

Final Exam Review / Study Guide

CS 1571, Fall 2017

Scope and Format

- Chapters 7-22 (sections from the syllabus)
 - Lectures (notes/in class)
 - Textbook
 - Homework assignments
- Closed book, in-class exam (Pitt exam schedule)
 - no make-up possibilities
- Question types same as midterm

Propositional and First Order Logic

- Given an English description, translate it into propositional and/or FOL and/or Horn Clauses
- Given sentences in logic, prove whether a statement is entailed
 - Truth tables
 - Chaining
 - Resolution
- Compare and contrast different types of logic
 - Unification
 - Reduction to propositional
 - Search

KR/Planning

- Representation and Inference
 - STRIPS
 - POP
- Translation/Comparison
 - English -> Representation
 - Representation A -> Representation B
 - Relation to Search

Uncertainty

- Motivation/Differences from Logic
- Representation
 - random variables, atomic events
 - prior and conditional probability
 - definitions and axioms
 - distributions
- Inference via full joint distribution
- Bayes Rule
- (Conditional) Independence

Bayesian Networks

- Translation from English into a network
- Compute the probability of some outcome using the network
- Explanation and comparison of networks
 - Are two events in the network (conditionally) independent ?
 - If multiple networks can model a scenario, why is one better than the other?
 - Comparison with FOL solution

Machine Learning

- Decision tree learning details
- Information gain computation
- Supervised learning literacy
- Evaluation approaches and metrics

Decision Making

- Formalize/solve making a rational decision given uncertain outcomes, using both expected value and utility.

Natural Language Processing

- Language Modeling
- Ngrams

Summary

- You should be able to formalize/represent a problem intuitively described in English
- You should be able to solve such a problem, once represented
- You should know the correct terminology
- You should be able to translate one formal representation into another
- You should be able to compare, contrast, and evaluate all the different representation and reasoning methods (e.g., with respect to expressiveness/tractability tradeoffs)