



Laboratorio di Bioingegneria
Dipartimento di Informatica e Sistemistica
Università di Pavia

Staff:

A. Buizza

G. Magenes

R. Lombardi

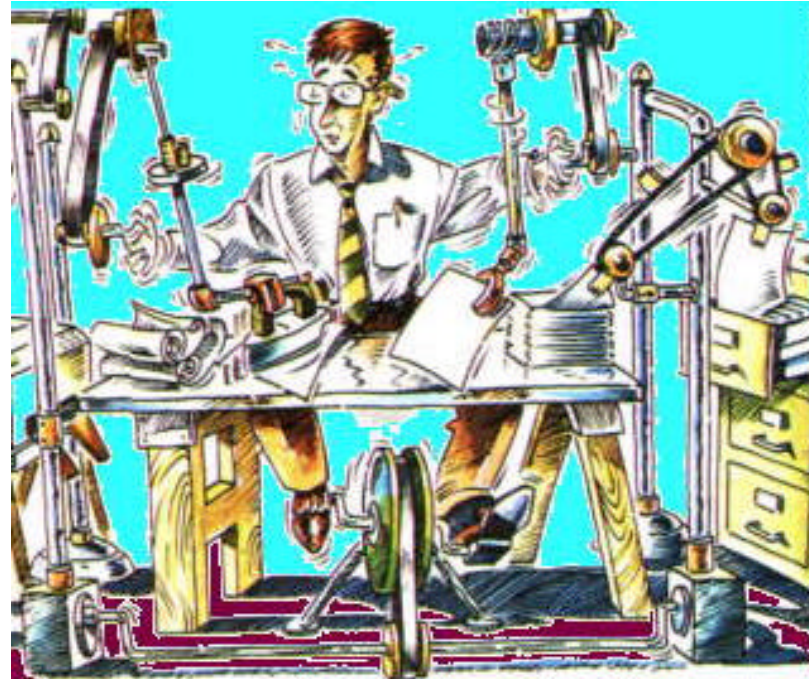
S. Ramat

G. Beltrami

R. Gandolfi

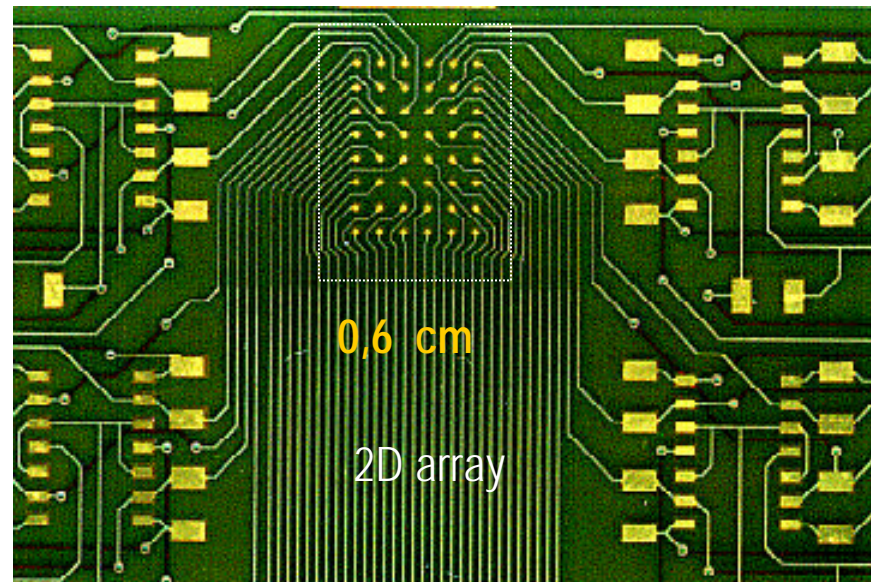
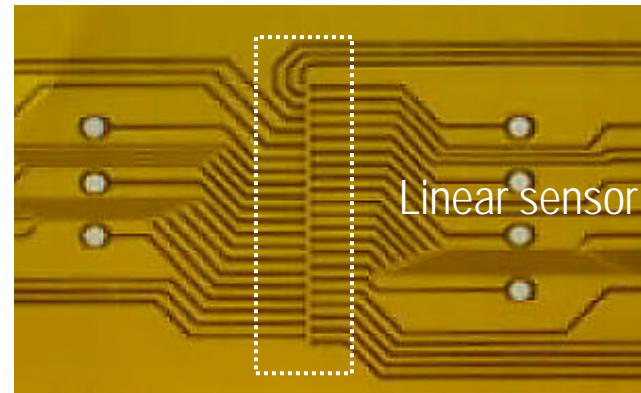
Main activities of the Lab

- Hardware prototypes of:
 - Tactile sensors
 - Artificial vestibular system
 - Inclination detector
- Mathematical Models of:
 - Visuo-vestibular interaction
 - Eye-head-arm coordination
- Applications of NN to:
 - Tactile recognition
 - Eye-head coordination
 - Pursuit systems
 - Classification problems

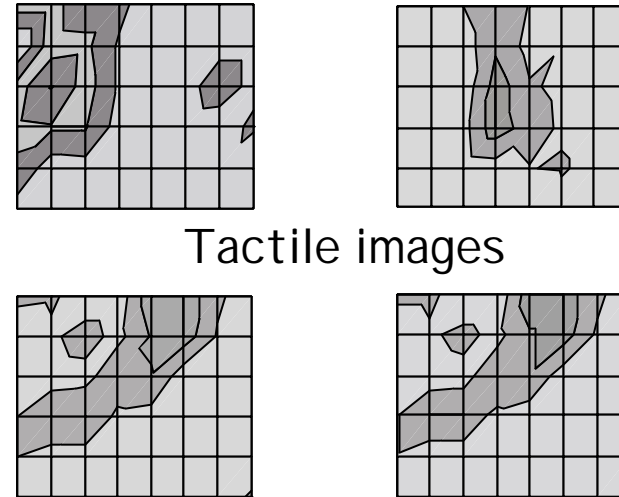
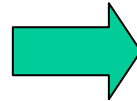
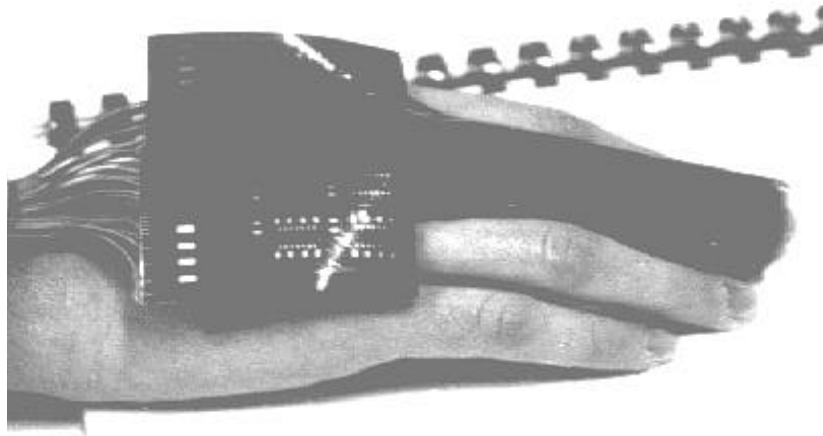


Tactile systems

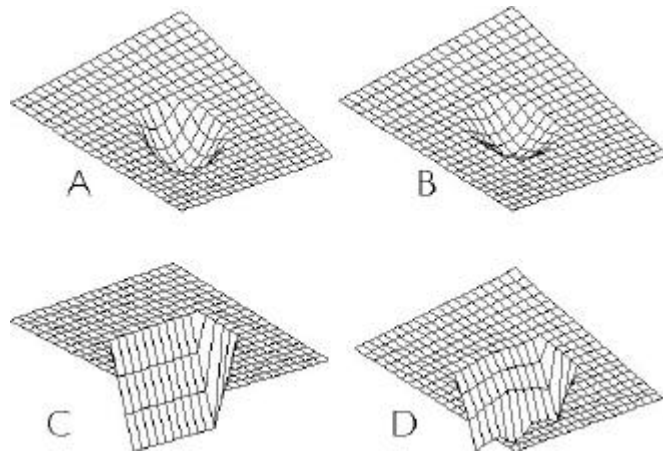
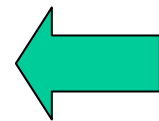
- Array sensors:
 - Linear (PVDF)
 - 2D array (PVDF)
- Fine form detection
 - Multi layer perceptrons
 - Radial basis functions
- Contour following:
 - Adaptive Resonance Theory
 - Momentum
- Shapes classification



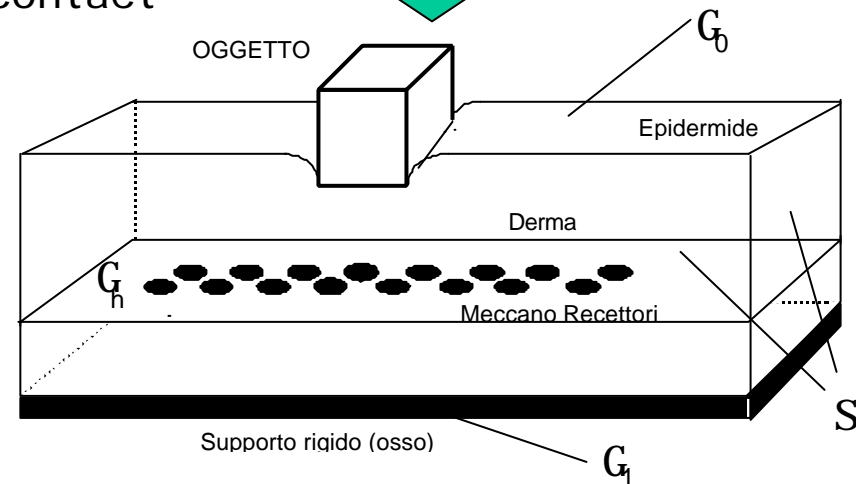
Tactile systems



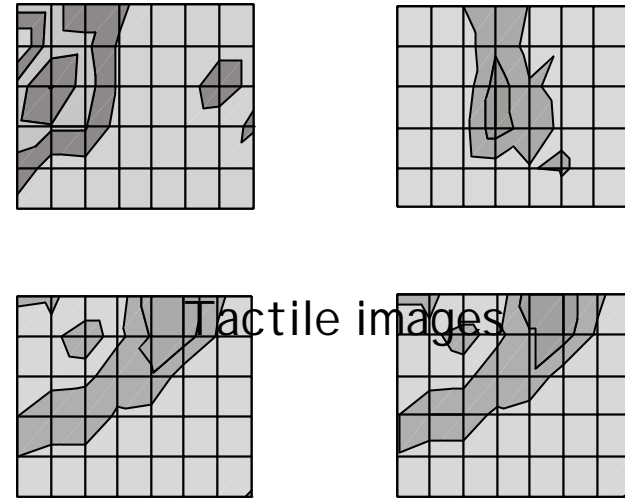
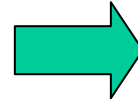
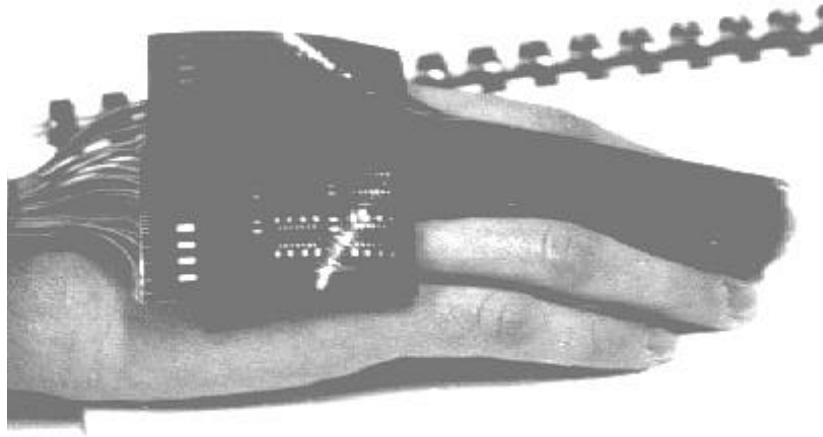
Mathematical model
of contact



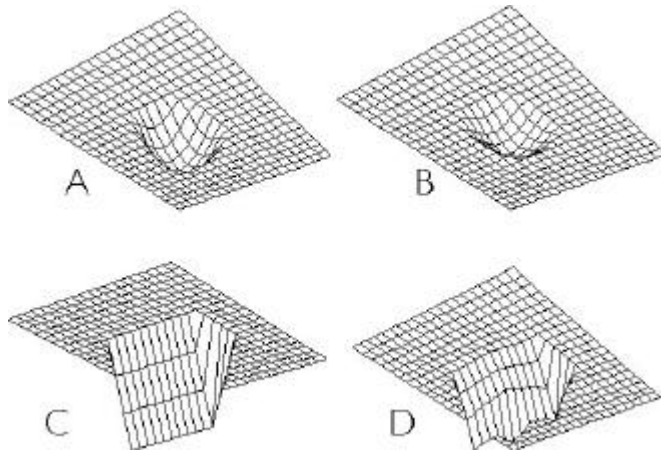
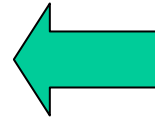
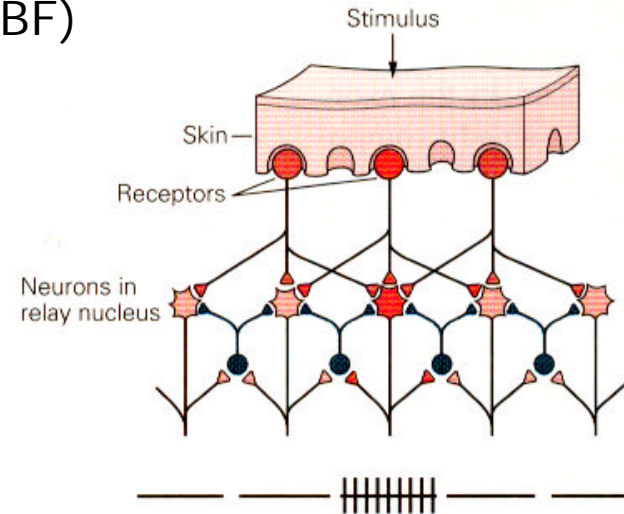
Fine form detection



Tactile systems



Neural Network
(RBF)

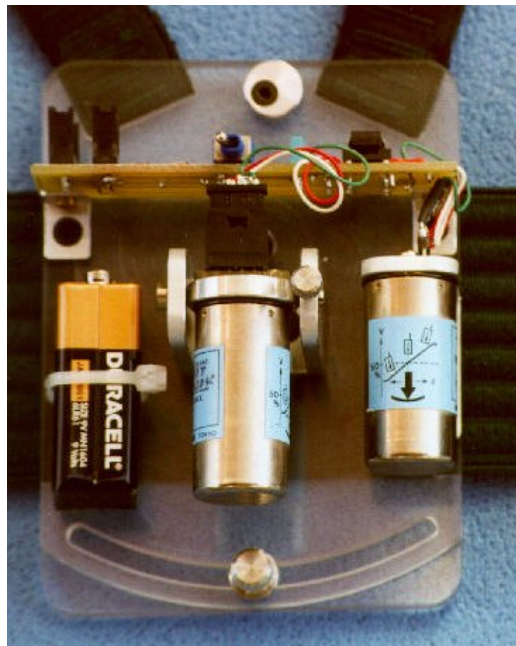
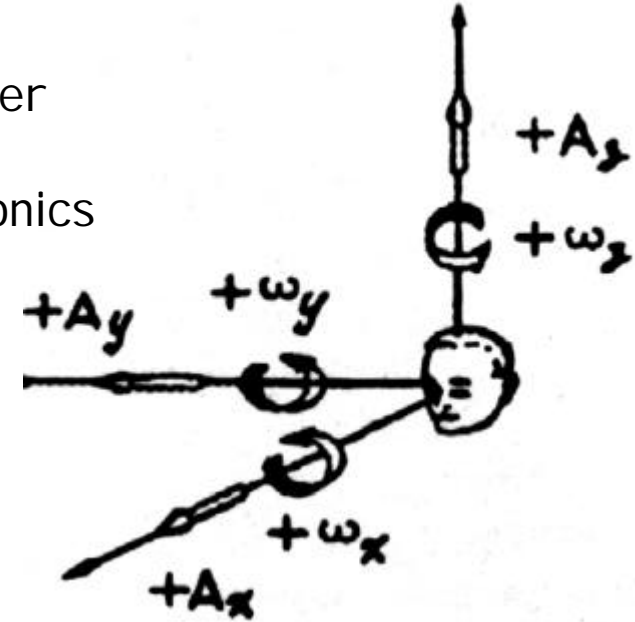


Fine form detection

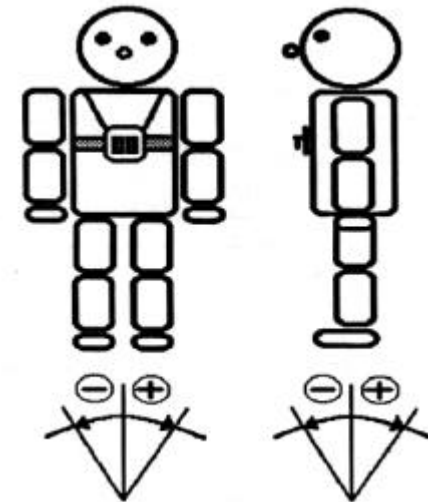
Vestibular and posture system



Hardware:
3 axial accelerometer
3 gyroscopes
Conditioning electronics
A/D conversion



Posture:
2 inclinometers
Conditioning electronics
A/D conversion



Open topics

- Discrimination of tilt from linear acceleration
 - Interaction of linear and angular signals
 - GIA orientation interpretation
- Hebbian learning for nature-like network plasticity
 - Visual environment recognition
 - Stabilization during locomotion
- Active touch
 - Integration of touch and finger movements.
 - Stereognosis
 - 2 finger grasping

Contact:

giovanni@bioing.unipv.it

Giovanni Magenes

Dipartimento di Informatica

Via Ferrata 1, 27100 Pavia

Italy

Phone: +39 0382 505352

Fax: +39 0382 505373