

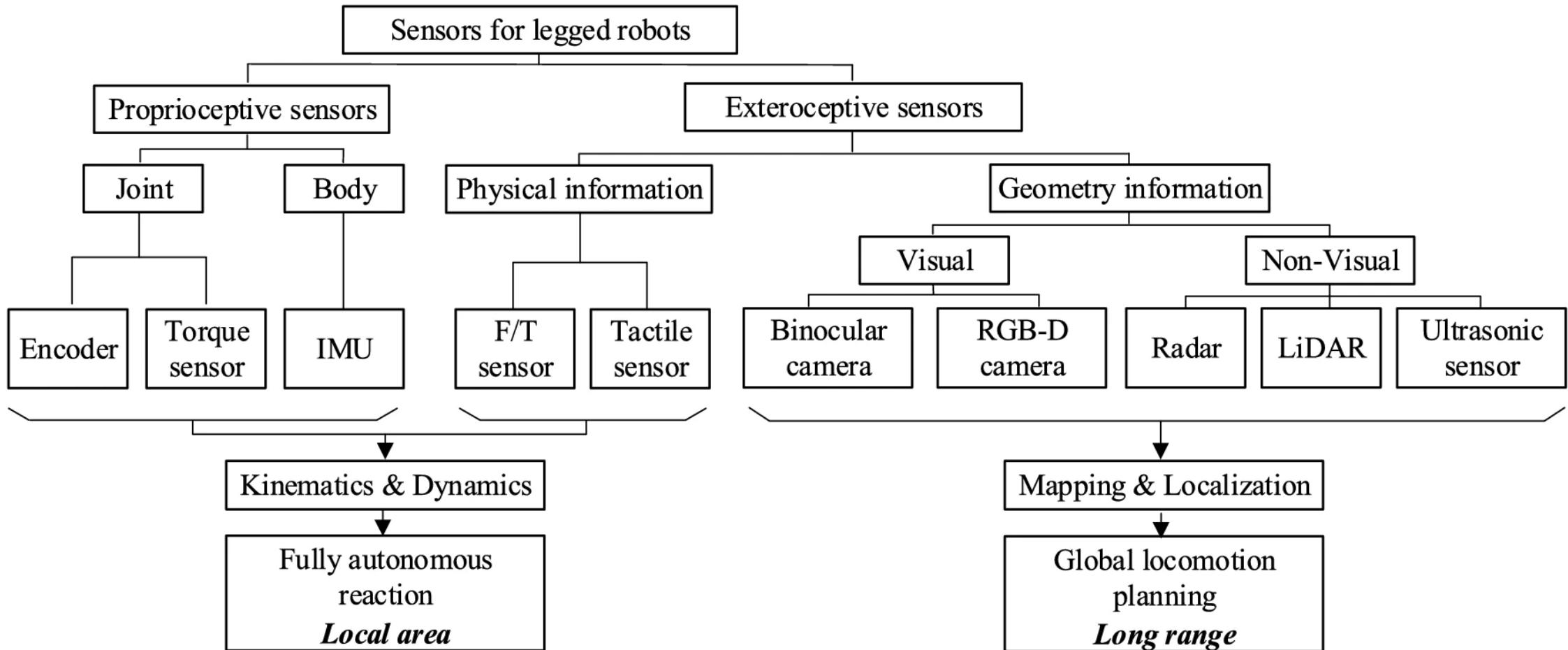
Actuators & Sensors

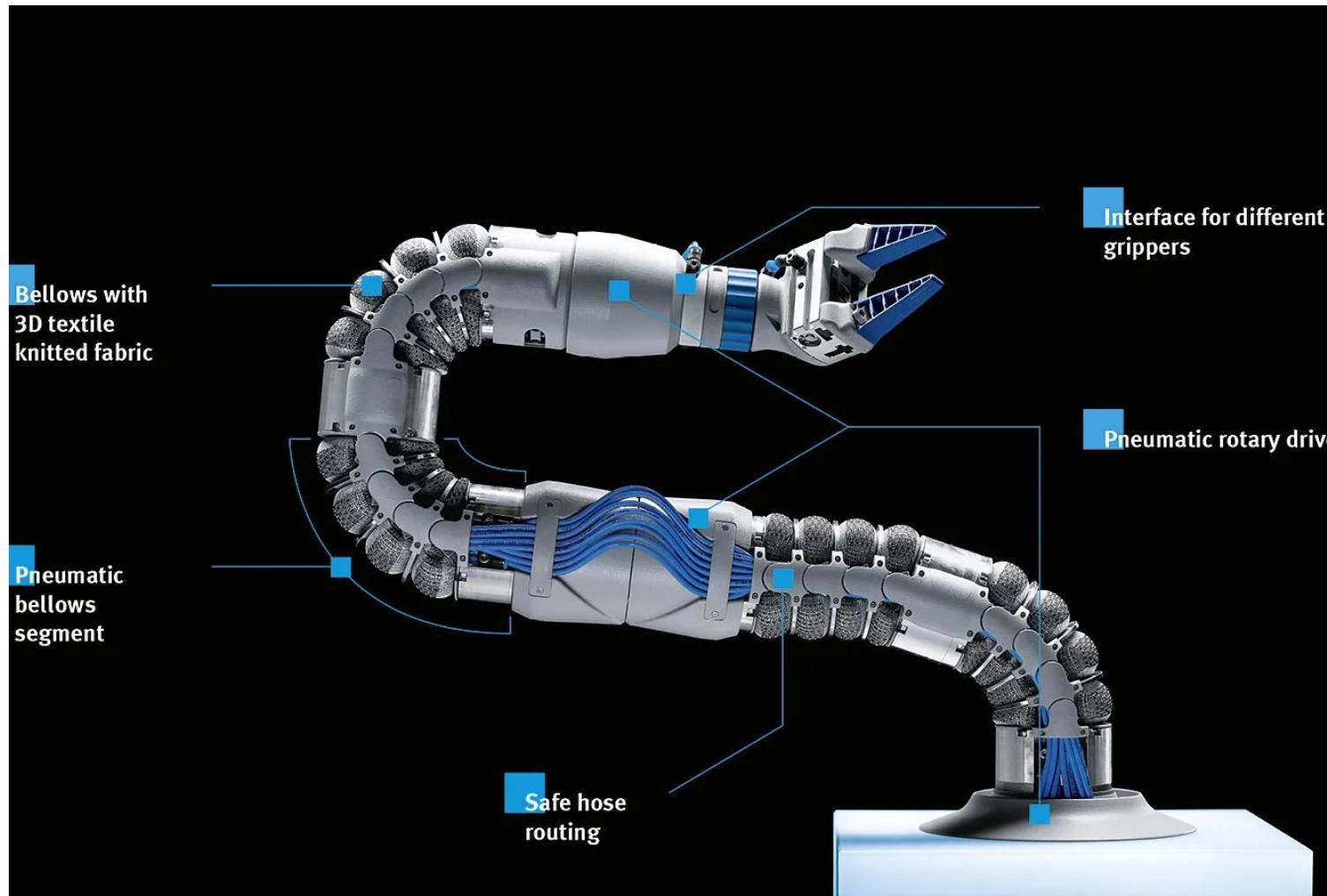


Legged robots – the sensor & actuators

- <https://www.youtube.com/watch?v=rVlhMGQgDkY>
- <https://www.youtube.com/watch?v=bKDhmENcKto>
- <https://www.youtube.com/watch?v=7atZfX85nd4>

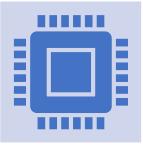
Case Study – sensors in legged robots





BionicSoftArm: Modular pneumatic lightweight robot

Actuators



Devices that take signal in electrical form and transform it to something that can influence the physical world



Can almost say that this is the end goal of all IoT devices, i.e., influencing or altering the physical world



Can obtain actuation in many forms – movement, temperature (heating/cooling), light, sound, etc.

Types of actuators

To enact movement, the actuator requires energy. The main types of energy sources are the following:

electric

hydraulic

pneumatic

thermal/magnetic

Electric actuators

- **Advantages of electric actuators**

1. These actuators offer the highest precision among other actuators.
2. Easy to network and easy to program. They offer immediate feedback for diagnostic and maintenance.
3. They provide complete control on motion profiles and can include an encoder to control the velocity, position, and torque.
4. Less noise compared to hydraulic and pneumatic actuators
5. No fluid leak, so fewer environmental hazards.

- **Disadvantages of electric actuators**

1. The initial cost of the electrical actuator is higher
2. Unlike pneumatic and hydraulic actuators, these actuators are not suitable for all environments.
3. There are overheating, wear and tear issues are there compared to pneumatic and hydraulic actuators.
4. The actuator's parameters are fixed, so to change torque, speed, etc to a different level, actuators should replace.