

Surgical Robots
Biomedical Engineering Seminar ELE 282
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The first generation of surgical robots are already being installed in a number of rooms around the world. There are many reasons that surgical robots are being used. One is that computerisation of modern hospitals and the growth of broad band telecommunications, along with a new generation of computer cultured medical staff has grown. Secondly it can use the medical image as a map and navigate specifically to the target along a trajectory specified by the surgeon, making much more precise movements than humans can along with helping doctors see what would otherwise be concealed during surgery.

Surgical robots can be divided into two basic types: Telemanipulators and Image Guided Robots. Telemanipulators supply the medical doctor with a slave arm that can be controlled directly. Otherwise, the arm may be remotely-controlled by joystick. Telemanipulators are also the basis for telesurgery, where a distant expert can aid a local team. Image-guided robots narrate a physical point on the patient to a corresponding point on a medical image. Localising robots enable a surgeon to map a method pre-operatively, where the results would download to the robot controller and doctor would then supervise the actual procedure.

The Da Vinci fabricate a three dimensional video image by using small cameras placed into the patient. The machine has three arms and each one has a wrist controller with which to adjust the position and direction of the arm and cameras. Surgeons can control the robot by computer interface or by voice

recognition commands. Throughout the operation, there is always another surgeon that's stands at the side of the patient. If the patient faces an emergency or the robot faults, the robot is removed at once and the doctors perform traditional surgery.

“To use the Da Vinci system, a surgeon sits at a console, a few feet from the operating table, and looks into a viewfinder to examine the 3-D images being sent by the camera inside the patient. The images show the surgical site and the two surgical instruments mounted on the tips of two of the rods. Joystick-like controls, located just underneath the screen, are used by the surgeon to manipulate the surgical instruments. Each time one of the joysticks is moved, a computer sends an electronic signal to one of the instruments, which moves in sync with the movements of the surgeon's hands.”

Zeus uses an inventive partnership between surgeon and technology to extend surgical capabilities. At the console, the surgeon controls the instrument handles and views the operative site on a monitor. With a computer interface, the surgical instruments replicate the surgeon's actions at the operative site in real time

The many benefits of the Zeus are the tiny incisions, which are roughly the diameter of a pencil. Secondly the significantly reduced patient pain and also improving surgeon precision and dexterity.

Reference:

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