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# Virtual &Augmented Reality Museum on Renewable Energy

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***Abstract:*** *Virtual reality (VR) technology is now widely used in the fields of Science, Technology, Engineering, and Mathematics (STEM). The virtual reality (VR) interface is a new computer interface that is distinguished by high levels of immersion, trustworthiness, and interaction. This paper to discuss the Design Virtual & Augmented Reality Museum on Renewable Energy. The motivations depend on the gap research of integrated between Design Virtual Reality and Renewable Energy. The objectives are: Analysis Virtual & Augmented Reality Museum on Renewable Energy (Conceptual, logical and physical model for solar, wind and biomass energy museum), Designdatabase of Virtual & Augmented Reality Museum on Renewable Energy, and implementation Virtual & Augmented Reality Museum on Renewable Energy.The importance's are: Exploration, New Playing Experiences, Job Precise Training, and Comfort. The methodologies are three phases (Analysis, Design, and implementation). Renewable energy businesses are implementing various forms of virtual reality, primarily virtual tours and virtual meeting rooms, to improve engagement with prospects and solar, wind and biomass business modules. So, with so many options available in VR, it is up to us to figure out how to use it to our advantage. The Future of Virtual Reality is No single form of VR will transform the world on its own. As a whole, however, the technology's applications hold the potential to be one of the most disruptive concepts in the years to come. VR will become a standard practice in nearly every sphere, Specially renewable energy companies .Through virtual reality museums for renewable energy, education, experiments, marketing and other advantages of virtual reality environments can be achieved.*

**Keywords:** Semi immersive VR, Fully immersive VR, Non-immersive VR, Augmented Reality, Collaborative VR, Mixed Reality

## 1. Introduction

Virtual reality (VR) technology is now widely used in the fields of Science, Technology, Engineering, and Mathematics (STEM). The virtual reality (VR) interface is a new computer interface that is distinguished by high levels of immersion, trustworthiness, and interaction. VR has emerged as one of the most important technologies to be discussed in terms of its applications, usage, and various types that can achieve significant benefits in the real world. Virtual reality is a natural extension of 3D computer graphics, which also includes 3D manufacturing and design tools for creating and designing computer-aided engineering. Virtual reality (VR) allows many learners or trainees to simulate the real world in most learning environments. The benefits of this technology frequently start with computer graphics and last a long time. Virtual Reality (VR) has been used as education tools for some time in applied fields such as aviation and medical imaging, and it has also been used in schools and colleges in the recent years [1].One of the main reasons why VR has been used for educational and training purposes is the support of high interactivity and the abilities to present a virtual environment that resembles the real world. With this technology, learners can explore and manipulate three-dimensional (3-D) interactive environment. However, VR is just an educational tool which can be used to support learning, which might not work for all kind of learning [2].The objectives are : Analysis Virtual & Augmented Reality Museum on Renewable Energy, Designdatabase of Virtual & Augmented Reality Museum on Renewable Energy, and implementation Virtual & Augmented Reality Museum on Renewable Energy.The importance's are: Exploration, New Playing Experiences, Job Precise Training, and Comfort.

## 2. Literature Review

**There are many research discuss the visual reality technology and applications as "Augmented reality technologies, systems and applications" [3]:**This paper surveys the current state-of-the-art of technology, systems and applications in Augmented Reality. "Virtual **reality in tourism: a state-of-the-art review" [4]:**the purpose of this study is to analyses VR research in tourism and to provide a comprehensive state-of-the-art review. "Virtual **museums, a survey and some issues for consideration" [5]. "A survey of multisensory VR and AR applications for cultural heritage" [6]:** this paper presents a systematic review of technological multisensory applications in cultural heritage. Thus, the collected and analyzed data, focused on technologies used, purpose of the experience, stimuli explored, evaluation process, main findings obtained, and limitations found, will provide valuable information for further implementations. " **SHREC 2021: Retrieval of cultural heritage objects" [7] : T**his paper presents the methods and results of the SHREC'21 track on a dataset of cultural heritage (CH) objects. "**Virtual reality-based digitisation for endangered heritage sites: Theoretical framework and application" [8] :** this study applied a qualitative longitudinal method to present the steps required to collect the data, develop a narrative-based framework and interactively present it via the VR project. " **Augmented reality in the tourism industry: A multi-stakeholder analysis of museums" [9]. " A Review of Using Virtual Reality for Learning" [10] :** This paper reviews types of VR that have been used forlearning, the theoretical framework for a VR learning environment, and instructional design for VR-based learning environment. Further research is suggestedfor VR-based learning

environment. Also [11], also there are many paper to discuss geospatial area [12],[13],[14],[15],[16],[17],[18],[19],[20],[21],[22],[23],[24].[25].-[26],[27],[28],[29],[30].[31],[32],[33],[34],[35],[36],[37], [38],[39],[40]. me be to help us to integrate the geospatial and virtual reality in the future research.

## 3. Background

### 3.1. Type of Virtual Reality Museum

Here are sex types of virtual reality that are shaping the future [41].

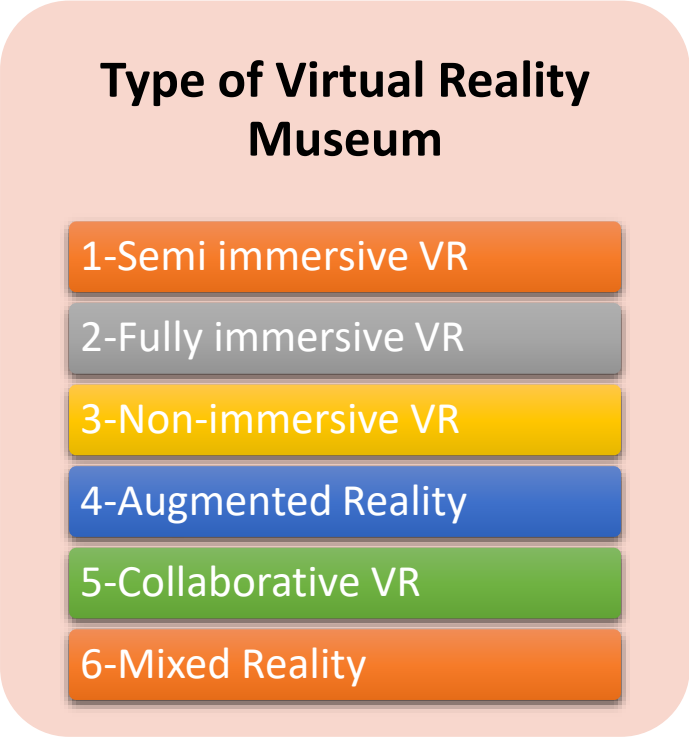


Figure 1: Type of Virtual Reality Museum

Table 1 : Type of Virtual Reality Museum

| | |
|---|---|
| 3.1.1. Semi immersive VR | A system that gives the users a feeling of being at least slightly immersive by a virtual environment [42] where users remain aware of their real world. |
| 3.1.2. Fully immersive VR | A system that uses special hardware where users are completely isolated from the physical world outside, to fully immerse in the virtual environment. |
| 3.1.3. Non-immersive VR | A computer-based virtual experience in which you can control some characters or activities within the software but the environment does not interact with you directly. |
| 3.1.4. Augmented Reality | A system where users can have access to a combination of VR and real-word attributes by incorporating computer graphics objects into real world sceneIt is also known as Mixed Reality. |
| 3.1.5. Collaborative VR | A type of virtual world in which people from various locations can interact within a virtual environment, usually in the form of 3D or projected characters. |
| 3.1.6. Mixed Reality | One of the most recent advances in VR (MR). In that it combines virtual and real elements, MR is similar to AR. In contrast to AR, the virtual components in MR interact with the real world, resulting in a genuinely affected VR experience. |

### 3.2. Uses of Virtual Reality

There are:Virtual Reality in Energy& Science, Virtual Reality in Society,Fashionand Tourism, Virtual Reality in Media& Transportation, Virtual Reality in Intelligent, Virtual Reality in Environment, Virtual Reality in Military& Politics , Virtual Reality in Mental Health

### 3.3. Virtual Reality and Augmented Reality

Virtual reality (VR) is an all-enveloping artificial and fully immersive experience that obscures the natural world. Augmented reality (AR) enhances users' real-world views with digital overlays that incorporate artificial objects.VR creates synthetic environments through sensory stimuli. Users' actions impact, at least partially, what occurs in the computer-generated environment? Digital environments reflect real places and exist apart from current physical reality.In AR, the real world is viewed directly or via a device such as a camera to create a visual and adds to that vision with computer-generated inputs such as still graphics, audio or video. AR is different from VR because it adds to the real-world experience rather than creating a new experience from scratch.

## 4. Material and methods

The VR process combines hardware and software to create immersive experiences that "fool" the eye and brain. Hardware supports sensory stimulation and simulation such as sounds, touch, smell or heat intensity, while software creates the rendered virtual environment.

### 4.1. Phase (1): Analysis

The first phase is analysis.

#### 4.1.1. Data & Information

Virtual & Augmented Reality Museum on Renewable Energy data(solar museum data, wind museum data, and biomass museum data).

#### 4.1.2. Hardware

Special hardware such as gloves, suits and high-end computer systems might be needed in immersive VR environment. Lately, VR computer simulation has been defined as a highly interactive, 3-D computer generated program in a multimedia environment which provides the effect of immersion to the users [43]. Virtual reality hardware includes sensory accessories such as controllers, as well as headsets, hand trackers, treadmills and, for creators, 3D cameras.A VR headset is a head-mounted device, such as goggles. A VR headset is a visual screen or display. Headsets often include state-of-the-art sound, eye or head motion-tracking sensors or cameras. There are three main types of headsets: PC-Based VR Headsets, Standalone VR Headsets, and Mobile Headsets. VR accessories are hardware products that facilitate VR technology. New devices are always in development to improve the immersive experience. Today's accessories include the 3D mouse, optical trackers, wired gloves, motion controllers, bodysuits, treadmills, and even smelling devices. These are some of the accessories used today in VR: 3D Mouse, Optical Trackers, Wired Gloves, Motion Controllers, Omnidirectional Treadmills (ODTs), Smelling Devices.

#### 4.1.3. Software

Developers use various software to build VR. They include VR software development kits, visualization software, content management, game engines, social platforms, and training simulators.

### 4.2. Phase (2): Design

We design Virtual RealityRenewable energy museum model as Virtual RealityRenewable energy museum Conceptual model, Virtual RealityRenewable energy museum Logical model, and Virtual RealityRenewable energy museum physical model.

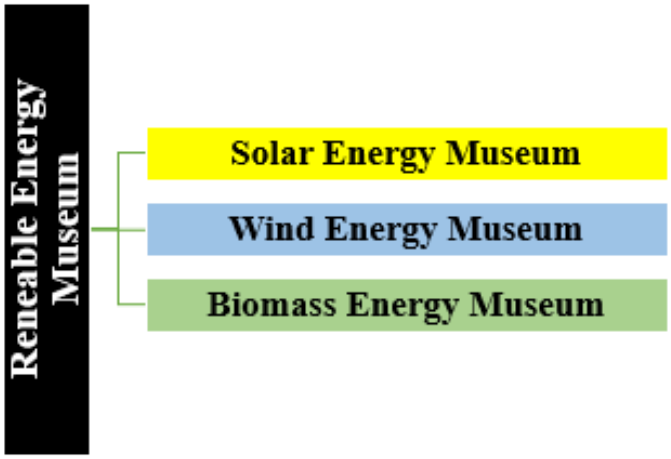


**Figure 2**: Virtual Reality Renewable Energy Museum

Also, Build Renewable Energy Museum database.

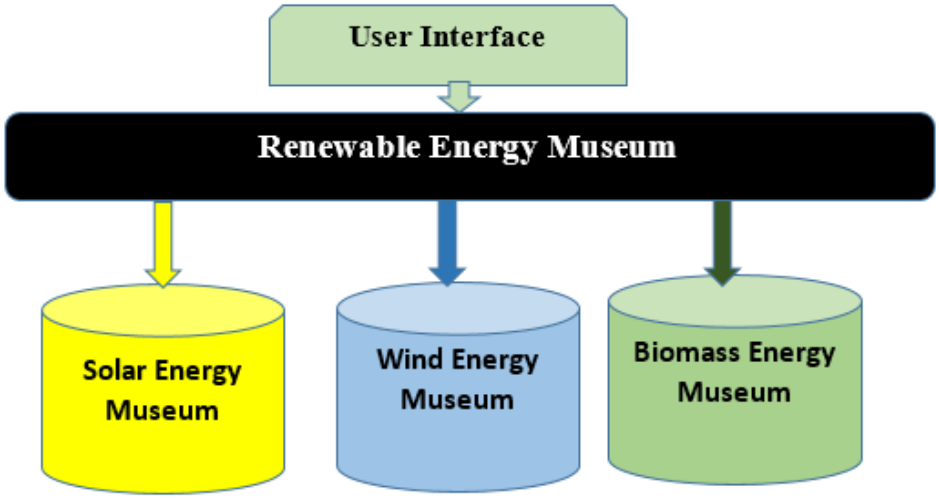


**Figure 3**: Virtual Reality Renewable Energy Museum database

### 4.3. Phase (3): Implementation

There are a number of methods to generate a non-immersive virtual environment on a personal computer. Web3D open standards, such as X3D (eXtensible 3D Graphics) and VRML (Virtual Reality Modeling Language) are used to generate 3-D interactive graphical representations that can be delivered over the World Wide Web [44], [45]. VRML provides a language that integrates 3D graphics, 2D graphics, and text.

## 5. Conclusion

Renewable energy businesses are implementing various forms of virtual reality, primarily virtual tours and virtual meeting rooms, to improve engagement with prospects and solar, wind and biomass business modules. So, with so many options available in VR, it is up to us to figure out how to use it to our advantage.

The Future of Virtual Reality is No single form of VR will transform the world on its own. As a whole, however, the technology's applications hold the potential to be one of the most disruptive concepts in the years to come. VR will become a standard practice in nearly every sphere, Specially renewable energy companies .Through virtual reality museums for renewable energy, education, experiments, marketing and other advantages of virtual reality environments can be achieved

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