Development of a training Simulator for Minimal Invasive Surgery

Motivation:

In recent years Surgery has moved from conventional open incision surgery to minimal invasive or keyhole surgery. In conventional surgery in order to operate a surgeon makes a large incision and performs the required operation. On the other hand for minimal invasive surgery only a few small holes are made through which instruments are inserted into the body (See Figure 1). One of these instruments is an endoscopic camera. By using these instruments and video feedback from the camera the surgeon performs surgery by looking at the monitor. Since the keyholes are very small minimal invasive surgery results in quick recovery of patients, less pain after surgery, less chance of post-operative infection, less complications and early discharge of patients from the hospital. With MIS becoming common it is important to train surgeons for this kind of surgery; but this expertise requires much practice and acquiring of new skills like depth perception and eye-hand coordination.

In order to train these surgeons for these new kinds of skills Simulators are required. For obvious reasons it is not possible to train surgeons on human patients. Similarly before a surgeon can go into the operation theatre he/she requires extensive hands on training to develop the required hand eye coordination and minimal invasive surgery skills. The goal of this project is to develop such a low cost simulator for minimal invasive surgical procedures which can be used to train surgeons for minimal invasive surgery.

Activities for the project

The challenges involved in developing such a simulator include

- Understanding SOFA (Open Source Surgical Simulation Library)
- Modeling Simulation Scenes in SOFA
- Programming in C++ using SOFA
- Documentation of source codes
- Developing video/written tutorials for learning of SOFA
- Working with Omni Haptic Device to create realistic simulations
- Possibly select final year project based on SOFA
- Reading research papers and implementing them
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Who Should Apply?

Undergraduate students of 6th or 7th semester with interest in programming, graphics, modeling and simulation are encouraged to apply for these positions. Selecting your final year project as part of this project would be encouraged.

Skills Required

We are looking for highly motivated students with strong interest in research and development work. Strong programming skills are required with an eye for understanding open source libraries and frameworks.

- OpenGL
- C/C++ and object oriented techniques
- Graphics programming and modeling using graphics libraries
- Some experience with hardware interfacing or interfacing game controllers would be a plus point

Remuneration: Rs. 5,000/- per month and your own workspace in SMART lab, plus a chance to become part of one of the most exciting labs at SEECS.

Number of Positions: 4 xs

How to Apply

Send your resume to Syed Yasir Hasan (Project Coordinator) yasir.hasan@seecs.nust.edu.pk mentioning UG_ICTRDF_TSRS in the subject.

Learn more about the project at: https://www.youtube.com/user/SMARTLabSEECS/videos?view=0