Virtual Job Expo: A Practical Approach to Virtual Reality in Different Development Engines

Ordoñez Sergio, Rodríguez Iveth, and Neira-Tovar Leticia

Abstract Virtual reality (VR) is a technology that allows emulating a synthetic environment giving users the perception of being elsewhere or augmented reality that mixes the real environment with additional elements creating the illusion that the environment is a mixture of both worlds, the virtual and the real. These technologies allow people through devices to recreate sensations from visual to tactile becoming increasingly realistic, detailed, interactive, and exciting.

Virtual reality has not only served for recreational purposes but has been a fundamental part in education, in research, and in the replacement of activities that at the time entailed physical effort and threaten safety and even involve high costs or simply the provided environments it was impossible in a real environment to be present in each of them. One of the targets that this work promotes is the use of virtual reality into the workforce research. Actually, employers search for candidates who have evolved the use of new technologies to select and hire human capital. At this work, a review of two platforms that uses VR (virtual reality) in job expos is exposed, with the aim of showing its usefulness as a means of virtual rapprochement between employers and job seekers

Keywords Immersive reality · Virtual reality recruit · VR framework · Job sites · Video-games design

1 Introduction

Virtual reality has long been touted for its potential to revolutionize education, with countless advantages cited: access to remote experts, access to experiences that depend on scarce resources or limited access (e.g., going to the moon), and access

O. Sergio (✉) · R. Iveth · N.-T. Leticia
Universidad Autónoma de Nuevo León, San Nicolás de los Garza, N.L., Mexico
e-mail: sergio.ordonezg@uanl.mx; diana.rodriguezsncz@uanl.edu.mx; leticia.neiratv@uanl.edu.mx

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to experiences that are physically impossible (e.g., standing inside a module), to name a few. A new generation of consumer hardware has made this vision more affordable than ever. The interest is to understand what advantages of virtual reality in an educational context will determine when and how it will happen. The named advantages for collaborative virtual environments fall into two broad categories: in interaction with other humans and those focused on the environment. Human interaction can be novel because of who you can interact with (e.g., remote people) or how you can interact (e.g., by assuming a physical appearance). The environment can be novel because it is based on a physical location that only a few people can go to or because the experience it provides is inherently virtual (e.g., being inside a molecule) [1]. The Virtual Job Fair consists of offering the user (whether student or company) a completely virtual experience located at the exposure site, where the company can exhibit its stands to recruit the student and students can take a tour to obtain information on vacancies and get statistics.

Thanks to the appropriate measures being taken to replace school activities, this will lead to continuing innovating new information technologies and every day to reach new goals.

2 Hardware and Software Needed for Virtual Reality

For all who are willing to step into the world of virtual reality, a specific set of hardware accessories is needed to make it possible.

The set mentioned above could be comprised of:

- Head-mounted screens consisting of two small screens, one for each eye, a material used to stop light from approaching the real world, and a pair of stereo headphones with the function to give users awareness of the environment.
- Immersive rooms that represent an alternative to head-mounted screens, lists of areas that contain special projections, and tours that turn walls into exhibits. This highly advanced room also contains an array of specialized sensors that can track people inside, thus moving the projected images according to their movement.
- Data gloves that are used to give people the ability to interact with the virtual object objects that make the experience more realistic. This technology involves very sophisticated sensing strapping on ordinary gloves [2].

For the Virtual Job Fair project, it has been thought and designed to be supported by VR equipment such as Vive, Rift, Windows Mixed Reality, Daydream, Gear VR, Cardboard, Oculus Go, and 360° equipment with a rendering quality on midrange equipment up to 90 fps and high-end equipment up to 120 fps. On the software side, the use of the A-Frame platform has been implemented, which is supported by Supermedium, Firefox, Oculus Browser, Samsung Internet, Microsoft Edge, Chrome, Exokit, Safari for iOS, Chrome for Android, Firefox for iOS, and UC Browser (Fig. 1).

Fig. 1 Compatible virtual reality equipment

3 A-Frame

A-Frame is a framework for creating virtual reality (VR) experiences. A-Frame is based on HTML, which simplifies getting started. But A-Frame is not just a 3D scene graph or markup language; the core is a powerful entity-component framework that provides a declarative, extensible, and composable structure to Three.js.

Originally conceived within Mozilla and now maintained by A-Frame's co-creators within Supermedium, A-Frame was developed to be an easy yet powerful way to develop virtual reality content. As a stand-alone open-source project, A-Frame has grown into one of the largest virtual reality communities.

A-Frame is compatible with most VR headsets like Vive, Rift, Windows Mixed Reality, Daydream, Gear VR, Cardboard, and Oculus Go and can even be used for augmented reality. Although A-Frame supports the full spectrum, A-Frame aims to define fully immersive interactive VR experiences that go beyond basic 360° content, making full use of positional tracking and controllers [3] (Fig. 2).

4 Implementation of 3D

The use of 3D (three-dimensional representation of geometric data) has wide implementations both within the industry and in the research area; based on this,

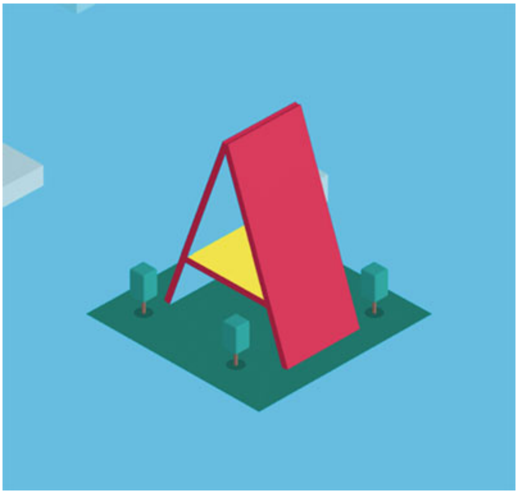

Fig. 2 A-Frame framework photo credits: https://aframe.io/

the 3D department of the Faculty of Mechanical and Electrical Engineering was given the task of carrying out the design and rendering of the images of the faculty as well as the complete design of the stands that will house the different affiliated companies. This implementation is made up of several fundamental factors; among them are architecture, physics, electronics, and multimedia.

4.1 Architecture

The creation of 3D models is something that in the professional architecture area is essential to represent structures or buildings in order to visualize and have the possibility of considering whether what is planned requires any change or not.

4.2 Physics

Within this area, it is possible to create assets which can be used to emulate an object in real life, in order to carry out simulations, such as experimenting with how aerodynamic an object can be.

Fig. 3 School area rendered by the 3D department for the implementation of the Virtual Work Fair 2020

4.3 Electronics

Since 3D printing has become accessible to the specialized 3D modeling public, the generation of plastic parts has become common for electronics projects where it is necessary to generate original or unusual parts.

4.4 Multimedia

3D is a tool that is increasingly used in all fields of multimedia, certain things that may seem real many times tend to be 3D models which with techniques and special effects give the impression that they are really there, and this is highly useful for when you need to generate something that is not easy to have or generate either in real life or in 2D animation, so the use of 3D is increasingly common in advertising, cinema, and animations [4] (Figs. 3 and 4).

5 Virtual Experience

AQ1 A fundamental part to implement the virtual experience is the framework where the renders, videos, laboratories, and main events are hosted. For this, the use of Bootstrap was implemented, which is basically an open-source multiplatform library; its handling implies the use of HTML and CSS, which makes it an extremely easy tool to use. There are some free templates which can be manipulated at the user's convenience, in combination with a specific model that includes the kind of

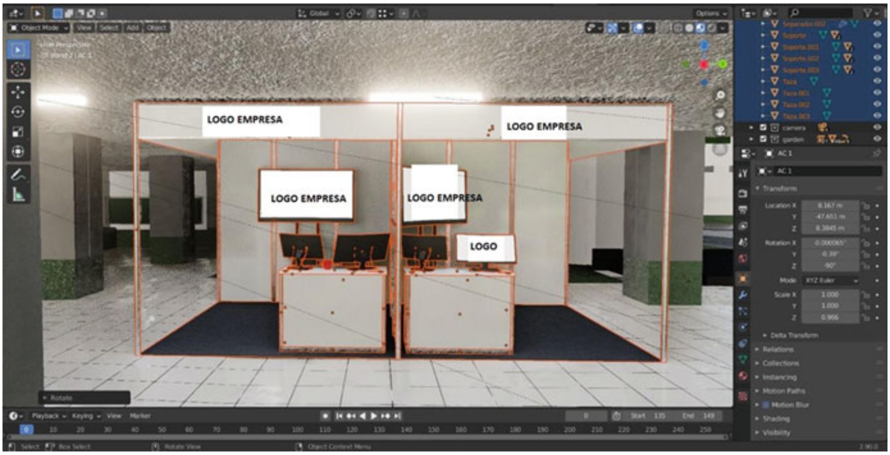

Fig. 4 Stands of the companies made by the 3D department for the implementation of the Virtual Work Fair

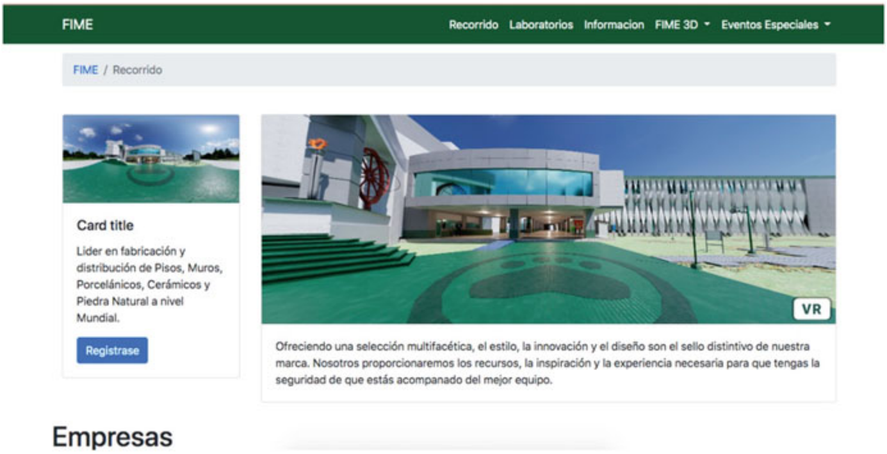

Fig. 5 Implementation of the VR experience in Bootstrap

interaction that will be required based on VR games for health interaction research [5] (Fig. 5).

6 Unity 3D

At the time of planning the job fair project, several proposals were made to carry it out; before entering A-Frame, the first option that emerged was Unity 3D because it is a platform with which many collaborators are already familiar and it is an

Fig. 6 Microsoft development platform for 3D projects

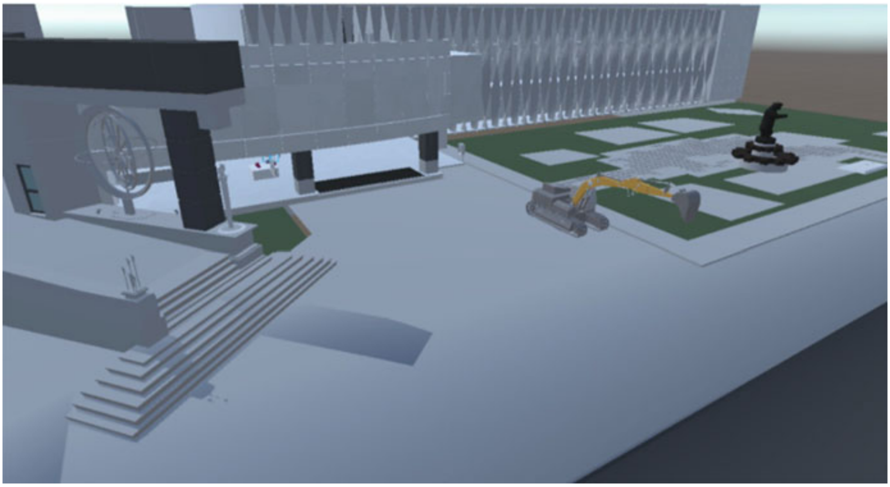

Fig. 7 Image of the project in the Unity 3D version

extremely powerful development engine that enables the creation, design, and operation of a fully interactive environment for the user.

One of its main features that makes Unity 3D stand out is that it supports the export of a large number of platforms apart from being supported by operating systems such as Windows, macOS, and Linux Experimental. For the virtual fair, version 2018.3.8 was used, which asks for basic requirements such as Windows 10, Google Chrome, or, where appropriate, Mozilla Firefox and to have a graphic card of at least 1 GB (Figs. 6 and 7).

7 A-Frame vs. Unity

At both platforms, a methodology to know the estimation of effort [6] to build the VR project. When creating virtual reality projects, there are various tools; for the Virtual Job Fair, two were considered, Unity 3D and A-Frame. After a search in the comparison with both tools, the following conclusion was reached: Unity is a powerful tool and A-Frame is a fast tool. Unity is a complete engine to develop games, movies, and virtual experiences as it has been done with the job fair to the point of being at the level of the large video game companies and movie studios. Some advantages of this tool are that it is considered that once you understand the

Fig. 8 Comparison between Unity and A-Frame

jargon and usability, you can create anything. It already contains many premade elements, animations, and motion systems, and if they do not exist, they can be created using C#. Some of the cons are that because it is such a powerful tool, this implies that it is an extremely heavy tool, even making compilations much larger than really necessary, and the processing power to run and load the compilations is not reasonable for the result obtained. For a computer with sufficient resources or a video game console, this may not represent a problem, but when considering it in a mobile environment, the results will not be the most optimal.

On the other hand, A-Frame is a complete, light, fast tool with compilation sizes that will not affect RAM using JavaScript.

The cons of A-Frame is that it is not as flexible as Unity; this is because Unity is a game engine with extensive potential where a combination of script and integrated components is made; on the other hand, A-Frame is a library of JavaScript (Fig. 8).

> A Virtual Reality experience is worth more than a thousand images. (Carlos Fernández (Iberdrola, SA))

8 Conclusions

Currently, there may be thousands of tools that fit our needs [7, 8], some more powerful, some faster and lighter; in the cases that we study, we consider Unity 3D and A-Frame as two main keys for the development of virtual environments; on the side of Unity is the extensive usability, in which if you know how to handle it correctly, you can design any element you imagine; on the other hand, there is A-Frame, a tool perhaps not so powerful but that offers a great virtual experience, great adaptation, and, most importantly, a great compatibility so that practically any user can have an experience in virtual reality without needing teams with large resources. The findings at this approach help to support a next research where the uses of these platforms could be used in other virtual environment experiences as industrial areas [9], or tourism sector [10], to look for their virtual workforce.

9 Remarks

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