Overview

- Seminar-like graduate course
- Lectures, reading, reviewing, discussing
- Projects (theory development, prototyping, and writing)
Focus

- Qualitative spatial reasoning
- Cognitively plausible
- Small set of items
- Formalized
Visual vs. Symbolic Reasoning

- Tangerine next to aqua
- Aqua surrounds plum

Plum outside of tangerine
Graphical vs. Verbal Languages

• Analogies
  • visual reasoning about graphics
  • symbolic reasoning about natural language
Verbal Language

- Limited, but large vocabulary
- Finite (?) amount of valid sentences
- Multiple natural languages
- Words often ambiguous
- Descriptions are typically incomplete
Graphical Language

• Limited vocabulary
• Infinite (?) amount of valid *sentences*
• Spatial configurations captured very precisely
• Descriptions are typically complete
Challenge

• Find automatic reasoning mechanisms that come close to people’s spatial thinking

• Exploit these reasoning mechanisms across verbal and graphical languages
Spatial Relation Reasoning

• Types of spatial relations

• Cognitive concepts related to spatial relation types

• Computational models that reflect some aspects of people's reasoning

• Formal inferences over spatial relations
Types of Spatial Relations

• Finding a rationale for identifying a complete set of a type of spatial relations

• Deriving such a set of spatial relations

• Exploring the (algebraic) properties of that set of spatial relations

• Making inferences about configurations with spatial relations
Usefulness of Spatial Relation Reasoning

- Inference of missing information
- Evaluation of consistency and inconsistencies
- Computational comparisons of methods
Power of Inferences from Combinations of Types of Relations

- Canada north of Mexico
- New Brunswick in Canada
- New Brunswick north of Mexico
- New Brunswick outside of Mexico
Class Schedule

- First 5(?) weeks: MWF 11:00-11:50
- After that:
  - group projects and weekly individual meetings with me (and Matt)
Grades in 3-Credit Course

• Class Participation: 15%
• Homework: 10%
• Final: 10%
• Project: 65%