Revolutionizing Surgery

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Revolutionizing Surgery : India Leads the Way in Robotic Telesurgeries with SSI Mantra

Context:

India has reached a major milestone in healthcare technology with the successful completion of **robotic telesurgeries** using **SSI Mantra**, an indigenous robotic system. This advanced technology allows **remote surgery** with minimal delay, achieving an incredible **latency of just 40 milliseconds**. With telesurgery, **surgeons can perform surgeries from anywhere** using robots and high-speed data connections, which is a significant breakthrough in medical technology.

About SSI Mantra: India's Indigenous Surgical Robotic System

- **What is SSI Mantra?**

  - **SSI Mantra** is an **advanced surgical robotic system** created by **SS Innovations** to perform complex surgeries, including telesurgeries.
  - **First in the world**: It is the **only robotic system** globally to be approved for **telesurgery** and **tele-proctoring** by India's **Central Drugs Standard Control Organization (CDSCO)**.

- **Key Features of SSI Mantra:**

  - **Ultra-low latency**: It has an **amazing speed** of **35-40 milliseconds**, making it possible to perform surgeries remotely without delay.
  - It is capable of performing **high-precision surgeries**, including **Totally Endoscopic Coronary Artery Bypass (TECAB)**, one of the most complex cardiac surgeries.
  - **Regulatory approval**: SSI Mantra is the **first** robotic system to receive **official approval** for telesurgery and tele-proctoring.

- **How It Works:**

  - **Remote control**: **Robotic arms** are controlled remotely by surgeons over a **secure, high-speed network**.
  - **Real-time operations**: This technology allows for **precise and accurate remote surgeries** with little to no delay.
  - It also supports **tele-proctoring**, where experienced surgeons can **mentor** other surgeons remotely during surgeries.

Global Significance and Benefits of SSI Mantra

1. **Bridging Healthcare Gaps:**

   - **Telesurgery** helps provide **access to expert medical care** in **remote or underserved areas**, where specialized healthcare services may be limited.
   - This innovation helps eliminate **geographic barriers**, making world-class surgeries available to people in distant regions.

2. **Better Patient Outcomes:**

   - By using **minimally invasive techniques**, surgeries result in **faster recovery**, **fewer complications**, and improved **patient outcomes**.
   - **Remote surgeries** mean patients do not need to travel long distances, which reduces physical strain and speeds up recovery.

3. **Impact on India's Healthcare System:**

   - SSI Mantra helps address **healthcare disparities**, especially in **rural areas**, where access to top-tier medical care has traditionally been challenging.
   - It offers a **cost-effective solution** for improving healthcare access across India.

4. **Global Potential:**

   - The **remote surgery capabilities** of SSI Mantra make it a **scalable solution**, meaning it can be adopted globally, especially in countries with limited access to skilled medical professionals.
   - It also opens new doors for **surgical education**, allowing **remote mentoring** of surgeons.

Other Key Applications of Robotics in Healthcare

Besides telesurgery, robotics is transforming various areas in healthcare, including:

1. **Safety & Monitoring Robots:**

   - **Telepresence robots** use **computer vision** to monitor patients' **vital signs** and **health conditions** in real-time, helping healthcare staff keep a close watch on patients.

2. **Robotic Prosthetics:**

   - Advanced **robotic prosthetics** (like robotic limbs and exoskeletons) are helping **amputees** regain **mobility** and **functionality**, improving quality of life.

3. **Sanitation and Disinfection Robots:**

- **Sanitation robots** use **UV-C light** or **hydrogen peroxide vapour** to disinfect hospital rooms, helping maintain a **clean and safe environment**.

4. **Medical Transportation Robots:**

   - **Medical robots** are being used to deliver **supplies**, **medications**, and **meals** to patients, increasing hospital efficiency and reducing the need for human intervention.

Challenges in Robotics for Healthcare

While robotics offers significant benefits, there are challenges to overcome:

1. **High Initial Cost:**

   - The **cost of robotic systems** like SSI Mantra can be **expensive**, which may make it hard for some healthcare institutions to adopt.

2. **Training and Skill Gaps:**

   - Operating these **advanced robotic systems** requires specialized skills. There is a **need for training programs** to ensure healthcare professionals can effectively use this technology.

3. **Ethical Concerns:**

   - With **remote surgeries**, it's not clear **who is responsible** if something goes wrong. **Accountability** becomes a key concern, especially when errors happen during telesurgery.

4. **Patient Trust:**

   - Patients may have concerns about **having surgery performed remotely**. Gaining **trust** in robotic systems and remote operations is essential for widespread acceptance.

Indian Initiatives to Promote Robotics in Healthcare

India is actively supporting robotics in healthcare through several initiatives:

1. **National Health Policy, 2017:**

   - The policy emphasizes the role of **technology** in healthcare, recognizing the potential of **robotics** in improving medical services.

2. **Draft National Strategy on Robotics (2023):**

   - This strategy promotes **robotics**, including in healthcare, and plans to establish a **Robotics Innovation Unit (RIU)** to drive innovation.

3. **Artificial Intelligence & Robotics Technology Park (ARTPARK):**

   - Located at **IISc Bengaluru**, ARTPARK is dedicated to the development of **AI and robotics** solutions, including those aimed at improving healthcare.

Conclusion

India's successful **robotic telesurgeries** using **SSI Mantra** marks a **transformative moment** in healthcare. This **indigenous technology** not only allows **remote surgeries** with high precision but also helps bridge the gap in healthcare access, particularly in **remote areas**. While **telesurgery** has the potential to **revolutionize healthcare**, addressing challenges such as **costs**, **training**, and **patient trust** will be crucial for its widespread adoption. As SSI Mantra continues to gain global recognition, it could set the standard for **remote surgery** worldwide, creating new possibilities for healthcare innovation.