Nanorobotics

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INTRODUCTION

- What is Nanorobotics
- Nanotechnology
- Aim of presentation
- Functionalities
- Nanometer
- Nanorobot
- Macro and nano-scale robots
- Nano robotics
- Bibliography
WHAT IS NANOROBOTICS:

- A technology with the advancement in nanotechnology.
- Creating automatic machines, respondent devices and robots at the atomic scale of 10-9 nanometers.
- Used in most complex engineering & designing nanorobots.
- Constructed- ranging from 0.1 to 10 micrometers.
- 99% human like non biological robot.
- Emerging applications- medicine and technology.
NANOTECHNOLOGY

- Nanometer - billionth of a meter, 1/80,000 diameter of a human hair, or 10 times the diameter of a hydrogen atom.
- Size- measure, manipulate, and assemble matter on a scale of 1-100nm.
- The engineering of molecular products needs to be carried out by robotic devices, which have been termed *nanorobots*. 
AIM OF PRESENTATION:

- Focuses -state of the art
  - its applications
  - essential properties
  - dynamical laws
- Reviewing- nano-scale robotic.
  - which are usually used in nanorobotics
ITS FUNCTIONALITIES:

- *Swarm Intelligence* – decentralization and distributive intelligence
- *Cooperative behavior* – emergent and evolutionary behavior
- *Self assembly and replication* – assemblage at nano scale and ‘nano maintenance’
- *Nano Information processing and programmability* – for programming and controlling nanorobots (autonomous nanorobots)
- Nano to macro world *interface architecture* – an architecture enabling instant access to the nanorobots and its control and maintenance
Nature’s Nanorobotic Devices

Protein based molecular machines

- ATP Synthase
The Kinesin, Myosin, Dynein and Flagella Molecular Motors
Nature’s Nanorobotic Devices

DNA based molecular machines
- Inorganic (chemical) Molecular machines
Design and Control

Increasing Capability of Bio Nano Systems

Bio Sensors
DNA Joints
Bio Motors
Bio Nano Components

A bio nano robot (Representative)
Assembled Bio Nano Robots

A bio nano Computational Cell
Distributive Intelligence Programming & Control
Bio nano Swarms

Automatic Fabrication and Information processing
A Bio Nano Information Processing cell
Automatic fabrication Floor

STEP 1 2008
STEP 2 2013
STEP 3 2018
STEP 4 2023

Project Progression
Control

- Internal control mechanisms
  - Active and Passive
- External Control Mechanism
- Hybrid control mechanisms
Conclusion

- Dynamics and properties
- *Bio* nanorobotic systems
- Developing a complete database
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- Molecular requirements for bi-directional movement of phagosomes along microtubules. *J Cell Biol* 137: 113-29