

Engineering Essentials for Medical Robotics



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Abstract

Medical Robotics became very advanced medical field which make lengthy and complicated operations and surgeries easy task with provide comfort and quick relief to human body. Now days Medical Robotics not only limited for operations and surgeries but also became very useful in organs transplants and Cyborg implementation in/with human body to enable disabled body parts or to give super power to ordinary body. This communication discuss some key terms in medical robotics like bionic, Cyborg etc. and also discussed two models named "Bionic Engineering Model and Medical Robotics Engineering Essentials Model".

Keywords: Medical robotics; Cyborg; Bionic; NCOD

Medical Robotics

Medical Robotics includes a number of devices used for surgery, medical training, rehabilitation therapy, prosthetics, and assisting people with disabilities.

Bionic

Bionics is a common term for bio-inspired information technology, typically including three types of systems, namely:

- A. Bio-morphic (eg neuromorphic) and bio-inspired electronic/optical devices,
- B. Autonomous artificial sensor-processor-activator prostheses and various devices built into the human body, and

- C. Living-artificial interactive symbioses, e.g. brain-controlled devices or robots.

In spite of some restrictive use of the term 'bionics' in popular culture, as well as the unfulfilled promises in the fields of neural networks, artificial intelligence, soft computing and other 'oversold' areas, it was agreed that the name bionics as defined above is the right one for the emergent technology also described as bio-inspired information technology (some people are suggesting info-bionics). There are numerous programs at several funding agencies which are supporting parts of this field under various other names[1-5].

Bionic engineering model

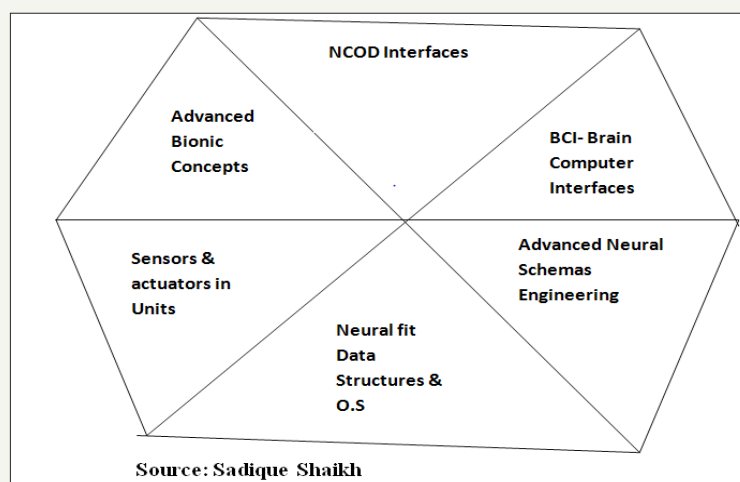


Figure 1: Bionic engineering model.

(Figure 1) In my communication I like to teach to things first is what Bionic and how its open several new path in the field of Medical Robotics and after this what are the essentials of Medical robots engineering with exhibiting two models. My first model is Bionic Engineering model divided into six engineering criteria's are Advanced Bionic concepts, NCOD interfaces, BCI Interfaces, Advanced Neural Schemas engineering, Neural fit data structures and O.S and Sensors & Actuators with body mounts. The first domain based on generic brain biology, study of natural Intelligence (N.I), and how to convert into artificial using theory of neuroscience. The second segment focuses attention how to engineer Neuron Command Operating Devices (NCOD) with ions-electrons communication to/from body to/from medical robotics,

Medical robotics engineering essentials

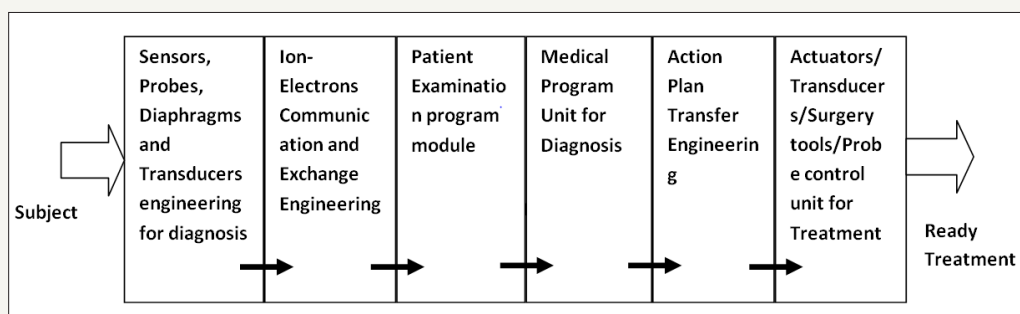


Figure 2: Medical engineering essential model.

(Figure 2) This is second important model labeled as Medical Robotics Engineering model. The objective behind to construct this model is not to teach you medical robotics with complication, but to show you how in simple way you can plan to engineer complicated medical robotics systems very easy manner. This model consist 6 segments. The segment 1 is deal with sensors, probes, diaphragms and transducers engineering for diagnosis and work for its design and development rigorously. The second chamber deal with ion-electrons communication and exchange engineering where engineer must have to think very seriously how Biological-electronics Interfaces buildup for proper commanding and signaling. The third segment is patient examination program and the serious engineering here to detect diseases and likewise medical diagnosis. Further alternate given to medical program unit for diagnosis here alternate treatment can be design and programs possible. After disease detection, strategy for medical treatment using medical Robots design and develop at action plan transfer engineering. In last at the time of medical processing several sensors, actuators, probes, surgery tools, transducers work together hence accurate engineering need at stage six.

Conclusion

I must say medical robotics is very vital subject to attempt and has lot of research opportunities which are not only in terms of advancement but also in terms of human welfare. I have discussed

Cyborg and Bionic parts. The third criteria is all about how to interface all automatic medical assemblies and surgical robots with precise control, precision, coordinates, movements, time, pressure and others parameters control with Human brain and Computer (Electronic Brain) coordination. The next assumption for engineering is how to design and develop effective and efficient neural schemas. For neural schemas we also need schemas mapped data structures and operating system to handle overall medical process using bionic and best fit data structures develop. To command and control all input sensors, transducers, probes and output actuators, motors and diaphragms must need to design according to NCOD.

two models one for Bionic domain and another for how medical robotics can be engineer and implement. In the field also strong research candidates are "Cyborg" and "Bionic" along with regular research which opens several new paths.

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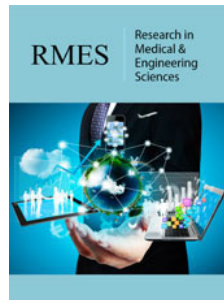
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