RESPONSIVE EARTH OBSERVATION & SPACE MUSEUM APPLICATION

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Abstract - *Nagpur Earth Observation (EO) is the gathering of information about planet Earth's physical, chemical and biological systems via remote sensing technologies supplemented by earth surveying techniques, encompassing the collection, analysis and presentation of data. Earth Observation is used to monitor and assess the status of, and changes in, the natural environment and the built environment. In recent years, Earth Observation has become technologically increasingly sophisticated. It has also become more important due to the dramatic impact that modern human civilization is having on the planet Earth, and the need to minimize negative impacts along with the opportunities Earth observation provides to improve social and economic well-being.*

The Space Museum is the collection of space crafts, air crafts, satellites and other celestial bodies.

These two systems will be implemented using virtual reality and augmented reality for developing an effective system.

***Key Words*: Responsive Earth Observation and Space Museum Application**

1. INTRODUCTION

1.1 Earth Observation

The term Earth observation is used in two ways, leading to confusion. In Europe, in particular, it has often been used to refer to satellite-based remote sensing, but the term is also used to refer to any form of observations of the Earth system, including in situ and airborne observations, for example. The Group on Earth Observations, which has over 100 member countries and over 100 participating organizations, uses EO in this broader sense. To add to the confusion, in the US, for example, the term remote sensing is often used to refer to satellite-based remote sensing, but sometimes used more broadly for observations using any form of remote sensing technology, including airborne sensors and even ground-based sensors such as cameras. Perhaps the least ambiguous term to use for satellite-based sensors is satellite remote sensing, or SRS, an acronym which is gradually starting to appear in the literature.

1.2 Space Museum

Space museum holds the largest collection of historic aircraft and spacecraft in the world. The National Air and Space Museum is a center for research into the history and science of aviation and spaceflight, as well as planetary science and terrestrial geology and geophysics. Almost all space and aircraft on display are originals or the original backup craft.

1.3 Virtual Reality

Virtual Reality (VR) is a computer technology that uses Virtual reality headsets, sometimes in combination with physical spaces or multi-projected environments, to generate realistic images, sounds and other sensations that simulate a user's physical presence in a virtual or imaginary environment. A person using virtual reality equipment is able to "look around" the artificial world, and with high quality VR move about in it and interact with virtual features or items. VR headsets are head-mounted goggles with a screen in front of the eyes. Programs may include audio and sounds through speakers or headphones.

1.4 Augmented Reality

Augmented reality (AR) is a live direct or indirect view of a physical, real-world environment whose elements are "augmented" by computer-generated sensory input such as sound, video, graphics or GPS data. It is related to a more general concept called computer-mediated reality, in which a view of reality is modified (possibly even diminished rather than augmented) by a computer. Augmented reality enhances one's current perception of reality, whereas in contrast, virtual reality replaces the real world with a simulated one. Augmentation techniques are typically performed in real time and in semantic context with environmental elements, such as overlaying supplemental information like scores over a live video feed of a sporting event.

1. Project Module

This project contains two main module i.e. Earth observation and Space museum.

1.1. Earth Observation

In the first module we will create a user-interactive environment and this will help user to acquire knowledge about Earth in various forms as mention in its components. There are four components i.e. images, videos, AR model, animated videos. Images contain

various types of images that are captured from satellite which shows the different information about earth. Videos contains VR videos of earth.AR model contains AR 3D model of earth. Animated videos contain animate description of earth. This will provide unique experience to individual user to understand and learn in a better manner.

1.2. Space Museum

In the second module we will create a virtual space museum which contains all the information about space museum exhibits. This module also contains four components i.e. images, videos, AR model, animated videos but for space museum. Images contain various types of images that are captured from satellite which shows the different information about space. Videos contains VR videos of space museum .AR model contains AR 3D model of satellite. Animated videos contain animate description of space museum.

2. Implementation

360 degree video:
360-degree videos, also known as immersive videos or spherical videos are video recordings where a view in every direction is recorded at the same time, shot using an Omni-directional camera or a collection of cameras. During playback the viewer has control of the viewing direction like a panorama.

360-degree video is typically recorded using either a special rig of multiple cameras, or using a dedicated camera that contains multiple camera lenses embedded into the device, and filming overlapping angles simultaneously. Through a method known as video stitching, this separate footage is merged together into one spherical video piece, and the color and contrast of each shot is calibrated to be consistent with the others. This process is done either by the camera itself, or using specialized video editing software that can analyze common visuals and audio to synchronize and link the different camera feeds together. Generally, the only area that cannot be viewed is the view toward the camera support.

360-degree video is typically formatted in an equirectangular projection and is either monoscopic, with one image directed to both eyes, or stereoscopic, viewed as two distinct images directed individually to each eye for a 3D effect. Due to this projection and stitching, equirectangular video exhibits a lower quality in the middle of the image than at the top and bottom specialized Omni-directional cameras and rigs have been developed for the purpose of filming 360-degree video.
UI implementation:

CSS is used to control the style of a web document in a simple and easy way.CSS is the acronym for "Cascading Style Sheet". CSS is a language that describes the style of an HTML document.CSS describes how HTML elements should be displayed. CSS saves a lot of work. It can control the layout of multiple web pages all at once.

2. 1. Working of Application

This is an educational type of application, which contain all type of information related to earth observation and space museum.

This application contains two modules i.e. Earth observation and space museum. As soon as user opens this application first page will appear which contain two buttons, first button is of Earth observation and second button is of Space museum.

2. 1.1. Earth Observation Module

1. Images.
2. Videos.
3. Animated Videos.
4. AR 3-D Model.

1) **Images**: In this module, it contain various types of images that are captured from satellite which shows the different information about earth.
2) **Videos**: In this module, Videos contains VR videos of earth.
3) **Animated Videos**: In this module, Animated videos contain animate description of earth
4) **AR 3-D Model:** In this module, AR model contains AR 3D model of earth.

2. 1.2. Space Museum

1. Images.
2. Videos.
3. Animated Videos.
4. AR 3-D Model.

1) **Images**: This module consists of various types of images that are captured from satellite which shows the different information about space.
2) **Videos**: This module consists of Videos contains VR videos of space.
3) **Animated Videos**: This module consists of Animated videos contain animate description of space.
4) **AR 3-D Model:** This module consists of AR model contains AR 3D model of earth.

3. Future Scope

The Future Scope Of The Project Would Be:

There is scope for future development of this project. The world of computer fields is not static, it is always subject to be dynamic. The technology which is famous today becomes outdated the very next day. To keep abstract of

technical improvements, the system may be further referred. So, it is not concluded. Yet it will improve with further enhancements.

Enhancements can be done in an efficient manner. We can even update the same with further modification establishment and can be integrated with modification. Thus the project is flexible and can be updated at anytime with more advanced features.

CONCLUSION

It is concluded that the application works well and satisfy the end users. This system is user friendly so everyone can use easily. Proper documentation is provided.

The end user can easily understand how the whole system is implemented by going through the documentation. The system is tested, implemented and the performance is found to be satisfactory. All necessary output is generated. Further enhancements can be made to the application, so that the application functions very attractive and useful manner than the present one.

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