Game Theory and Computational Social Choice

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Artificial Intelligence

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Multiagent Systems

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Economic Paradigms
Game Theory

Game theory is the study of mathematical models for the analysis of strategic interactions between rational agents. Example:

<table>
<thead>
<tr>
<th></th>
<th>Normal</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>High</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>5</td>
</tr>
</tbody>
</table>

Keywords: strategic games, mechanism design, coalitional games
Computational Social Choice

Social choice theory is concerned with the design and analysis of methods for collective decision making. Example:

2 Germans: Beer $\succ$ Wine $\succ$ Milk
3 Frenchmen: Wine $\succ$ Beer $\succ$ Milk
4 Dutchmen: Milk $\succ$ Beer $\succ$ Wine

Keywords: voting theory, fair allocation, judgment aggregation
Course Characteristics

• **Commonalities**
  – Analysis and discussion of formal models of real-world concepts
  – Lots of problem solving, mathematical maturity expected
  – Little or no programming required

• **Game Theory**
  – Focus on textbook material in mathematical economics
  – Assessment by homework

• **Computational Social Choice**
  – Focus on current research, topics change every year
  – Assessment: homework + group research project (paper/talk)