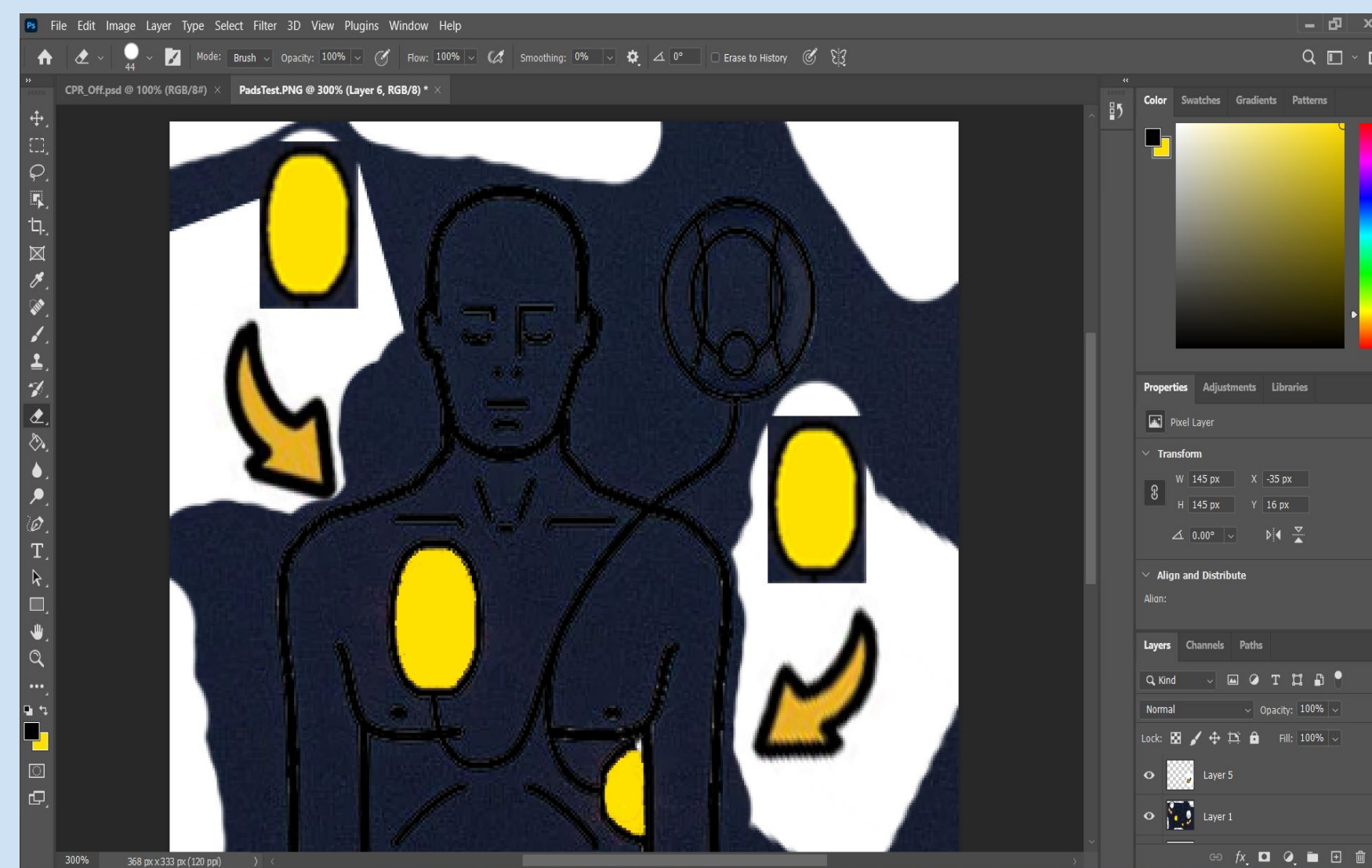# Automatic External Defibrillator Study

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Internship/Service Site

My capstone took place in the research study course, ENME488, where I worked under supervision of Professor Vaughn-Cooke, and technical lead, Janell Joyner, to research and develop an automatic external defibrillators simulation and measure the current effectiveness of civilian use.

Issue Confronting Site

The primary objective is to design a realistic and interactive training environment in which human subjects are allowed to interact with.

Due to COVID-19 restrictions, the simulation will be implemented on a web-based platform where CAD models will be designed and integrated into a Unity 3D gaming environment.

Once the web-based simulation is created, human interactivity with the AED will be measured and recorded.

Prior to designing and developing the simulation, FDA human factors and usability guidelines were read and documented to ensure the research and developmental phase is within standard procedure.

Impact

The study is based on the current public automatic external defibrillators on the U.S. market. There are approximately 6 companies that produce and sell commercial AEDs.

Defibrillators is a vital device for people undergoing life-threatening abnormal heart rhythms such as cardiac arrest. Majority of the public probably has seen or heard of the medical defibrillator in hospitals, where doctors use them to provide and electrical shock to the patient, in an attempt to reestablish heart rhythm.

However, the existence of automatic external defibrillators is less known to the public where everyday civilians has not seen nor know how to use an AED. The simulation aims to develop a training simulation to assess the performance and knowledge of users' capabilities with the studies' developed generic AED.

	A	AB	AC
1			
2			Location
3	Model	Inside	Outside
4	Phillips HeartStart Onsite	1	
5	Phillips HeartStart FRx		1
6	Philips FR2		1
7	Philips FR3		1
8	Powerheart G3 Plus	1	
9	Powerheart G3 Pro	1	
10	Powerheart G5	1	
11	LIFEPAK CR Plus	1	
12	LIFEPAK 1000		1
13	LIFEPAK 500		1
14	Zoll AED Plus		1
15	Zoll AED Pro		1

Activities

Researched the characteristics of AEDS on the U.S. market that contains approximately 16 devices with similar and distinct features depending on company.

Developed a relational database, based on the devices along with event-task tables and audio tables.

Designed and developed CAD models on Blender that represent a generic version of an AED based on the research. Applied 3D modeling/geometric techniques such as vertex/edge manipulation, bezier curves, gradients, 2D planes, etc.
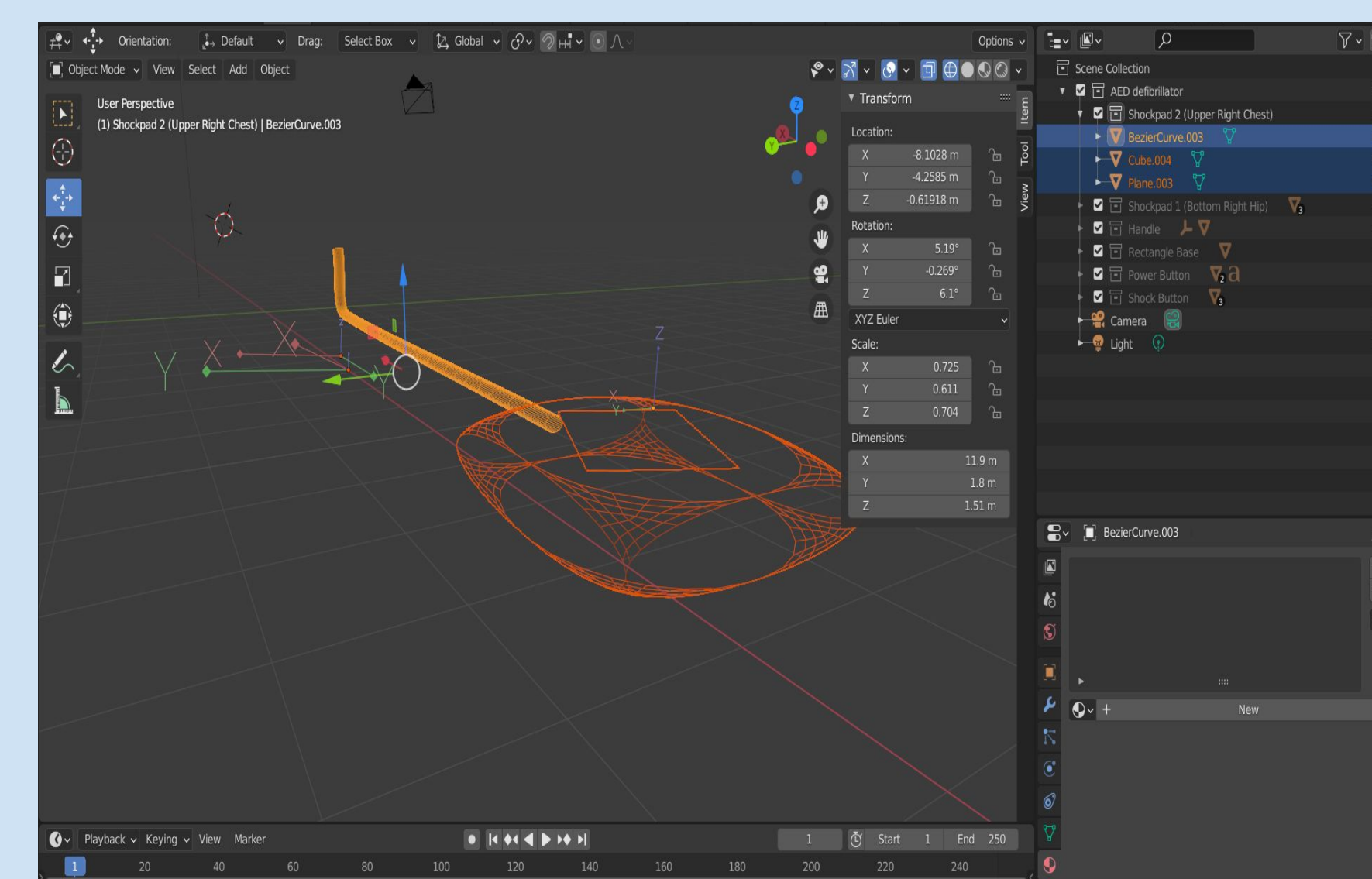
Created interaction points on the model to be then utilized in a Unity gaming environment.

Future work

My future goal is to work on more 3D design projects and manage implementations and workflow to create one cohesive product.

This project gave me the opportunity to hone my skills on CAD modelling, integration, and research which will bring me one step closer to my goals.

Acknowledgments

Would like to acknowledge my professor, Dr. Vaughn-Cooke as well as my mentor, Janell Joyner, and co-researcher Danyall Malik.