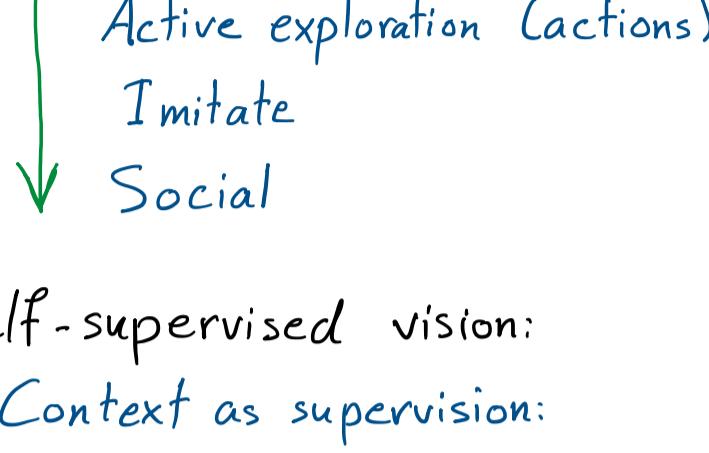


- Towards self-supervised curious robots:

Learning in Humans / Animals:

1. Unsupervised / Self-supervised
2. Physical in Real World.
3. Active exploration.
4. Diverse data and diverse tasks.
5. Continuous and lifelong (Reusability).
6. Multimodal.

- Stages of learning (babies):



- Self-supervised vision:

- Context as supervision:

images is composed of patches at different spatial positions.

spatial context - good at instance invariance.

- range of self-supervised systems:

images → videos → sound & depth → actions

- Learning in physical real world:

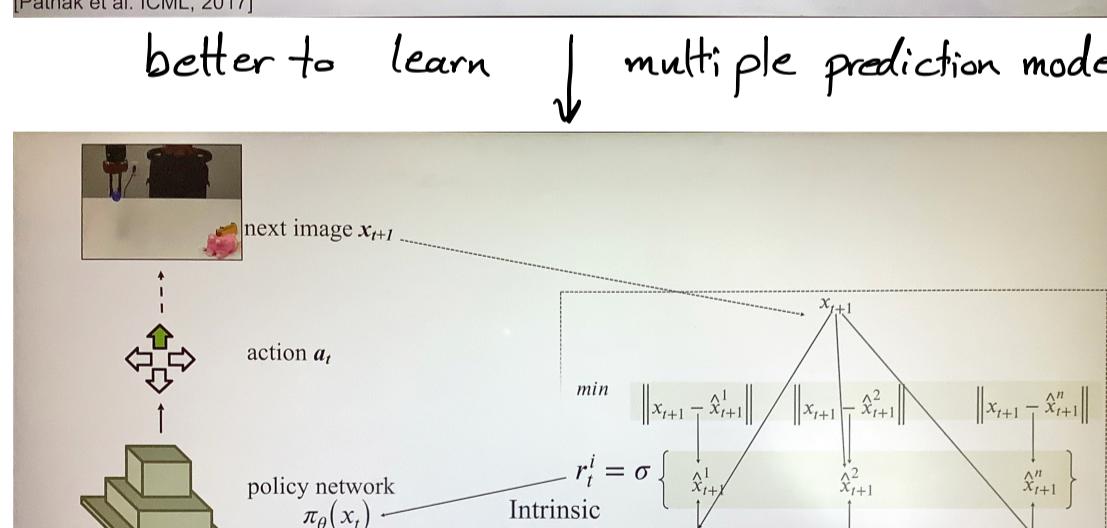
Mult-task robot learning using a shared network.

→ multi task better than single task.

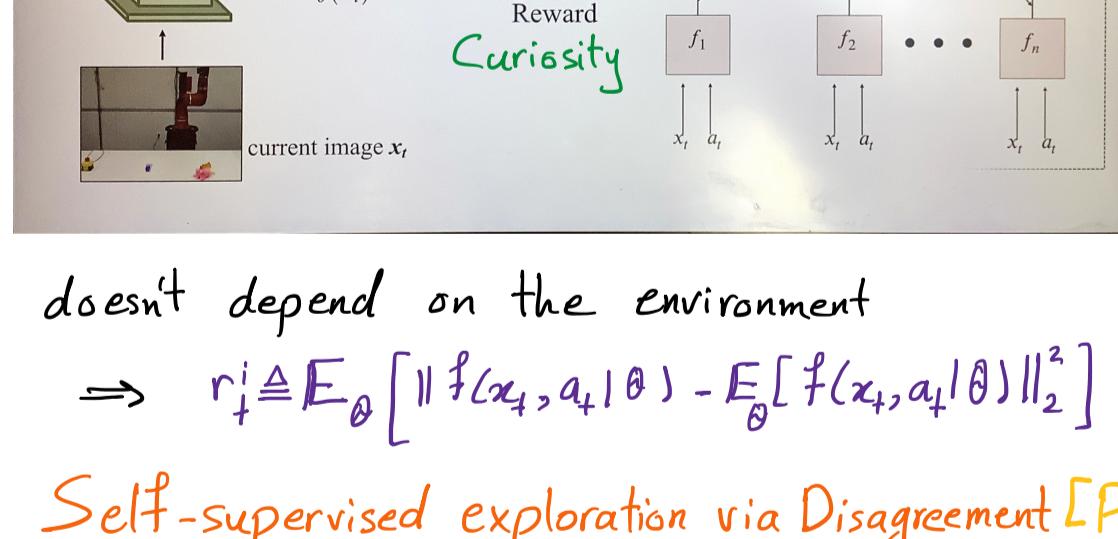
- Diversity:

1. Diversity of environments.
 2. Diversity of tasks.
 3. Diversity of hardware.
- hardware conditioned policies.

- Exploration:



better to learn ↓ multiple prediction models



doesn't depend on the environment

$$\Rightarrow r_t^i \triangleq E_\theta [\| f(x_t, a_t | \theta) - E_\theta [f(x_t, a_t | \theta)] \|_2^2]$$

Self-supervised exploration via Disagreement [Pathak '19]

- Goal: make robots learn synergistic behavior

Example: bimanual manipulation tasks.

Idea: explore how agents can change the world in ways they cannot do alone.

