

Hypothesis Finding and I

Yoshitaka Yamamoto

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Self-introduction

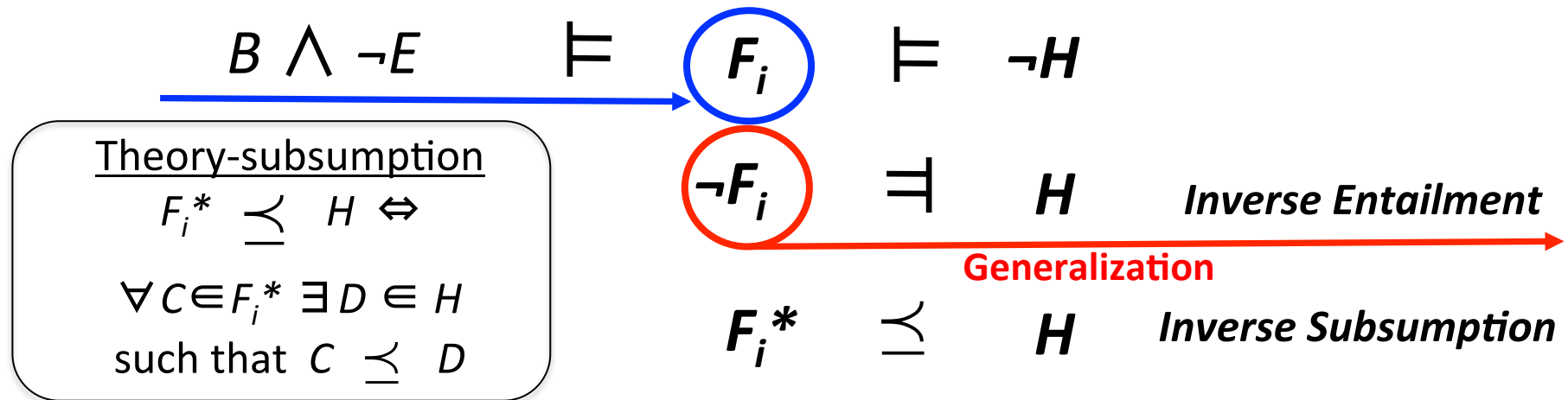
- ❑ The *first Ph. D. student* at Inoue lab in NII
 - 2006/10 – 2009/03 ··· working in NII
 - 2009/04 – 2010/10 ··· working in Univ. of Yamanashi
- ❑ My dissertation:
 - Research on Logic and Computation in *Hypothesis Finding*
- ❑ First paper which I have read in my B.Sc course
 - K. Inoue: Induction as Consequence Finding, J. of ML , 55, 2004
 - Toy but interesting example by A. Yamamoto

Input. Observation: $\text{odd}(5)$.
Background: $\text{even}(0)$. $\text{odd}(X) \rightarrow \text{even}(\text{successor}(X))$.

Output. Hypothesis: $\text{even}(X) \rightarrow \text{odd}(\text{successor}(X))$.

Research on hypothesis finding

- From Inverse Entailment (IE) to Inverse Subsumption (IS) (ILP2010): Logically reducing IE in the context of IS.



- Comparison of Upward and Downward Generalizations in CF-induction (ILP2011): Embedding IS approach to CF-Ind.
- Heuristic* Inverse Subsumption in Full-clausal Theories (ILP2012): Introducing a *best-first search* in IS approach

Current work on hypothesis finding

2013-2015 JSPS Grant-in-Aid for Young Scientists (B)

- Improving **IS-based Hypothesis finding system**
 - Non-monotone dualization
 - Non-grounded Inverse subsumption
(treating existential quantified formulas)
 - Theory subsumption
 - Resource-bounded Strategy
 - Approximation algorithms

- Knowledge discovery in molecular networks
 - Glucose repression pathway (FMMB?)
 - Simulation to demonstrate **the possibility of closed-loop learning** in some specific biological system