

Player Experience

During training the instructor will begin and setup the simulation. After that the player pauses to memorize the controls before pressing continue to start the pre-procedure preparations. The player begins just walking through the doors of the operation room with his/her instruments and equipment made ready by one of the nurses (I'm assuming it's a nurse). Picking up and observing the patient's chart informs the player what to expect as well as the tools necessary for the procedure. While checking the equipment the player realizes that the bed warmer isn't on and the nurse gathered the incorrect blade size. Flipping a switch and attaching the correct blade the player then signals that he/she is ready for the procedure to take place and a statistics screen appears. The player preformed the preparation successfully and thus is allow to continue to the procedure.

After a period of orientation in the virtual space, the player starts the intubation process. The screen will reflect the user's point of view (first person). As the player picks up the blade and focuses on the intubation process, the view will focus on the infant's airway. Maneuvering the blade the player feels resistance from the esophageal walls and tongue. With so much fluid in the way the player inserts a suction tube to increase visibility. Gentling moving the blade back and forth till eventually the trachea revealed the player then slowly inserts the intubation tube. Noticing that the belly of the infant is expanding the player removes the intubation tube and applies a bag mask to temporarily stabilize the patient heart rate. The screen is focus on the heart rate monitors at this time so the player knows when to start the intubation process over again. The user undertakes the same experience again, but inserts the intubation tube into the correct pathway causing the chest to inflate. The blade is removed and the statistics screen appears letting the player know that the score was not very high and ways to improve.

Programming Method

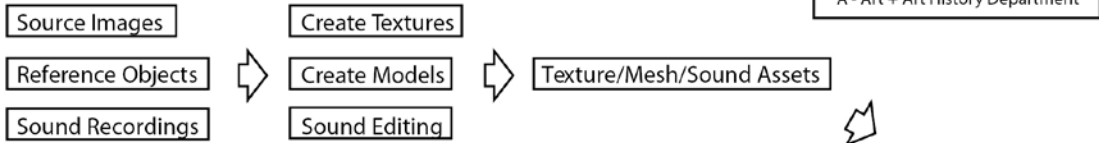
During the start screen the instructor sets variables directly or has the option to randomize them. These variables will be used at the beginning of the simulation to generate the infant for the procedure. Vitality, size, age, visibility, locomotion, airways (including abnormal), and other complications are also limited by the difficulty setting. So as the user advances through levels more dynamic and dire patients can be generated. Once the patient variables are chosen the equipment, instruments, and charts are prepared. Charts will be constantly correct, but equipment and tools have a chance of inaccuracy that need to be addressed by the user during the preparation portion of the simulation. Whether or not these issues are rectified determines not only the score on the statistics screen, but also the ability to progress onward to the procedure itself. At any time before the procedure the user may pause the simulation to memorize controls or quit.

When the procedure portion of the simulation begins the user's position is fixed, the option to pause is removed, and the haptic interface is swapped out for the main controller. With the force feedback and the deformation models developed by the Engineering department the user experiences realistic conditions. While maneuvering the blade, the motion from the infant and achieving the correct position to reveal the trachea is the challenge coordinated with the left hand haptic. The right hand haptic serves two purposes, during the positioning of the blade the user may insert a suction tube to clear visibility and after the trachea is in view used for insertion of the intubation tube.

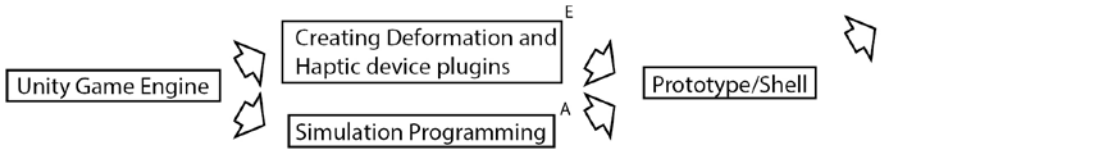
The main success factor of this simulation is the inserting the intubation tube into the trachea before the infant's heart rate drops below an unsafe level. If the heart rate is getting near this unsafe level the user may extract the blade and apply a bag mask to stabilize the patient before trying again. If the heart falls below an unsafe level an attendant is automatically called to replace the user and the simulation has been failed. If at any time during the operation the user feels as though they cannot complete the simulation successfully they may call upon an attendant to also end the simulation.

Pipeline FlowChart

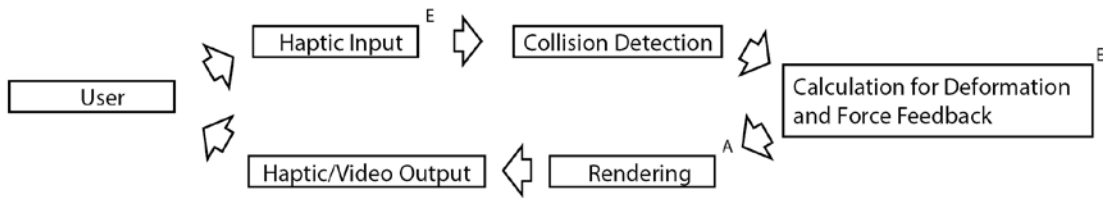
Database Pipeline ^A



Programming Pipeline



Realtime Simulation



Simulation FlowChart

