Spring 2008

CS 712: Advanced Topics in Artificial Intelligence: Inference Graphical Models

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# Tentative Syllabus

<table>
<thead>
<tr>
<th>Day</th>
<th>Topic</th>
<th>Reading</th>
<th>Optional Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/31/08</td>
<td>Introduction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4/02/08</td>
<td>Semantics of Bayesian networks and Markov random fields</td>
<td>L 2.1.1; P 3</td>
<td></td>
</tr>
<tr>
<td>4/09/08</td>
<td>Equivalence of chordal graph, decomposability and completeness of minimal separators; Maximum cardinality search algorithm</td>
<td>L 2.1.2-4; P 3.2.4</td>
<td>F. Jensen and F. Jensen, &quot;Optimal junction trees,&quot; Proceedings of the Tenth Conference Uncertainty and Artificial Intelligence, 360-366.</td>
</tr>
<tr>
<td>4/14/08</td>
<td>Heuristics to triangulate a graph; Properties of conditional independence</td>
<td>L 3.1; P 3.1.2-4</td>
<td></td>
</tr>
<tr>
<td>4/21/08</td>
<td>Factorization property on MRFs; Hammersley/Clifford theorem</td>
<td>L 3.2.1</td>
<td></td>
</tr>
<tr>
<td>4/23/08</td>
<td>Markov properties on Bayesian networks</td>
<td>L 3.2.2</td>
<td></td>
</tr>
</tbody>
</table>
4/28/08 Bayesian networks and directed factorization
4/30/08 Phylogenetic trees and chordal models
5/05/08 Mixture Models
5/07/08 Inference in HMMs
5/12/08 Inference on trees
5/14/08 Inference on undirected trees
5/19/08 Inference on poly trees
5/21/08 Exact inference on junction trees
5/26/08 Memorial Day Holiday (University Closed)
5/28/08 Generalized distributive law and Shenoy-Shafer formulation
6/02/08 Gaussian graphical models; Structure learning
6/04/08 Approximate inference
6/09/08 Project presentation