

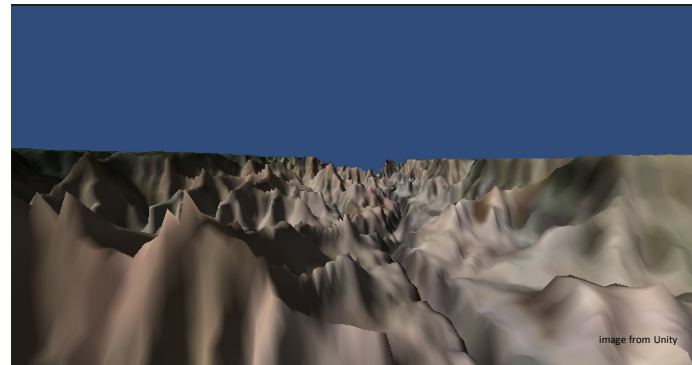
# Virtualizing the Real-World for Environmental Education using the Oculus Rift

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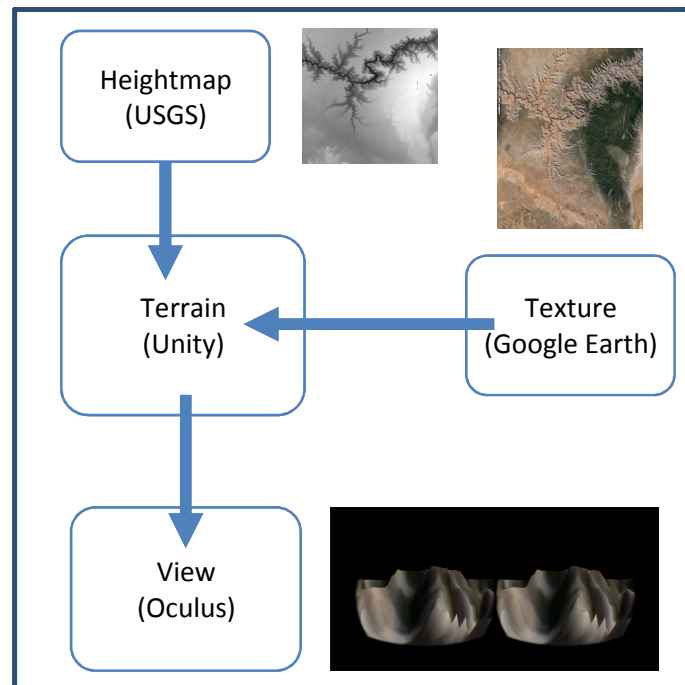
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## Abstract

A lack of local accessibility and availability of real-world environmental sites is a significant problem for engaging students and the public in fields such as geology. In this project we are investigating whether 3D virtual reality tools and real-world geographic data can be used to create authentic, interactive environmental education experiences. This project undertakes the task by recreating real world environments in a virtual setting using the Unity 3D engine and Oculus Rift. The Oculus Rift has received wide attention as one of the first pieces of hardware capable of producing authentic virtual reality experiences. We demonstrate the potential of this device for environmental education by rendering topographic data of the Grand Canyon provided by the United States Geological Survey. Using the Oculus Rift, a user is able to fly through the Canyon on a virtual tour designed to highlight geologic features of interest. In addition to observing the topography of the Canyon, it is also possible to augment the scene with aerial photos and supplemental data (such as layering the landscape with geologic maps). As a result, users obtain a unique experience that links the sensation of observing real geography with educational content in a way that could not be achieved in the real world. Development of environmental applications for emerging virtual reality tools is therefore likely to improve learning opportunities in environmental education, particularly for those that would otherwise not have the opportunity to experience real-world environments in person or in situations where concepts could not be communicated effectively in the field.



Simulated View of the Grand Canyon in Unity



## Methods & Materials

preliminary setup of Oculus and Unity  
search for available data sets  
render data in Unity  
create introductory visualization of The Grand Canyon  
search for higher resolution data

current status  
flyover model in Unity using Oculus Rift

introduction of user position movement  
develop a recreatable workflow  
create a graphic user interface



The Oculus Rift DK1 has medium resolution displays, one for each eye, and completely separates the images of the left and right eye.



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