

2009-300 Robotic Micro-Surgery System

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Technology description

SUMMARY

Researchers at UCLA have developed a high accuracy and precision robotic system that can perform complete microsurgical procedures with no manual assistance due to its high range of motion and integrated tracking system.

BACKGROUND

In recent years, robotic manipulators have proven beneficial in assisting surgeons in the performance of minimally invasive procedures with high precision and little tissue damage. Nonetheless, current robotic systems are not suitable for microsurgery procedures due to their limited range of motion, lack of tracking system, and bulky design. Furthermore, because microsurgery requires many instruments the robotic systems need to be equipped with multiple integrated arms that are capable of maneuvering different surgical instruments.

INNOVATION

Researchers at UCLA have developed a robotic system that performs complete micro-surgical procedures by exactly mimicking the motion of a joystick controlled by a surgeon. The system incorporates multiple arms, which can be moved separately or in unison. Each arm holds a surgical instrument that is moved in real time, has high range of motion, and has access to a universal cartridge that facilitates connections for multiple utilities. The instrument precision is further refined by filtering and removing the natural tremor of the surgeon's hand. Additionally, because micro-surgery requires the instrument to mechanically maintain a fixed-point of rotation at the site of penetration, the system incorporates an integrated tracking system that allows the robot to compensate for patient movement. The tracking system also triggers automatic termination in the event that the patient moves beyond a determined threshold.

Application area

Minimally invasive microsurgery

Advantages

- Multiple arm manipulator robotic system

- Exact mimicking of the motion of surgeon controlled joystick
- Automatic instrument change
- Integrated tracking system
- High range of motion
- Compatible with teleoperated, automated, and hybrid teleoperated/automated systems

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