Executive Summary: Bayes Nets

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Building Bayes Nets

- Bayes nets are sometimes built manually, consulting domain experts for structure and probabilities.
- More often the structure is supplied by experts, but the probabilities learned from data.
- And in some cases the structure, as well as the probabilities, are learned from data.

Example: Pathfinder

- Diagnostic system for lymph-node diseases.
- 60 diseases and 100 symptoms and test-results.
- 14,000 probabilities.
- Expert consulted to make net.
  - 8 hours to determine variables.
  - 35 hours for net topology.
  - 40 hours for probability table values.
- Apparently, the experts found it quite easy to invent the causal links and probabilities.
Pathfinder is now outperforming the world experts in diagnosis. Being extended to several dozen other medical domains.

Other Bayes Net Examples:

- Further Medical Examples (Peter Spirtes, Richard Scheines, CMU)
- Manufacturing System diagnosis (Wray Buntine, NASA Ames)
- Computer Systems diagnosis (Microsoft)
- Network Systems diagnosis
- Helpdesk (Support) troubleshooting (Heckerman, Microsoft)
- Information retrieval (Tom Mitchell, CMU)
- Customer Modeling
- Student Retention (Clarke Glymour, CMU)
- Nomad Robot (Fabio Cozman, CMU)