Perception and Action
Cognitive Science 211

Course Syllabus, Fall 2008 (version 31 Aug 08)

lectures: T & R, Mudd Chemistry 318, 9:00 to 10:15 a.m.
labs: R, Olmsted 023 & 322, 1:30 to 5:30 p.m.

professor: John Long <> intern: Sonia Roberts (soroberts)
office: Olmsted 317 <> office hours: M&T, 10:30 a.m. - 12:00 noon.
email: jolong <> phone: x7305

		Lecture Topic	Lecture Reading (t = textbook; b = Blackboard pdf; h = handout)	Lab Topic	Lab Reading
	September				
T	2	Whence behavior?	—		—
	September				
R	4	The biology of behavior	Carew (t), Ch. 1; Gordon (t), Ch. 1-4.	Skill Acquisition I	
T	9	P&A paradigms: overview	Noe (t), Ch. 1; Pfeiffer & Scheier, Ch 1 (b)		
R	11	What is perception? Action?	Gordon (t), Ch. 5-8; Noe (t), Ch. 2; Searle (h) Pp. 57-70; Vogel (b), Ch. 1	Simple Analog Robots	Braitenberg (t), Pp. 1-28; 95-114; Jones et al. (h), Pp. 1-42.
T	16	P & A primitives: fundamental functional units?	Arkin (t), Ch. 1-2; Long et al. (b)		
R	18	P & A primitives: the agent paradigm	Carew, Ch. 4; Cheil & Beer (b); Pfeiffer & Scheier (h), Ch. 4 & 10.	Psychophysics	Schiffman (h).
T	23	Transducing the global energy array	Allman (h), Pp. 63-83; Jones (t), Ch. 7; Kolb (b).		
R	25	The mechanics of movement	Dickinson et al. (b); Vogel (b), Ch. 22-24	Robot Ethology I	Jones (t), Ch. 1-2.
T	30	Sensorimotor linkages	Arkin (t), Ch. 3; Dayhoff (h)		
	October				
R	2	Sensorimotor circuits	Carew (t), Ch. 3; Tank (b)	Robot Ethology II	
T	7	Action selection I	Arkin (t), Ch. 4		
R	9	Action selection II	Grillner et al. (b)	Skill Acquisition II	Rizolatti & Craighere (b); Proctor & Dutta (h); Hagendoorn (b).
T	14	Coordinating P&A: timing	Beer (h); Eaton (b)		
R	16	Plasticity and evolution	Arkin (t), Ch. 8; Nolfi & Floreano (t), Ch. 1-3.	Skill Acquistion III	
	October Break				
T	28	Coordinating P&A: motion	Carew (t), Ch. 2; Noe (t), Ch 3		
R	30	Coordinating P&A: sensory guidance of locomotion	Bruce et al. (h), Pp. 267-311; Noe (t), Ch. 5.	Making Behavior I	Jones (t), Ch. 5
	November				
T	4	Coordianting P&A: navigation	Arkin (t), Ch. 7; Carew (t), Ch. 12; Nolfi & Floreano (t), Ch. 4.		
R	6	Limits of reactive intelligence	Arkin (t), Ch. 5 & 6; Nolfi & Floreano (t), Ch. 5 & 6; Steels (b).	Making Behavior II	Jones (t), Ch. 6
T	11	Learning and evolution	Nolfi & Floreano (t), Ch. 7 & 8.		
R	13	Do robots make good models of behavior?	Webb (b)	Making Behavior III	Jones (t), Ch. 8
T	18	Discussion: robots as models	Webb (b), commentaries		
R	20	What good are robots?	Halloy et al. (b); Long et al. (b); Long (b).	Making Behavior IV	
T	25	One perceptual system or many?	Stoffregen & Bardy (b)		
	Thanksgiving Break				
	December				
T	2	Discussion: perceptual systems	Stoffregen & Bardy (b)		

R	4	The view from the bottom up: reaching and grasping	Bataglia-Meyer (b); Schaal (b); Wong&Willshaw (b)	Making Behavior V
T	9	Consciousness, perception, action	Hesslow (b); Kelly (h), Pp. 208-257; Noe (t), Ch 6 & 7	Demo Day: Skill & Behavior

Dec 15 to 19 Final exams: date to be announced by Registrar.

Assignments	**Value**	**Due date**
Lab report I: analog robots	5	R, 18 September, 1:30 p.m.
Lab report II: psychophysics	5	R, 2 October, 1:30 p.m.
Lab report III: robot ethology	10	R, 9 October, 1:30 p.m.
Lab report IV: skill acquisition	15	R, 30 October, 1:30 p.m.
Lab report V: making behavior	15	R, 9 December, 1:30 p.m.
URSI science reporting	5	T, 2 October, 9:00 a.m.
ACACA: autonomous complete ant cooperative agent: outline	5	R, 6 November, 1:30 p.m.
ACACA: autonomous complete ant cooperative agent: design	15	T, 2 December, 9:00 a.m.
Participation (attendance; group work; preparedness)	10	every lecture and lab
Final exam	15	to be announced
Total	100	

Policies

Attendance is mandatory at all laboratories; missing a lab without an excuse from your Class Advisor will result in the loss of 5 points (50%) from your participation grade.

Assignments handed in late will be penalized 2% for each day, including weekends.

Required Textbooks

Arkin, R.C. (1998). *Behavior-Based Robotics*. Cambridge, MA: MIT Press.

Braitenberg, V. (1984). *Vehicles: Experiments in Synthetic Psychology*. Cambridge, MA: MIT Press.

Carew, T.J. (2004). *Behavioral Neurobiology: the Cellular Organization of Natural Behavior*. Sinauer Associates.

Gordon, D. (2000). *Ants at Work: How an Insect Society is Organized*. W.W. Norton.

Jones, J.L. (2003). *Robot Programming: a Practical Guide to Behavior-Based Robotics*. New York: McGraw Hill.

Noe, Alva (2006). *Action in Perception*. Cambridge, MA: MIT Press.

Nolfi, S. & D. Floreano (2004). *Evolutionary Robotics: The Biology, Intelligence, and Technology of Self-Organizing Machines*. Cambridge, MA: MIT Press.