Road Map

A little history and background

Individual perspectives:

- Niels Taatgen
- Mike Schoelles
- Frank Ritter
- Me

Discussion
History: The Beginning

1994: First ACT-R Summer School
- Maybe call this one a beta

1995: Second ACT-R Summer School
- Taught primarily by John & Christian
- ACT-R 2.0
  - Slow machines, bare Lisp
- Students worked in pairs, not individually
- Some of the students:
  - Niels Taatgen, Kevin Gluck, Mike Byrne
- Considered successful enough to continue as an annual event
History: The Middle Years

Late 1990s
- Different units taught by different instructors at CMU
- First ACT-R environment (with structured editor)
- Formalization of tutorial units
- Use of the 1998 book

Early 2000s
- Multiple courses based on ACT-R tutorial taught outside CMU
- Continued improvement of tools
  - Tutorial text, environment, exercises
- No updated book, however
  - 1998 book and 2004 Psych Review paper + other readings?
Recent History

- Full ACT-R manual available (yay)
- 2007 book
  - Covers ACT-R 6 including new utility learning
- Frequent tweaking and updating of materials
  - Cross-platform environment
  - Tutorial text
  - Exercises
- ACT-R now routinely taught at multiple institutions
ACT-R at Rice

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Course Background

- Titled “Computational Modeling of Human Cognitive Processes”
  - Inherited title
- Listed in Psychology
  - Not a requirement in either Psyc or CogSci majors
  - But an option that meets a requirement for both
- Mixed enrollment
  - Advanced undergraduates
  - 1st/2nd year graduate students
  - Must have had basic cognitive psych and at least some programming background
Course Outline

Start with “what is computation and modeling”
  • Pylyshyn, Newell-Simon

Schools of modeling
  • Early Newell on architecture, Rumelhart on PDP

Some coverage of PDP
  • Also cover some local connectionism (Thagard’s ECHO)

Then dive into ACT-R
  • 2007 book with supplemental readings
  • ACT-R tutorial units through Unit 6 only
Course Structure

- We have standard 15-week semesters
- 2 sessions per week
  - Generally one lecture/discussion, one lab
- 10 homework assignments
  - 1 essay on computation, 3 connectionist assignments, 6 ACT-R units
- Project
  - Pick a data set
  - Model it
  - Write it up
  - Lots of assistance from the instructor at each step
Clear understanding of:

- Limitations of one-off models
- Pros and cons of architectural approaches
- Why modeling is important and why it’s hard

Show clear progress in ACT-R

- Lots of terminology becomes natural
- Looking back at Unit 2, they can barely remember why it was hard
- But, still have misconceptions and limitations
Issues: ACT-R

- Always software issues
  - Students want to use their own laptops, always flaky
  - Hard to push updates to standalones
- Limited tutorial coverage (e.g., noise)
- No tutorial coverage
  - Additional modules like EMMA and Temporal
- Bad tutorial assignment: Blackjack was a complete disaster
  - Underspecification in assignment
  - No data to match—what’s the psychological content here?
- Mismatches between book and tutorial units
  - Ex: lots of BOLD stuff in book, little in tutorial units
Other Issues

- Variance in students is always a challenge
- Grading models is time-consuming
  - I now have code for testing each tutorial model in a variety of conditions
- Projects are difficult, but can be valuable
  - Writing UI code for experiments is especially painful
If you don’t teach ACT-R, why not?

If you do teach ACT-R

• What works?
• What doesn’t work?
• What tools/reading/exercises/etc. do you want?