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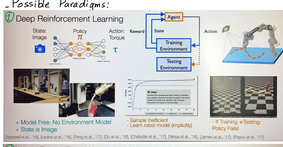
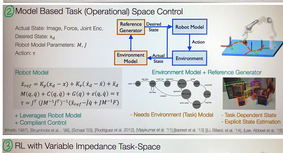
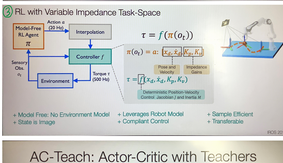
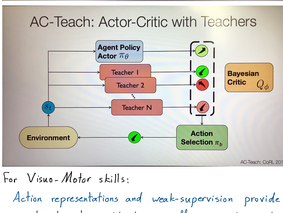
- Generalizable Autonomy for Robotic Manipulation:
  - Vision: Build intelligent robotic companion.
  - Approach: Learning with Structured inductive bias and priors.
    - Demonstrations → Task imitation → Generalization
  - Inductive bias in ML: a set of assumptions that the learner uses to predict output of given input that it hasn't been encountered. i.e. the ability to generalize beyond the training data.
- Leveraging imitation learning :
  - Control → visuomotor skills
  - Planning → Compositional planning
  - Perception → task structure
- Control (Visuo-motor skills):
  - Challenge: Algorithmic framework to learn diversity of skills.
  - Approach: Close the Visuo-motor loop with learning-based control.
  - Possible Paradigms:

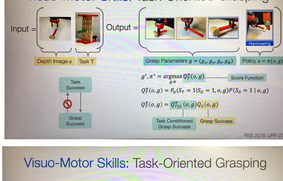


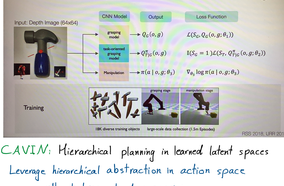




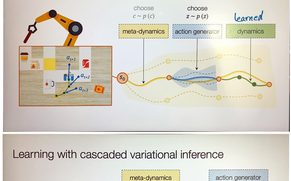


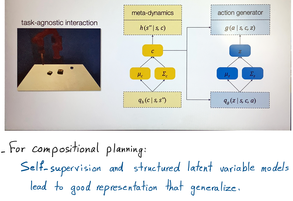
  - For Visuo-Motor skills:
    - Action representations and weak-supervision provide structure to enable learning efficiency and generalization.
- Planning (Compositional skills):
  - Sequential skills : Manipulation with tools.



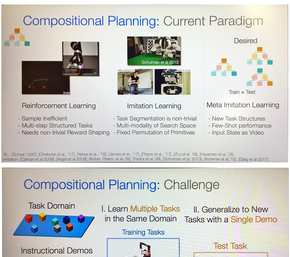


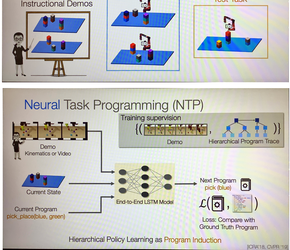
- CAVIN: Hierarchical planning in learned latent spaces
  - Leverage hierarchical abstraction in action space without hierarchical supervision.
  - CAVIN planner → effect code c (sub-goals), motion code z (motion)

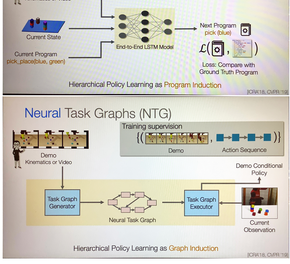




  - For compositional planning:
    - Self-supervision and structured latent variable models lead to good representation that generalize.
  - Complex task structure:







  - For task structure learning:
    - Compositional priors with modular structure enable generalizable learning in hierarchical domains.