TEHAROSU: ROBOTICS FOR SURGICAL OPERATIONS BETWEEN LOCATIONS

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Abstract - TEHAROSU is one of the robotics technology to perform surgical operations in the future. The development of robotics technology can now be used to perform a surgical operation remotely, so the surgeon can perform the operation even if they're in a different area. This remote surgery using robotic hand as the executor of the operation is controlled by a controller in the form of gloves as well as a motion sensor using the sensor mind. This remote control robot using the Internet network, so that it can cover a wide area.
The entire hospital will be fitted with a robotic hand that is used to perform surgical operations along with other surgical operations equipment. Then for the robotic hand controller provided in some hospitals have surgeons. Later in need with high-speed internet network which is widespread in use for a link between a controller with a robotic hand. With this technology can realize medical treatment between locations so that a surgeon can perform surgery remotely even can also use surgeons from abroad. In addition to this technology can save travel time to refer patients from one hospital to another hospital.

Keyword - Surgical Operations, Robotic, Long Distance

I. INTRODUCTION

Robotic Surgery is a form of the development of medical technology that uses a robotic system to assist the surgical procedure. Although it is equipped robotic computer, the system is not able to make their own decisions in surgery, so doctors experts still play a role in the action operations.
The surgeon uses a computer system to control a robotic arm and end-effector, and can also use telemanipulators for input. One of the advantages of using a computerized method is that the surgeon does not have to be present in the operating room, the surgeon could be anywhere diseluruhi world, and it is possible to perform operations remotely.

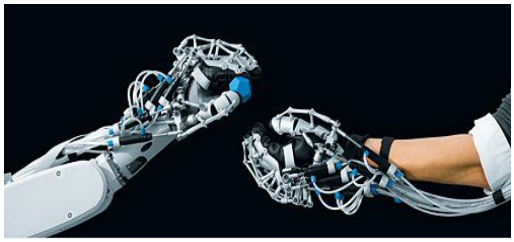
In the case of open surgery are now using the instrument of steel, to stretch the ribs can be much smoother if done with robots, motion controlled feedback can be done compared to using human hands. The lack of medical equipment in Indonesia and the distribution of medical personnel uneven causing many public health services choose to hospital for treatment abroad.
While Indonesia neurosurgery expert Prof Sri Muliawan explained that Indonesia has only four thousand doctors surgery in 2014. Of these, as many as 1800 people coming from general surgeons. Of the total number of general practitioners 1800, there are 1,250 people who live in big cities in Java and Bali.
Though many factors an obstacle when medical treatment abroad for example length of travel time from Indonesia to countries which have the power surgical specialists, bad weather made it impossible to travel (especially air) to places / countries which have the power of surgical specialists and Time emergency surgical operation do not allow patients to travel abroad to these factors, the need for innovation in robotics technology for surgical operations in the future companies to these constraints.

II. EXPERIMENTAL METHODS

A. Provision of equipment or components used in the application of the idea TEHAROSU as Robotics Technology for Surgery in the Future, namely:

1. Robotic Hand and Glove Mover

The robotic hand is used to perform a surgical operation that uses a motion sensor in the form of gloves and using the mind as the sensor controller. Robotic hand made to perform surgical operations adjusted to the shape of the human hand that has been equipped with some tools for surgical operations.



Picture 2. Robotic Hand and Glove Controller

2. Glasses Oculus and Control System VR (Virtual Reality)

Glasses oculus is a tool used to visualize an image or a state where the operation the patient. So that surgeons who perform operations remotely can obtain more information with the real state of the room. With this tool the surgeon residing elsewhere may obtain more detailed description of the object of the operation.



Picture 3. Visualisasi Oculus

3. Internet-based robot controller remotely

This robot controller is used to operate the robot arm for surgical operations. It uses the internet then this robot hand can be operated in a considerable distance, so that the surgeon does not have to be present in the operating room, the surgeon could be anywhere diseluruhi world, and it is possible to perform operations remotely. The surgeon uses a computer system to control a robotic arm and end-effector, and can also use telemanipulators for input. Long Distance Control System (controlling remote systems) so that the robot as one icon automation system can be controlled not only locally but capable on the remote control (remote) uses the internet.

B. Installation of the robotic arm and controller in hospital

To realize this idea we required the installation of robotic hand that is evenly distributed in various areas. So when requiring medical practitioner or a surgeon needed to perform the operation does not need to make a referral to hospitals located in major cities so that patients can be directly addressed and can save travel time.

C. Provision of Internet network that supports

In implementing the ideas we needed internet network that has a high speed that spread throughout the country. Internet network is used for input dealer or order from the surgeon to the robotic hand that will do the surgery, so in need of network connection that has a high speed.

D. Provision Robotics Technician

To maintain or treatment continuously in need of a robotics technician on duty to perform maintance robotic hand operating equipment in order to work optimally.

III. RESULT AND DISCUSSION

The development of robot technology as it has existed in the United States actuating the robot with the mind making it possible to develop a surgical instrument with a robotic arm motion sensor technology and sensor arm of mind. Besides in Indonesia has no hospital for surgery using robots. For example Bunda Hospital Jakarta which was a hospital in Indonesia that perform robotic surgery.

Challenges in the supply or the implementation of this idea is the need for an internet connection that has a high speed to be used as the control of the robot arm to perform operations remotely, requiring Internet network that spread evenly throughout the country. Besides challenges in realizing this idea was the installation of a robotic arm in a hospital is INDONESIA given the state of Indonesia which is so broad that required a lot of robotic hands.

IV. GOALS AND BENEFITS

The aim of the Robotics Technology for the Future of Surgery at these among others are:

1) Obtain medical treatment between locations
2) Sufficient emergency actionable quick operation by a specialist elsewhere
3) Eliminate the time and transportation to the place biayaa operation should
4) Reduce or eliminate trauma networks that usually found in open surgery.
5) Minimize disturbance vibration due to hand surgery doctor while dissecting or stitch to close the wound.

The benefits derived from their ideas for Robotics Technology for Surgery in the Future include:

1) Operation using robotic precision
2) The smaller incision surgery
3) Reducing blood loss during surgery.
4) The healing time is faster, shortening the length of postoperative
5) morbidity in patients with lower
6) Satisfaction of higher operating results.

CONCLUSIONS

Based on the discussion of ideas on the above ideas, it was concluded as follows:

1) Lack of distribution of medical personnel, especially the surgeon makes the treatment of patients who need surgery can not be done quickly.
2) Using TEHAROSU Aklan then surgery can be done remotely so that patients can be handled directly without the need to move to another hospital.
3) Implementation of TEHAROSU this by installing a robotic hand to conduct

operations throughout the hospital, with multiple controllers in a hospital with a surgeon. By using okulus glasses to see the state directly from the hospital who will perform surgery.
In the application of this technology required distribution network with high-speed internet are spread evenly on a national scale

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