

An Interactive Mars Experience Using WebXR Technologies

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Abstract

This project aims to create an immersive experience set on the planet of Mars using WebXR technologies. To achieve this data gathered from research conducted by outside parties will be used to simulate the geography with which users can interact alongside commanding a virtual replica of a Mars Rover. This experience will focus on using the WebXR API's ability to support virtual reality environments

Declaration

I, Kyle Dick confirm that this work submitted for assessment is my own and is expressed in my own words. Any uses made within it of the works of other authors in any form (e.g., ideas, equations, figures, text, tables, programs) are properly acknowledged at any point of their use. A list of the references employed is included.

Signed: Kyle Dick

Date: DATE OF SUBMISSION.

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Introduction

Background

Requirements Analysis

The project will be divided into several segments allocated to time periods.

The following “milestones” were used to plan the project timetable found later in the document.

Create a 3D environment which can be explored in virtual reality

The first milestone focuses on creating the basic foundations from which the rest of the project can be built upon.

This includes

- Object Loading
 - The act of loading in an asset for the explorable plane, this will initially be a flat simple geometry such as a long cuboid but in the final build will be a complex surface accurately representative of the martian surface.
- Lighting
 - Creating a lighting system where the origin can be manipulated.
 - This would simulate a day/night cycle for the environment.
- Mesh
 - Allow the user to be able to walk upon the plane and have their position transform accurate to the geometry of the mesh
- Interactive Elements
 - This will include sourcing a physics engine for the project to handle the user manipulating 3d objects in the virtual space
 - Examples of this in the final build would be the user’s ability to pick up a rock from the surface and throw it where the trajectory is accurate to the martian environment.
- WebXR API integration
 - Connecting the user’s perception to a camera object within the virtual space.
 - This will allow the user to move within the virtual space and should account for motion sickness and the ability to fall back on the monitor output.

The end goal of this step will produce a featureless 3D environment from which it could be molded into one accurate to the martian environment.

Recreating Mars

This section of the project is focused on taking the foundation from the previous step and building upon it.

This includes

- Mapping martian texture to the terrain mesh
 - Sourcing accurate data that represents the different types of surfaces that can be found on the planet.
- Creating a skydome

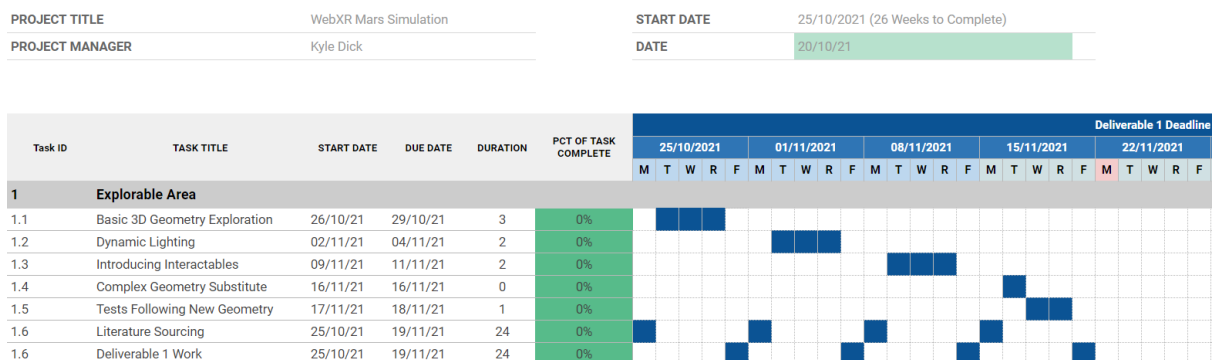
Design

Evaluation Strategy

Project Management

Project Timetable

Mars Gantt Chart



Risk Analysis

Consideration of Professional, Legal, Ethical and Social Issues