Forge API Project Requirements

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Abstract

Group 20 s project branches from an Autodesk prototype project called Vrok It, which is a simple web-based 3D model viewer and mobile virtual reality (VR) explorer. Group 20 s project will expand upon its ability to display uploaded 3D models in browser and in VR, and improve its accessibility. Conventionally, viewing 3D models in VR is a challenge if you have model files on many devices, or have a headset that only works in conjunction with a smartphone. Group 20 s project aims to do this by utilizing a web-based software that uses the features of the Autodesk Forge API. The project will also be expanded with new ideas and stretch goals as the project is developed.

SYSTEMS AND SOFTWARE REQUIREMENTS SPECIFICATION (SSRS) FOR

[Forge API Project]

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FORGE API PROJECT SSRS

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1 INTRODUCTION

The system being developed is intended to be a place in which users with CAD files can go and easily view those files in both a 3D and VR setting. This provides a solution to those who don't have access to expensive CAD programs or fancy VR headsets as it will be a free to use web services that is usable with entry level VR equipment. The intended user for this project is a person that would likely not experienced with CAD software and would not have access to software that supports CAD files.

1.1 SCOPE

The scope of this project includes developing new software solutions over the course of roughly 3 months. This software should allow for the upload of a 3D model file to be viewed in (browser?) and then also into a VR environment. Having a platform that allows for simple 3D viewing on screen into an transition to VR would allow many to have access to such functionality.

1.2 DEFINITIONS, ACRONYMS, AND ABBREVIATIONS

CAD: Computer Aided design is software used to design and view 3D models.

CAD file: The type of files that can be uploaded to the website for viewing in the large model viewer. We will narrow down what types of files can be used as we progress through the development process.

FORGE: A collection of CAD API services provided by Autodesk.

VR: Acronym for virtual reality, typically a peripheral device or smartphone

1.3 REFERENCES

Sources

https://developer.autodesk.com/

https://github.com/KeanW/vr-party

Vrok.it

2 OVERALL DESCRIPTION

2.1 PRODUCT PERSPECTIVE

The product would be building off the Vrok-It platform that has already been created. We would adding features to the product that will enhance the overall usability of the current system.

2.2 PRODUCT FUNCTIONS

1. The user is able to pick from a list of 3D models or upload one of their own CAD files.

2. once a model is chosen or a file is uploaded the 3D models will be seen in the large model viewer at the center of the website.

3. "Viewable" 3D models can be interacted with by the user in the large model viewer in multiple ways.

4. The user will have the ability to connect a smartphone to the website through the use of a QR scanner and web servers.

5. Once connected to a smartphone, the current model should be able to be viewed in VR with a the use of a VR headset such as Google Cardboard.

2.3 USER CHARACTERISTICS

When finished this product should be usable by anyone that has access to a CAD file. If the user is want to use the VR portion of the website then they will need access to some VR headset. If the user does have access to a VR headset they should not need any extra Knowledge other than how to use the headset.

2.4 SYSTEM LEVEL (NON-FUNCTIONAL) REQUIREMENTS

2.4.1 Software Interfaces

1. Interface between the computer and the website, for the uploading of CAD models from a user's hard drive into the website for viewing. Input will be CAD models while the output will be the website window in which the users model is displayed. 2. Interface between the website and the device the user wishes to view the model on. Currently vrok.it uses a QR code to accomplish this. Input is the QR code scanned by the phone, output is the manipulatable model in a environment for viewing. 3. User interface for viewing model on smartphone. Their phones touchscreen that gathers input and the output is the manipulation they make to the model.

2.4.2 User Interfaces

The main user interface will be the Vrok-It website in which the user will be able to upload a CAD model and then view it in the large model viewer at the center of the webpage. The user will be able interact with the model through use of their mouse. They will have options to rotate the model look at an exploded view of the model, along with other options.

3 SPECIFIC REQUIREMENTS

3.1 SYSTEM FEATURES

3.1.1 The ability for the user to upload a CAD file of Their choosing

3.1.1.1 Introduction/Purpose of this feature: This This will allow the user to be able to upload any CAD files in which they have access to the website.

3.1.1.2 **Input/Output sequence for this feature:** The user will select a file from their computer that they would like to upload to the website. After finishing the upload process the model that was in the file should be viewable on the website.

3.1.1.3 **Design constraints of this feature:** The file must be a CAD specific file and the user must have access to it on their machine.

3.1.1.4 **Performance requirements of this feature:** The file must be able to be uplaoded in a reasonable amount of time depending on the size of the file. This should take at most 1 minute.

3.1.1.5 **Detailed functional requirements of this feature:**

3.1.2 The user should be able to see and interact with their model

3.1.2.1 Introduction/Purpose of this feature: The user should be able to see the model that they have chosen or uploaded to the site in the large model viewer. They should also be able to interact with that model in the large model viewer.

3.1.2.2 **Input/Output sequence for this feature:** The user will chose from the list of predefined models or upload their own model. The model will now be view able in the large model viewer and the user should be able to interact with that model.

3.1.2.3 **Design constraints of this feature:** The must not be so large or detailed that the website can not render it.

3.1.2.4 **Performance requirements of this feature:** The model should be displayed in full in the large model viewer and should not be hard to interact with.

3.1.2.5 **Detailed functional requirements of this feature:**

3.1.3 User should be able to connect their device to the Vrok-It website through the use of a QR scanner

3.1.3.1 Introduction/Purpose of this feature: Connecting the phone to the Vrok-It website is needed so that the user will be able to view their model in a VR environment.

3.1.3.2 **Input/Output sequence for this feature:** The user scans the QR code on the website with a QR application on their phone. The model that is currently in the large model viewer on the website will now be displayed on the phone.

3.1.3.3 **Design constraints of this feature:** The user must have a smartphone that is capable of using a QR scanning application. The phone also has access to an Internet connection.

3.1.3.4 **Performance requirements of this feature:** The phone should be connected to the website within a few seconds. This might vary depending on how good of an Internet connection the user currently has.

3.1.3.5 **Detailed functional requirements of this feature:**

3.1.4 System feature 1: Hardware Detection

3.1.4.1 Introduction/Purpose of this feature: This feature serves as a way for the software to understand the hardware its being run on. This will be the foundation for giving a user feedback on potential experience viewing.

3.1.4.2 **Input/Output sequence for this feature:** The user connects their phone to Vrok-It through the use of a QR scanner. After connection it should verify what type of device that the user has connected.

3.1.4.3 **Design constraints of this feature:** Reliance on the user giving permission to allow the software to get information about hardware specifications. Similar to Androids permissions the user many not want to give information out so our hardware detection may be hindered and unable to function at all.

3.1.4.4 **Performance requirements of this feature:** Needs to be able to obtain hardware specification as fast as possible to give users feedback immediately. The sooner our software understands the user's hardware the faster it can give a recommendation about optimal viewing.

3.1.4.5 **Detailed functional requirements of this feature:**

3.1.5 A viewable model in VR

3.1.5.1 Introduction/Purpose of this feature: View the VR models on the user's device using peripherals such as Google Cardboard:

3.1.5.2 **Input/Output sequence for this feature:** A 3D CAD model / A VR Model displayed on the users device

3.1.5.3 **Design constraints of this feature:** Depends heavily on hardware on the device that the user is using. Devices with low end hardware will likely not be able to display models that are large or have a lot of detail very well

3.1.5.4 **Performance requirements of this feature:** The models need to be able to be viewed at a acceptable frames per second. 30FPS???

3.1.5.5 **Detailed functional requirements of this feature:**

3.1.6

3.1.6.1 Introduction/Purpose of this feature: In order to accommodate for new features, we would like to redesign the landing, and key interaction areas of the website. This will allow for more creative development as the project progresses, as well as improve the look of the project as a whole.

3.1.6.2 **Website source files and control. Output: An updated and structured web layout.:**

3.1.6.3 **Design constraints of this feature:** Must conform to client specification.

3.1.6.4 **Performance requirements of this feature:** The updated website must have similar performance(load times) to the original site.

3.1.6.5 **Detailed functional requirements of this feature:**

4 REQUIREMENTS TRACEABILITY/GANTT CHART