Honest assessment of TC over past 3 years and goals for next 3 years

In the 2007, as an effort from the co-chairs to make a more precise definition of the technical field of the TC, the scope of BioRobotics has been defined as a research field which involves any use of mechatronics systems to understand better complex living organisms. This field can be conceived as a highly interdisciplinary conference that brings together scientists and engineers from different backgrounds to share and learn about research activities in this fast growing field. Due to its interdisciplinary approach, during the past 3 years several efforts have been done to reduce the gap between robotists and biologists (i.e. IEEE/RAS – EMBS).

Even though during the past three years two conferences have been organized related to the field of BioRobotics (BIOROB 2006 and BIOROB 2008), it is still far to state that the activities promoted by the TC over the last three years attained its original goals. From the point of view of a TC, the BioRobotics research field is too broad (too difficult to define the borders among other TCs). From several discussions among experts of the field, it became necessary to propose a more focused TC which provides a clear definition of the scope and arguments. This approach will certainly promote the activities of the TC on the next coming three-years.

As a result, the co-chairs have been agreed to renew the TC on BioRobotics towards achieving more visible results. The renewal process consists in both rotating the existing co-chairs as well as redefining the objectives of the TC itself. The renewed TC is focused on in applying biological concepts/strategies to improve the current capabilities of robots from a technological point of view. Therefore, it is expected that the renewed TC will have a positive impact on many of the existing RAS TCs for the next coming 3 years.

List of activities during past three years

- BIOROB 2006, Pisa, Italy, February 20-22, 2006
- (2) IROS 2009, Workshop on Biologically-Inspired Robots, St. Louis, USA, October 2009

(1) Co-organized by: Surya SINGH, Roger QUINN, Ken WALDRON
(2) Co-organized by: Kin Huat LOW, Jorge SOLIS, Xinyan DENG, Ravi VAIDYANATHAN

List of outreach activities outside the RAS

- Track on "Biorobotics and Biomechatronics" of 4th International Conference on Autonomous Robots and Agents, February 10-12, 2009, Wellington, New Zealand (IEEE Instrumentation & Measurement Society)
- Track “Anthropomorphism” of 17th CISM-IFToMM Symposium on Robot Design, Dynamics, and Control, July 5-9, 2008, Tokyo, Japan
- Track “Biorobotics for longevity” of 6th Intl Conference of the International Society for Gerontechnology, June 4-6, 2008, Pisa, Italy
- CUCS Distinguished Lecture: Blake Hannaford, Surgery over the Internet, Columbia Distinguished Lecture Series in Computer Science, September 17, 2007, USA
List of important publications over past 3 years in TC area.


Number of members of each year in the past three years

~ 10

Summary of top three technical innovations in the area

- **A bipedal jumping and landing robot**

- **A bio-inspired climbing robot**

- **Wingbeat Time and the Scaling of Passive Rotational Damping in Flapping Flight**
  A passive mechanism termed flapping counter-torque (FCT) model has been proposed. The FCT model predicts that isometrically scaled animals experience similar damping on a per-wingbeat time scale, resulting in similar turning dynamics in wingbeat time regardless of body size. The model also shows how animals may simultaneously specialize in both maneuverability and stability (at the cost of efficiency) and provides a framework for linking morphology, wing kinematics, maneuverability, and flight dynamics across a wide range of flying animals spanning insects, bats, and birds. Tyson L. Hedrick, Bo Cheng, Xinyan Deng, “Wingbeat Time and the Scaling of Passive Rotational Damping in Flapping Flight,” in Science, Vol. 324 (5924), pp. 252 – 255, April 10th 2009:

Recommendations (and alternates) for new co-chairs

- **Atsuo TAKANISHI (ASIA : old)**
  ₹ (new) Kin Huat LOW\(^{(3)}\) in 2009 (proposed to the TAB)
  ₹ (new) Jorge SOLIS\(^{(4)}\) in 2009 (proposed to the TAB)

- **Blake HANNAFORD (AMERICA: old)**
  ₹ (new) Xinyan DENG\(^{(5)}\) in 2009 (proposed to the TAB)
• (EUROPE: Not assigned)
  ← (new) Ravi VAIDYANATHAN\(^{(6)}\) in 2009 (proposed to the TAB)

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