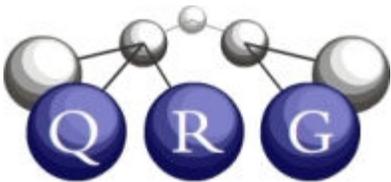
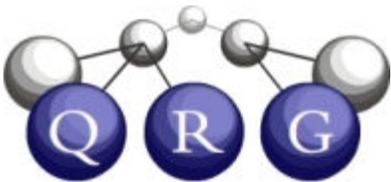


# Wrap-up



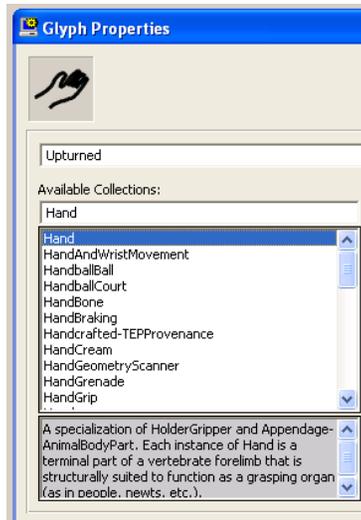
# Overview

- Seeking feedback on some plans for the near future
  - New conceptual labeling methods
  - High-level language for visual routines
  - Authoring support for education
  - Other “sweet spots” for education?
  - Building a community
- Discussion: What would you like to do with CogSketch?



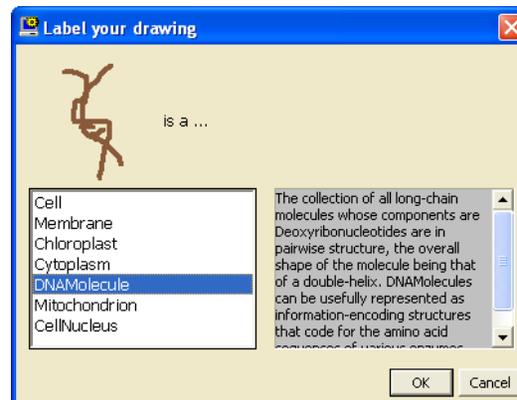
# Current Conceptual Labeling Schemes

KB concept picker



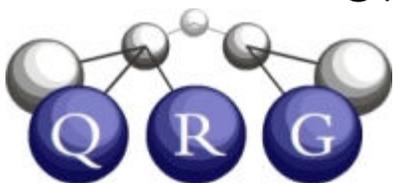
Wide breadth  
High reasoning support  
High entry barrier

List concept picker



Narrow breadth  
High reasoning support  
Low entry barrier

Strings



Wide breadth  
No reasoning support  
Low entry barrier



# Glyph Button Bars

- Associate domain symbols with predefined layer types
  - Use drag and drop to fill out information
- Can scale to  $10^3$  glyph types
- Only makes sense if learning visual symbols is part of domain learning

1. Choose type of glyph

2. Fill out roles in complex entities filled in via drag & drop

3

Draw

4. Draw ink for the glyph

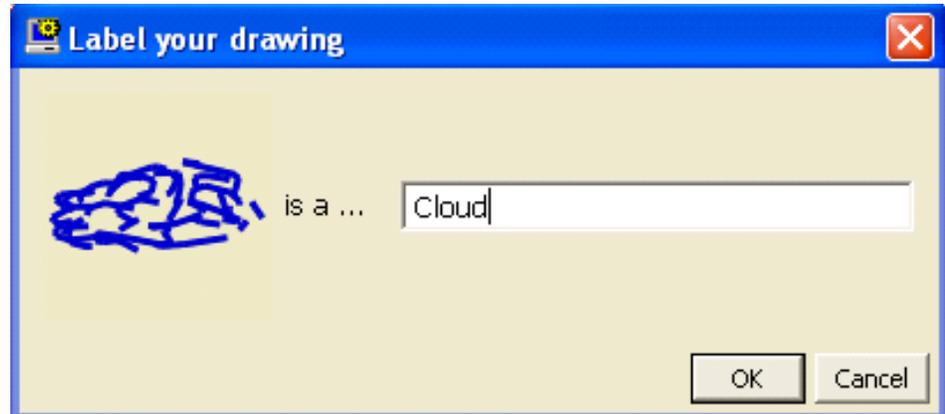
5

Finish

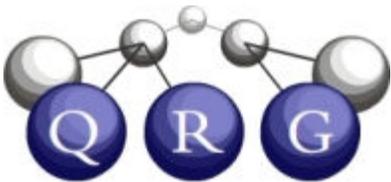


# Plan: Explore NLU for labeling

- Use string as input to natural language system
  - Lexical lookup
  - Phrase parsing
  - Use context of sketch to help disambiguate
  - If uninterpretable, fall back to just recording string

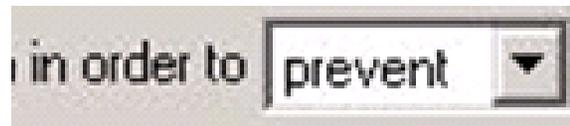
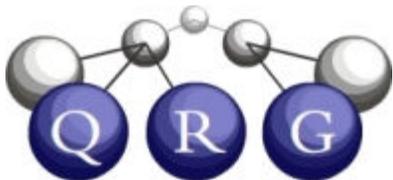


- Resources
  - WordNet/OpenCyc links already in KB
  - NULex, new lexicon integrating VerbNet & WordNet with OpenCyc
  - Existing simplified English NLU system (EA NLU)



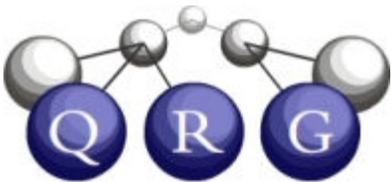
# Modalities for entering non-spatial information

- Examples: intended behavior, purpose of design, Q/A in tutoring, ...
- Simplified English NLP
  - Same infrastructure for conceptual labeling, plus discourse processing
  - Progress in language-based tutors suggests that this may be feasible for particular types of tasks
- Form-filling, as in Design Coach
  - Much less flexible, but very practical
  - Can use same word/phrase parsing as conceptual labeling



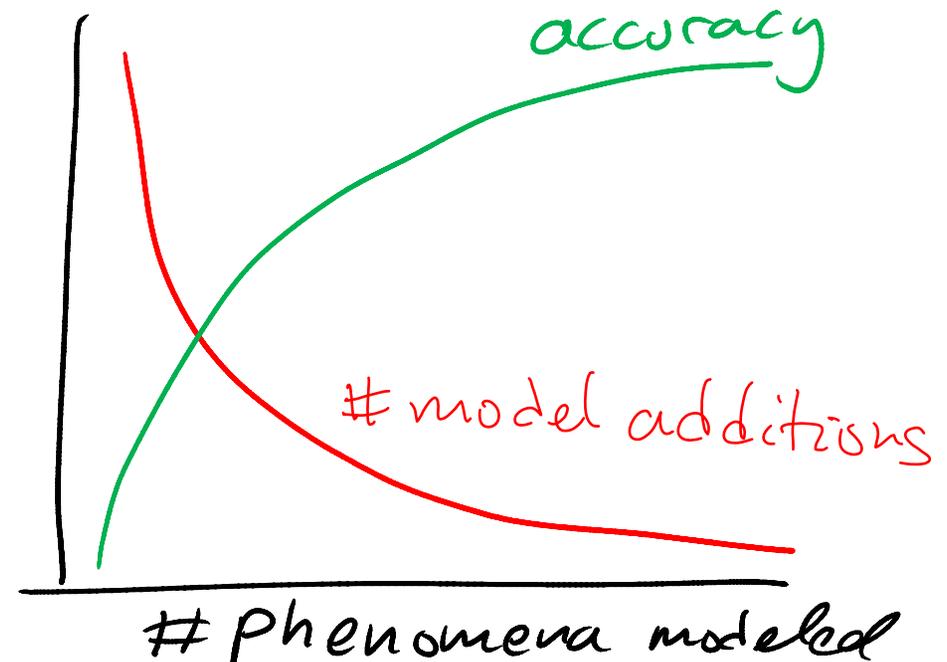
# Smoother Interface Mechanics

- Are speech commands worth exploring?
- Is it worth adding automatic segmentation heuristics?
  - Needs to be extremely reliable
  - Ability to edit the constituents of glyphs provides an error recovery mechanism



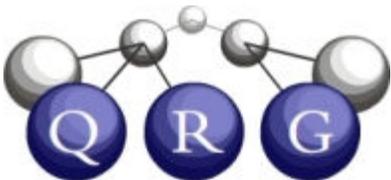
# Continue extending CogSketch into broad-scale model of human visual-spatial processing

- Accurate simulation of human performance
  - Evans, RPM, Visual Oddity
  - Expand: Sorby, Vandenberg, Paper Folding, etc.
- Explain individual & group differences via parameters and ablation
- Goal: Convergence of model as number of phenomena captured grows



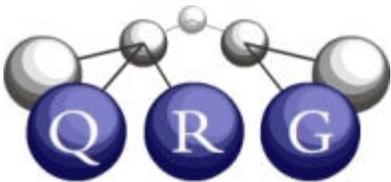
# Visual Routines Language

- Rapid convergence of techniques used to solve various visual tasks
  - But all of the simulations are written in Lisp code, driving CogSketch internal operations
- Possible approach: Define high-level declarative language for writing visual routines
  - Constrained to psychologically plausible operations
  - Support uploading of new routines by CogSketch users
  - May provide a simpler way to program CogSketch than the API



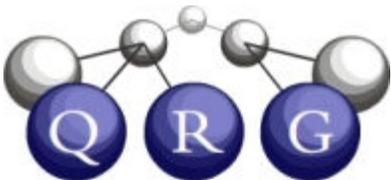
# Other “sweet spots” in education?

- Working hypothesis: Sketch-based educational software could have great benefits for education
- Worksheets: Simple, practical, low entry barrier
- Design Coach: Complex, but could raise the bar for intelligent tutoring systems
- Where else should we be looking?



# Building a Community

- Added “phone home” facility for gathering data from willing users
  - Identities scrubbed for privacy reasons
- Provide on-line archive for researchers to access submitted sketches
- Building a distribution site for worksheets
  - Goal: Create an “ecology” of worksheet users



# Discussion

- You've now seen the current state of CogSketch
- What might you be interested in doing with it?
- How might we extend it to help you do that?

