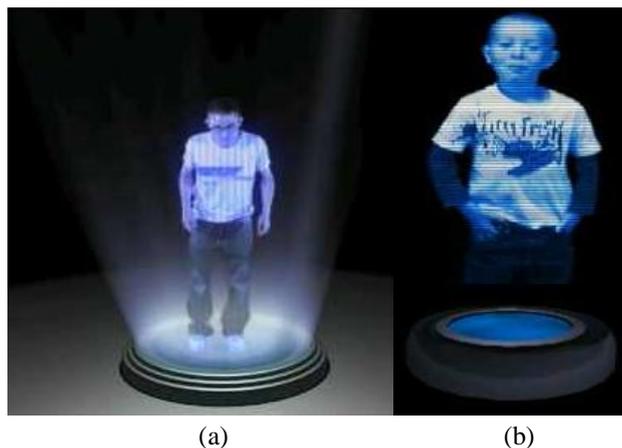
In 26th October 2016, Microsoft hosted a big event to announce a new computer, the Surface Studio, new VR headsets, and new software the company hopes will appeal to creative types the world over (which Apple has pretty much locked up in recent years). But the real groundwork for today's announcements actually happened over six years ago.

The event, part of that year's E3 video game convention, marked the arrival of Kinect, Microsoft's motion-sensing camera for the Xbox 360 that enabled Nintendo Wii-like experiences on a console perhaps best known for testosterone-fuelled rollercoaster rides like *Call of Duty*, *Gears of War*, and *Halo*.

"Kinect was an exercise in human input," Alex Kipman, a technical fellow at Microsoft's Windows and Devices group, recently told me over Skype. "That same team that did speech in Kinect where you could say 'Xbox on,' 'Xbox off,' 'Xbox Bing Harry Potter,' is the same team that does Cortana." Other current Windows technologies, including Windows Hello, which lets users sign into their PC using a webcam, also trace their development to Kinect.

Both the Surface Studio and the ability to create and share 3D models with Paint 3D are part of Microsoft's efforts to ensure that the next-generation of computing is not only accessible to non-professionals—creating 3D objects typically requires use of expensive, specialized software like *Autodesk's Maya*—but that this next-generation of computing isn't merely defined by passively enjoying someone else's content.

In fig. 6. some of suggested results for the Kinect and Hologram combination results we can apply it in circus to replace the regular Animal's tamer by a dynamic simulated 3D Tamer created by the new technologies from Microsoft for the **Kinect** devices, **Hologram** equipment and the **Xbox** products to protect the human tamers also save the souls of the audiences.





(c) (d)
Fig. 6. Microsoft results for Kinect-Hologram-Xbox devices:

a) Stationery dynamic I b) Stationery dynamic II c) Variable dynamic I d) Variable dynamic II

VII. CONCLUSION

The suggested technique explains how we can replace the animal's tamer in circus especially who deal with wild animals like Lions and Tigers by a created dynamic simulated 3D model to save the tamer's life also protect the audiences from any dangerous hazards. The various technologies could be used in the introduced design such as the Hologram devices have been explored and described with all details for its types and functionality. All about Kinect devices and the most recent products connect between Kinect devices and Hologram equipment introduced in 2016 by VNTANA have been discussed. Some figures have been stated the real results for the recent technologies which is really we can apply for the research objective (3D visual Animal's Tamer). So the final recommendation as Microsoft told at the last event, *"Let's just make technology so ubiquitous, so ambient, that all human endeavor, across all countries, across all economic strata, can benefit from it. That's ultimately the dream."*

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