Department of Computer Science and Engineering
University of California at San Diego

CSE 255
Winter 1998

CSE 255: Intelligent Systems

CSE255 is a graduate course on applied artificial intelligence. This is a core course for students in the M.S. Program in Advanced Manufacturing, but all graduate students in computer science, cognitive science, and engineering are welcome to participate also, as are qualified undergraduates.

The description of the course is:

> Data mining: statistical, neural network, and decision tree methods. Knowledge-based problem-solving: forward and backward chaining rule-based inference, decision trees, and case-based reasoning. Expert system architectures, languages, and tools. Applications in scheduling, planning, diagnosis, and training. Fuzzy logic and heuristic control. Guidelines for successful intelligent system deployment.

Lectures:

> Tuesdays and Thursdays from 2:20pm to 3:40pm in Center Hall room 206. The lecture time may be changed to accommodate students coming from another course.
>
> Lecture notes will be made available online through the course web page at `http://www-cse.ucsd.edu/classes/wi98/cse255/`.

Instructor: Charles Elkan, Associate Professor.

> Office: APM 5131 until further notice.
> Office hours: Mondays and Wednesdays 2pm to 3pm, or by appointment.
> Telephone: 534-8897
> Email: `elkan@cs.ucsd.edu`
> Secretary: Lisa Bodecker, APM 3141, 822-0702

References:

> Five textbooks are recommended, but their purchase is not required:
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> - *Seven methods for transforming corporate data into business intelligence* by Vasant Dhar and Roger Stein, Prentice Hall, 1997,
> - *The engineering of knowledge-based systems: Theory and practice* by Avelino J. Gonzalez and Douglas D. Dankel, Prentice Hall, 1993,
> - *Fuzzy Logic and Neurofuzzy Applications Explained* by Constantin von Altrock, Prentice Hall, 1995,

- *Introduction to Knowledge Systems* by Mark Stefik, Morgan Kaufmann, 1995, and
- *Artificial Intelligence: A Modern Approach* by Stuart Russell and Peter Norvig, Prentice Hall, 1995.

Readings from other sources will also be distributed.

Assignments:

There will be four or five project assignments, a midterm examination in class, and a final examination. Grades will be based 1/3 on the examinations and 2/3 on the projects. The examinations will be based on the lectures and projects, and are meant to be straightforward. You will be allowed to bring personal notes to the exams.
The project assignments will be team efforts that involve the design and/or implementation of real-world applications. These assignments will use use modern high-level software designed to help in building real-world AI applications.

Teamwork:

One of the findings of Avron Barr and Shirley Tessler, co-directors of the Stanford Computer Industry Project, was that

> ... interviewees at software publishing firms in the US were satisfied with the graduates of US computer science programs, at both the undergraduate and graduate levels. US respondents did express some reservations regarding training in project management and team development, however.

This course is intended to help develop your teamwork skills.

For the project assignments, you should form a team of three people. Each team should hand in one joint solution. You are encouraged to discuss the assignments with people in other teams, but each team must hand in solutions written up independently.

Each team should have at least one member with programming experience, and should contain members from at least two different departments or programs. You may change teams for each project if desired.

Each team will receive a single grade for each assignment. This score will be recorded for each team member. To develop team communication skills and to help you learn from your experience, for each assignment, each team should submit one joint "team peer evaluation" form. Samples of this document will be distributed. Team peer evaluation forms will be kept confidential, and will not be used for grading purposes, except possibly to give extra credit for outstanding individual performance.

Computer resources:

For this course you may use Sun computers in the Advanced Programming Environment (APE) lab, located in APM 6426. The APE lab web page is `http://www-`

cse.ucsd.edu/cse/restricted/APE_lab.html. If you are not a CSE grad student, then send email to csehelp@cs.ucsd.edu to request access to APE lab resources.

Schedule of topics:

The schedule below is from 1997 and illustrates the range of topics to be covered. The actual schedule will be different, and the first main topic will be data mining.

Page references below are to *The engineering of knowledge-based systems: Theory and practice* by Avelino J. Gonzalez and Douglas D. Dankel. References for other topics will be announced later.

date	*topic*	*pages*
Jan 6	Artificial intelligence application trends	26–31
Jan 8	Expert system architecture and CLIPS6.0	1–3, 19–25, 34–45
Jan 13	Rule-based knowledge representation	86–109
Jan 15	Object-oriented knowledge representation	174–189, 195–199, 203–204
Jan 20	Formal logic	47–60
Jan 22	Guest lecture by Dr. Friedman-Hill on Java and CLIPS	
Jan 27	Probabilistic reasoning	232–239
Jan 29	Model-based reasoning	263–279
Feb 3	Case-based reasoning	279–284
Feb 5	Hypermedia knowledge-based systems	
Feb 10	Scheduling and planning applications	
Feb 12	Expert system development methodology	296–433
Feb 17	Fuzzy logic	254–260
Feb 19	Fuzzy control	
Feb 24	Fuzzy control applications	
Feb 25	Data mining and learning decision trees	
Mar 3	Bayesian learning and decision theory	
Mar 5	Neural network learning	
Mar 10	Knowledge discovery in databases	
Mar 12	TO BE ANNOUNCED	