An Intelligent Discussion-Bot for Guiding Student Interactions in Threaded Discussions
http://ai.isi.edu/discourse

Jihie Kim, Erin Shaw, Grace Chern, Donghui Feng
University of Southern California/Information Sciences Institute

- Courses Involved
  - Undergraduate CS Operating System, USC
  - Graduate CS Advanced OS, USC
  - Psychology of Women course at the Univ. of Massachusetts
  - Engineering Negotiation for Collaborative Product Development, USC
  - Graduate Security Systems, USC
  - Formal Languages and Automata, UC Irvine
  - Undergraduate CS Operating System, Michigan Technological Univ.
- ~500 past students
- ~150 current student
- Over 7000 messages

Modeling User Interactions in Discussions

- Interaction patterns in threads
  - e.g. threads that reach an agreement on a topic versus threads that have unanswered queries
- Topic Modeling
  - Topic of the discussion, topic coherence
  - Quality of the content (e.g. use of technical terms)
- Role of each participant and his/her contribution
  - e.g. person who asks many questions on a particular topic
- Interaction changes over time
  - e.g. topic changes over a semester

Topic Modeling (AAAI 2006)

Automatic SA Classifiers (AIED 2007)
- Cleaning/preprocessing/transformation of raw data
- N-gram features and Linear SVM
- Accuracy: QC (Question Classifier) – 88%
  - AC (Answer Classifier) – 73%

Thread Modeling with SA Classifiers

Pattern Group A: short information exchange on non-controversial issues
16 QUES <P1>  ANS <P2>
1 ANNO <P1>  ACK <P2>
16 QUES <P1>  ANS <P2>
1 ANNO <P1>  ACK <P2>

Pattern Group B: Discussion on somewhat complex issues, answers may have been found.
1 QUES <P1>  ANS <P2>  CORR <P3>
1 QUES <P1>  ELAB <P2>  ANS <P3>
1 QUES <P1>  QUES <P2>  ANS <P3>
1 QUES <P1>  QUES <P2>  CORR <P3>
1 QUES <P1>  QUES <P2>  QUES <P3>
1 QUES <P1>  ELAB <P2>  ELAB <P3>
1 QUES <P1>  QUES <P2>  QUES <P3>
1 QUES <P1>  QUES <P2>  ANS <P3>
1 QUES <P1>  ANS <P2>  ANS <P3>
1 QUES <P1>  ELAB <P2>  QUES <P3>
1 QUES <P1>  QUES <P2>  QUES <P3>
1 QUES <P1>  ELAB <P2>  QUES <P3>

Pattern Group C: collaborative discussion on complex issues, followed by agreeable conclusion
1 QUES <P1>  ANS <P2>  CORR <P3>  ACK <P4>
1 QUES <P1>  CORR <P2>
1 QUES <P1>  ACE <P2>
1 QUES <P1>  QUES <P2>  CORR <P3>  ANS <P4>  QUES <P5>
1 QUES <P1>  QUES <P2>  QUES <P3>  ANS <P4>  QUES <P5>

Pattern Group D: Students may have unresolved issues.
1 QUES <P1>  CORR <P2>
1 QUES <P1>  QUES <P2>  QUES <P3>  CORR <P4>  ANS <P5>
1 QUES <P1>  ANS <P2>  QUES <P3>  QUES <P4>  QUES <P5>
1 QUES <P1>  ELAB <P2>  QUES <P3>  QUES <P4>  QUES <P5>

Pattern Group E: students have a discussion on an issue that is not yet resolved.
1 QUES <P1>  ELAB <P2>  QUES <P3>  QUES <P4>  QUES <P5>