Vineeta Khatuja, Andrew Wang, Tifany Yung
February 24, 2013
Team 9: Data Integration during Robotic Ultrasound-Guided Surgery
CIS II

Budget Proposal

Background

We plan to perform two trials to test the TilePro interface on the da Vinci robot console. Phase 1 will involve non-clinical testing of the stability and functionality of the baseline interface containing the live da Vinci camera feed, the live ultrasound image display, and the user interface console allowing the surgeon to access saved images. Andrew and Tifany will run tests on the interface in the mock OR for approximately one to two hours to check for the correct implementation and possible bugs of the interface. Phase 2 will involve testing of added functionalities, such as 3D lesion mapping and manipulable 3D organ models in the user interface by surgeons in a clinical setting. Intermediate stability checks will also be performed in the mock OR every time a new function is added to the interface in order to isolate any problems or incompatibility caused by the addition.

In the Phase 2 clinicial study, surgeons will be asked to perform basic tasks on a gelatin phantom liver using the da Vinci robot and the TilePro. These tasks include locating and identifying pseudolesions in the phantom liver. Depending on the actual number of surgeons enrolled in the studies, we are also considering lesion removal as a task to measure the minimization of skill differences between novice and expert surgeons. Questionnaires will be administered after the mock operation to gauge the surgeons' responses to the TilePro interface.

We also require usage of the da Vinci robot to re-design and develop the TilePro interface.

Expenses

We assume that the Mock OR and da Vinci robot cost $50/hr to use. We believe that we will enroll approximately 10 surgeons in each study.

During the Phase 1 non-clinical study, we believe that each surgeon will take no more than 2 hours in the OR. Phase 2 clinical studies will be conducted during procedures at the hospital, so mock OR funds will not be needed. One approximately 1.5 hours stability test session will be conducted for each functionality added; we estimate that, in addition to the baseline interface, we will have three functionalities from the maximum deliverables ready for the clinical testing.

We believe that interface development will require approximately 7 hours per week in the mock OR to develop the interface. However, since only the actual time spent using the da Vinci robot is counted towards the cost, we estimate that a maximum of 1.5 of the 7 hours is needed with the da Vinci per week to debug the interface.

Estimations

$$\text{Cost of usage for interface development} = \frac{1.5 \text{ hours}}{1 \text{ week}} * \frac{8 \text{ weeks}}{\text{semester}} * \frac{\$50}{1 \text{ hour}} = \$600$$

$$\text{Cost of Phase 1 study} = \frac{1.5 \text{ hours}}{1 \text{ session}} * \frac{\$50}{1 \text{ hour}} * 1 \text{ session} = \$75$$

$$\text{Cost of intermediate studies} = \frac{1.5 \text{ hours}}{1 \text{ session}} * \frac{\$50}{1 \text{ hour}} * 3 \text{ sessions} = \$225$$

Total cost of clinical studies: $900