

Innate concepts as specialized programs?

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Cornell workshop on grammar induction
Commentary on Noah Goodman's talk
'Concept learning as probabilistic program induction'
May 16, 2010

Marr

I represent knowledge in (probabilistic) programming languages for human communication and machine execution.

- ▶ Separate what from how
- ▶ Reconcile generality with specialization

Question

How to base algorithmic accounts of human performance on Noah's computational models?

- ▶ Initial hypothesis: Church's general inference
- ▶ Eventual hypotheses: hand-coded special inference

Complaint

Why not discard Church model eventually?
Especially if special inference is approximate. . .

Suggestion

Custom code generation—compile model into inference!

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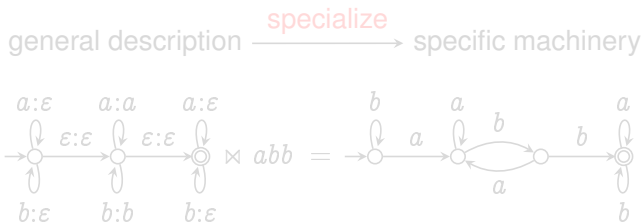
Parnas

'Domain-general', 'language-specific' are properties of modules.

A module is a part of a description of a system.

- ▶ Modularity should be invariant under physically entangled emulation with dye pack.
- ▶ Modularity makes a theory more concise, comprehensible.

Organizing principle: reuse in the face of change

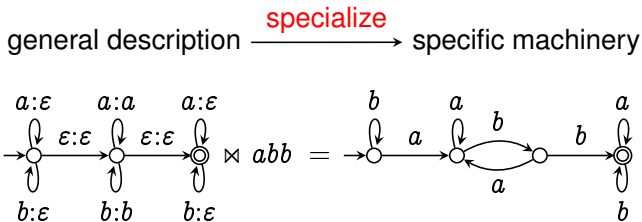


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Computation: $\lambda x. x^{10}$

Algorithm: $\lambda x. ((x^2)^2 \times x)^2$

Algorithm generator: ' $\lambda x. g(10)$ where $g(1) = 'x'$
 $g(2n) = g(n)^{'2}$ '
 $g(2n+1) = g(2n) ' \times x '$ '

Summary

A module is a part of a **description of a system.**

general description $\xrightarrow{\text{specialize}}$ specific machinery

'Compile time' includes evolution.