Spineducation iOS Application

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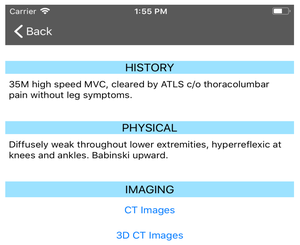
Case Studies

Within the cases section, the user selects a case and is directed to a page that contains the patient's general history, information from their physical examination, and links to the pre-op CT images. This information will help the user answer the upcoming multiple choice questions.

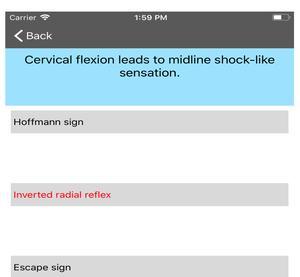


2D CT and MRI Images, and 3D Reconstructions

Spinal surgical cases often consist of 2D and 3D images saved after each patient undergoes CT or MRI scans; these are unique and valuable, and image manipulation software cannot design as realistic spinal deformity scans. Our team anonymizes the images and incorporate them into cases.

Multiple Choice Questions

The multiple choice questions quiz users on their knowledge. Users will see a question and 4 options. When selecting an answer, it will turn green if correct, or red if an incorrect answer while the correct answer turns green. The user will be able to immediately learn from their mistakes.



Softwares Used

For this project we made use of Blender, XCode, ARKit, PHP, Amazon's Web Services: RDS, MySQL, and MySQL workbench

Objectives

Our project aims to provide users with real clinical scenarios and multiple choice questions to prepare students for their medical exams and practise performing procedures in augmented reality.

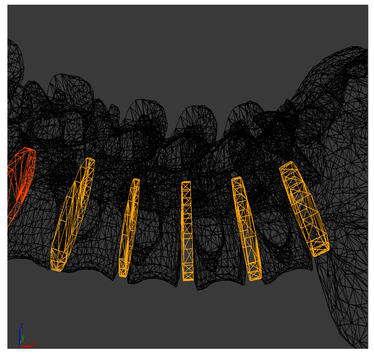
Target Audience

When it comes to hands-on experience, medical students have little opportunity to practice their skills in spinal surgery; as such the user of a medical application like ours would be provided tools to do so.

Special Thanks

We would like to thank Dr. Colby Oitment for the inspiration behind this project and the time he has dedicated.

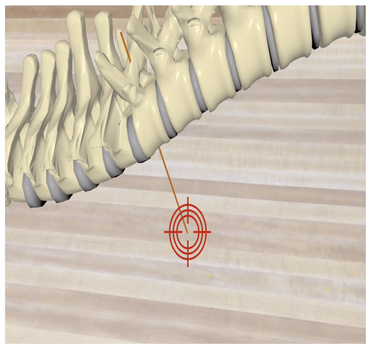
AR Surgery



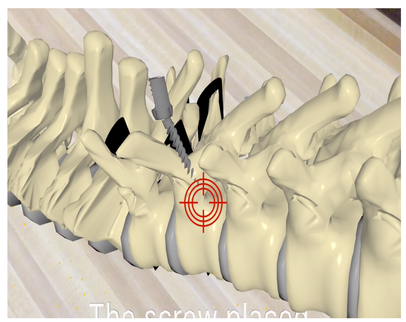
The augmented reality component of the application uses blender to texture and manipulate a 3D model of the spine, helping ensure that the spine that is superimposed in the user's environment has all necessary attributes to provide the most lifelike surgical experience.

Selecting Start Points and Trajectory

In order to simulate trajectory selection, when a pedicle start point is chosen, a line from the start point to the user appears; this allows the user to move the line according to the camera angle and select a trajectory with which they place the screw into the pedicle start point on the spine.



Placement of Screws



Afterwards, the screw is placed using the selected position and by calculating the rotation angle from the camera. If the placement of the screw is within the designated pedicle start point, then the screw has been placed successfully.

Future Work

In the future, this project can be extended to include additional medical cases, as well as performing augmented reality surgeries on spines with deformities.