University of Ottawa

GNG 1103: Engineering Design

Project Deliverable B: Needs Identification and Problem Statement

Group members:

Name :	Student number :
Aidan Billou	(300199731)
Peter Lee	(300173633)
Noor Madhoun	(300162420)
Magtireh Mahad	(8866131)
Sarah Qadri	(300117201)

October 1, 2020

The construction industry is currently suffering from labour shortages due to a lack of new workers. The amount of construction workers retiring is much larger than the amount of construction workers left in the field. Increasing complexities in design and disruptive technologies are to blame. The construction industry remains one of the last fields that is behind in terms of technological advancements. Therefore, change is required to attract more workers as well as help improve the work process. It is our goal to devise a solution that will blend the innovation of technology and the creativity of construction. Our mission is to develop a VAR (virtual altered reality) technology that will make lifelike models accessible with the touch of a fingerprint. The product solution needs to incorporate specific needs of the product, buyer and user.

The most important need the client possesses is a functional and purposeful product. To create this, basic qualifications for it need to be met. Firstly, the software needs to be able to let the user see 3D Building Information Models (BIM) through either Virtual Reality or Augmented Reality. The main purpose for this product is to offer workers on site the capability to transform 2D models and sketches into a 3D model. The user will be able to remove layers and see the mechanical, structural, and electrical components. This characteristic is vital to the program as the people on site who are building a structure and want to refer back to the original design. The product will need to offer an easily accessible model for the workers to refer to. Vital information for the configuration of the building will need to be viewable from the program. Information such as wiring placement, plumbing, wall structure… all need to be visible and modifiable through the program to permit construction workers to better understand their work. This aspect of the program is increasingly important because being able to see the placement of different components gets rid of the ambiguity that exists when having to interpret 2D models done by someone else.

The second most important client need is exceptional user experience. The software has to offer easy and understandable training to new users as well as a descriptive user manual. The purpose of this is to facilitate the usage of the product and permit the user to have a quick familiarity with the software. The training can be provided through videos and interactive tutorials as well as the user manual itself. A good program is a program that can be easily understood and easily used, therefore, user friendliness is paramount to creating a successful and functioning program. The next most important need is the ability to be able to annotate directly onto the 3D Model. This let's the user better understand modifications to the initial sketch coming from the designer. This ability let's the user display modifiable dimensions of any object or area so they may get a clearer idea of what they may change or what needs to be changed in their surroundings.

Thirdly, the client requires an efficient and clean software to work off of. It needs to be open sourced and free for use to allow maximum reach and unlimited use. The ability to download the app for free from the IOS App Store or the Android Play Store would be beneficial

because most users are already familiar with this concept from their own personal devices, and they won't have to worry about licenses. Along with this, they will be able to modify the program themselves if needed.

This of course ties in with the user experience, accessibility to the app permits more usage and better experiences. The usage of headsets and remotes will be considered throughout the process, however their cost and maintenance issues will be taken into consideration for the user. In fact, these extra tools are expensive and can be considered as intrusive in an open work environment, however, they may also be useful in other situations. Therefore, their role in this program will be decided further along in the process. All the information, designs and models can be regularly updated and saved onto a cloud if the company decides to purchase the cloud package. In fact, the application itself will be free of charge as previously mentioned, however if people wish to save documents onto a shared cloud instead of directly onto their hard drive, for a specified amount of money, they can purchase a cloud. This permits corporation users to share their documents to many workers at a time and facilitate their work. For users on a non corporation scale, their work may be directly downloaded onto their hard drive free of charge but will not be saved on the cloud.

Lastly, the graphics need to be enough for the user to clearly understand what the real item looks like. This means that the program requires a simple but descriptive illustration for objects. The graphics will be a middle ground between quality and practicality. Therefore, the program will offer shortcuts for specific aspects such as materials that can be conveyed through colours.

In conclusion, the construction industry, more specifically, onsite worker users, need BIM accessible in the forms of VR or AR with an ability to see all parts of a model with ease. The company in charge of this project will decide whether this program is the solution that they are looking for, by verifying their needs such as: accommodation for user experience by the means of well structured manual, accessibility in self-sufficient apps in terms of cost and adaptivity, frequent updates, decent visual quality and opportunities for feedback. It will also be accessible everywhere both online and offline for corporations who purchase a cloud.