

FireVizVR

Multidimensional wildfire data visualization in virtual reality

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Target User Group And Problem Statement

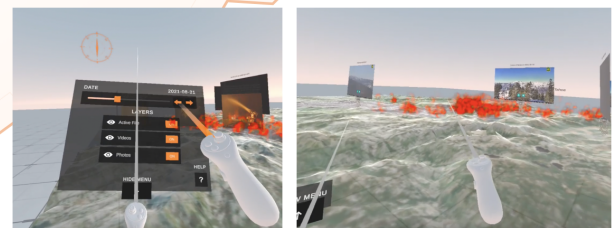
FireVizVR aims to help people understand the spread of wildfire in an immediate way via a virtual reality (VR) application. The application can assist in informing the public on the severity of wildfires. Wildfires are an integral part of natural ecosystems. However, wildfires cause destruction to life, climate, and the economy, especially when they spread rapidly and unpredictably. The recent climate change trend has made the wildfires more common and more severe. Therefore, it is important to design a solution that could educate people on the destructive capabilities of wildfires and streamline the planning and preparation of each wildfire season.



Historical photographs of the Caldor Fire in August 2021 (image credit: The Atlantic)

Solution Overview

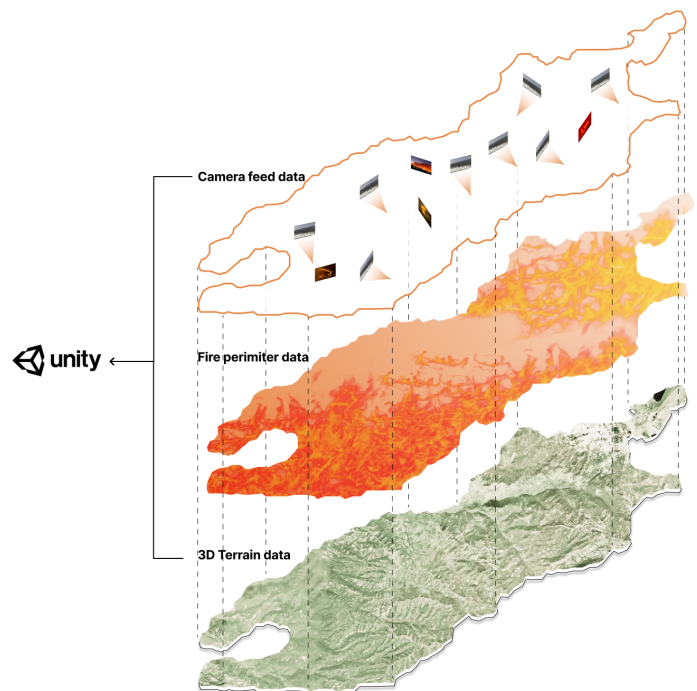
FireVizVR is a virtual reality (VR) application that visualizes the spread of wildfire and integrates relevant data into one tool. The aim of this project is to address the problem of reconstructing historical fire from publicly available data by visualizing its spread over time in the immersive medium of virtual reality. Our application combines multiple sources of publicly available fire data in a single VR experience for an immersive and interactive wildfire visualization. For the proof of concept, we focus on the Caldor Fire, which occurred in August 2021 in El Dorado county, California. The Caldor Fire was one of the largest fires recorded in California wildfire history. Hence, there was a large amount of data related to this fire. In the future, our application can extend to other wildfires given the requisite data.



Screen shots of FireVizVR controls (left) and map with videos (right)

Implementation Details

We integrated three components into the Unity application. First, we integrated the 3D Model generated in Blender. The terrain data came from OpenStreetMap and satellite image overlay came from Mapbox. We also computed a height map of the 3D terrain. Second, we integrated fire perimeter data. Third, we integrated video streams from lookout stations and photographs. We added fire particles and a time slider that shows the spread of the fire over time as well as relevant videos and photos based on the chosen day. We collected video data from the AlertWildfire website via a web scraper. We visualized the burnt areas using fire perimeters by shading the areas that fall inside the perimeter. Finally, the user interface attached to the left controller allows the player to adjust the scale and viewing angle of the map and select layers of information to display. The Help menu provides information on the details of available interactions.



Integration diagram of three disparate data sources of wildfire

