Syllabus P269 (68850)
Special Topics / Human Performance:
Computational Models of Memory

Time/Location. Spring Quarter 2003, Wednesday 9:30-12:30pm, SSPB 3249. Organizational meeting: Wed. April 2, 9:30am (SSPB 3249). Contact instructor for additional information.

Instructor. Mark Steyvers. Office: SSPA 2109. Email: msteyver@uci.edu.

Course Description. The goal of this course is to:

1) review some basic empirical findings in episodic (long-term) memory.
2) review several prominent computational memory models. We will contrast different modeling styles such as connectionist vs. Bayesian models and process oriented vs. descriptive models.
3) discuss new directions of research depending on the interests of students. One possibility is to review recent fMRI research relevant to memory modeling. Students are encouraged to propose relevant papers to read – in order to have time to discuss new papers, we might skip some papers on the current reading list.

The format of the course will be discussions and presentations by students. Implementation of various memory models is encouraged but not necessary.

Pdf's of all papers will be available on a website to be announced.

Grading Basis. A short paper will be due at final's week. Papers can be written about any topic relevant to the course. One possibility is to report on a simulation of a computational memory model. Another is to report on empirical results (behavioral or brain imaging) that might constrain or inform theoretical models of memory. Finally, it is possible to write a review paper contrasting several memory models.

Reading List (subject to change)

Introduction

Bower, G.H. (2000). A brief history of memory research. In E. Tulving & F.I.M. Craik (Eds.), The Oxford Handbook of Memory, pp. 3-32. Oxford University Press.

Global Memory Models (and alternatives)

(Minerva) *Hintzman, D. L.* (1988). Judgments of frequency and recognition memory in a multiple-trace memory model. Psychological Review, *95*, 528-551.

(Todam) *Murdock, B. B.* (1989). Learning in a distributed memory model. In C. Izawa (ed.), Current issues in cognitive processes: The Floweree Symposium on Cognition, pp. 69-106. Hillsdale, NJ: Lawrence Erlbaum and Associates.

(REM) *Shiffrin, R. M., & Steyvers, M. (1997).* A model for recognition memory: REM: Retrieving effectively from memory. Psychonomic Bulletin and Review, 4(2), 145-166.

(BCDMEM) *Dennis, S., and Humphreys, M. S. (2001).* A context noise model of episodic word recognition. Psychological Review, 108(2), 452-478.

Adaptive Nature of Memory – Models for the environment

Anderson, J.R., & Schooler, L.J. (2000). The adaptive nature of memory. In E. Tulving & F.I.M. Craik (Eds.), The Oxford Handbook of Memory, pp. 557-570. Oxford University Press.

Theories of Context

(ICE) *Murnane, K., Phelps, M.P. & Malmberg, K* (1999) Context-dependent recognition memory: The ICE theory. *Journal of Experimental Psychology - General,* 4 (128) pp.403-415

Howard, M. W. and Kahana, M. J. (2002). A Distributed Representation of Temporal Context. Journal of Mathematical Psychology, 46, 269-299.

Semantic aspects of Language & Memory

(LSA) *Landauer, T.K., & Dumais, S.T.* (1997). A solution to Plato's problem: The Latent Semantic Analysis theory of acquisition, induction and representation of knowledge. Psychological Review, 104, 211-240.

(TOPICS) *Griffiths, T.L., & Steyvers, M.* (in press). Prediction and semantic association. In: Advances in Neural Information Processing Systems.

Connectionist Models

McClelland, J.L. (2000). Connectionist models of memory. In E. Tulving & F.I.M. Craik (Eds.), The Oxford Handbook of Memory, pp. 583-596. Oxford University Press.

Norman, K. A. & O'Reilly, R. C. (in press). Modeling hippocampal and neocortical contributions to recognition memory: A complementary learning systems approach. Psychological Review.

(TRACELINK) *Murre, J.M.J., Graham, K.S., & Hodges, J.R.* (2001). Semantic dementia: relevance to connectionist models of memory. Brain (2001), 124, 647-675.

Dual Process Models

Kelley, C.M., & Jacoby, L.L. (2000). Recollection and familiarity: process dissociation. In E. Tulving & F.I.M. Craik (Eds.), The Oxford Handbook of Memory, pp. 215-228. Oxford University Press.

Yonelinas, A.P. (2002). The nature of recollection and familiarity: a review of 30 years of research. Journal of Memory and Language, 46, 441-517.