Virtual reincarnation of Mexican Norteño representative artist using ‘holographic’ projection and CG technologies

Gabriel Pantoja a *, Priscila López a , Pablo Ramírez a , Moraima Campbell a , Daniel Cabrera a , Francisco Quiñones a

* Tecnologico de Monterrey, Av. Eugenio Garza Sada #2501, Monterrey, 64849, México

Abstract

Under the framework of the commemoration of Nuevo Leon Heritage (March 8th, 2015) arises the idea of bringing back to life a beloved Norteño artist, Eulalio Gonzalez “Piporro”, singing in company of real artists and musicians in an event called “Mujer Neoleonesa: Musa y Creadora” which also had the intention to recognize the Nuevo Leon women’s talent and dedication by presenting numbers authored and performed by renowned women. Using a variation of so-called Pepper’s ghost effect, nowadays known as ‘holographic projection’, Computer Graphics technologies and chroma key filming techniques, a three-dimensional computer-generated face of Piporro was successfully superimposed onto a professional imitator’s body. After only two weeks of planning and almost six weeks of production, three functions were presented the day of the event in which Piporro was able to perform once again in front of his fans who were delighted by hearing the 'Corrido a Monterrey’, a song that was never performed by Piporro in his life.

Keywords: Holography; Pepper’s ghost effect; Chroma Key; Virtual Resurrection; Holographic film; Holographic projection
1. Introduction

Under the framework of the commemoration of Nuevo Leon Heritage (March 8th, 2015) and the International women’s day, Tecnológico de Monterrey organized the event “Mujer Neoleonesa: Musa y Creadora” [1]. One of the objectives was to recognize the creative talent of Neolone woman and the heritage of our state through its mountains, traditional old houses, and one of the most beloved characters, Mr. Eulalio González “El Piporro”, who plays for the first time themes never did at live, and who comes back to life thanks to the optical illusion generated by the integration of art with computer technology, the digital recognition of facial movements and three-dimensional digital modeling.

2. Development

The overall project was managed by Moraima Campbell, Pablo Ramírez and Daniel Cabrera. The development of the project was divided in three main processes: Digital production, Musical Production, Projection production and Installation. Priscila López, a 3D artists, was in charge of the digital production while Francisco Quiñones directed the musical production.

2.1. Digital production

A 3D model of Piporro’s head was created and rigged in the Autodesk Maya [2] platform and the texture details (skin color, eyebrows, hair, wrinkles, etc.) were added using Z-brush [3] and Photoshop [4]. After finishing the details, the next step was giving life to this 3D model. Using a face animation software (Faceshift [5]) in addition with a two-camera system that can detect both image and depth, it was possible to record all the gestures made by Mr. Roel (Piporro’s imitator) while he was singing and then copy them to the 3D model. Thanks to the software used, the animation process was faster and easier than the conventional process; nevertheless, a clean-up of the motion capture data was necessary as well as the enhancing of the gestures animation in Maya.

Once the virtual head could reproduce all the gestures there was still a lot of work to do with the tracking to superimpose the 3D model to Mr. Roel’s body and with the synchronization between all movements and gestures and the music. Mr. Roel was filmed performing in front of a green screen wearing some tracking marks on his face as reference to virtually attach Piporro’s modelled head. The 3D tracking data was imported into Maya to have the head's position and rotation integrated with the gesture's animation. After-effects [6] software was used to remove the green background and make the post-production to integrate the live action footage of the body with the 3D rendered head.
2.2. Musical production

The show consisted of three musical pieces, were conceived, designed and performed by an enthusiastic and multidisciplinary group of alumni students, faculty and staff of the Tecnológico de Monterrey, with the idea of bringing back to life a beloved Norteño artist, Eulalio Gonzalez “Piporro”, singing in company of real artists and musicians in an event, singing songs never sing at live.

The First song “Aquellos Años” (those years), was written by Bertha Villaseñor Lagrange, originally from Nuevo Leon state Mexico [7]. Song evoke the Nuevo Leon yesterdays, old houses, memories, smell of flowers and first love. Performed a live by Luisa Montemayor.

The second song “Monterrey Señora de Montañas” (Monterrey lady of Mountains), written by Rolando Usó Toledo, and played by Don Eulalio González “Piporro”, for the first time, presents the city through the great mountains that surround it and are part of their heritage. Performed by Mr. Roel Martínez.

Finally the third song “El corrido de Monterrey”, written by Severiano Briseño [8], was played by Don Eulalio González "El Piporro" in which is exalted the love we have for our land. Performed by Mr. Roel Martinez.

Mr. Roel’s voice, together with the music played by Banda Sonido Azul from Tecnológico de Monterrey, was recorded in Tecnológico de Monterrey music studio labs, under the direction of Professor Francisco Quiñones. Some arranges were made to the recordings so they would be able to match with the gestures and movements previously recorded.

2.3. Projection production and installation

To make the hologram, the video produced was to be projected into a 90% transparent ‘holographic’ film which has the property of retaining part of the light projected to it. The idea for the event was to hang a 2.44 by 2.44 meters film from an aluminum structure, placing aluminum profiles at its top and bottom edges to stretch it (similar used for testing, Figure 1). For previous testing the quality of the video and of the projection, some film was adhered to a 1.22 by 2.44 meters PMMA sheet and attached to an aluminum structure; since there were only tests, it was not necessary to install the structure to hang the film. Figure 1 shows some projection tests.
For the whole event, four 15,000 lumens Christie projectors were used for all the projections, but only one was dedicated to produce the ‘hologram’. They were installed in the aluminum structure shown in Figure 2, as well as the lights. In the floor it can be seen the installation of the aluminum profiles at the film edges.

![Figure 2. Installation of the scenery](image)

For enhancing the projection quality, the stage was surrounded with black walls to avoid that the light of the environment had a great impact to the desired illumination. Also, dark-colored lights were chosen to illuminate the stage instead of bright-colored ones. The musicians were distributed into three levels and a white wall (Figure 2) was placed at a fourth level to project virtual musicians and images related to the music (Figure 3).

![Figure 3. Musicians playing at the event before the hologram performance](image)

### 3. Results and Conclusions

Three functions were presented the day of the event: 12:00, 18:00, 21:00, being this two last ones the most successful because of the illumination scenario. Around 100-120 spectators were present in these two functions. Figure 4 shows how the hologram was seen by the spectators.
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References