**LIBERO: Benchmarking Knowledge Transfer in Lifelong Robot Learning**

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**Procedural Generation**

Crowd-source Human Activities

- On(white_mug, init_region_1)
- On(cabinet, init_region_2)
- Open(cabinet_top_drawer)
  - Specify init Configuration

- On(white_mug, cabinet_top_side)
  - Close(cabinet_top_drawer)
  - Specify Task Goals

PDDL Definition File

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**LIBERO Task Suites**

- LIBERO-Object
  - Different layouts, same objects

- LIBERO-Spatial
  - Different objects, same layout

- LIBERO-Goal
  - Different goals, same objects & layout

- LIBERO-100
  - Involve declarative knowledge
  - Involve procedural knowledge

- Diverse objects, layouts, backgrounds

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**Five Research Topics**

- Distribution Shifts
- Algorithmic Designs
- Neural Architectures
- Task Orderings
- Pretraining Effects

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**Implemented Lifelong Algorithms**

- Memory Buffer
  - Memory (Experience Replay)

- Dynamic Architecture
  - Dynamic Architecture (PackNet)

- Pretraining
  - Multitask Baseline (Multitask)

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**Results**

- The tested lifelong algorithms are overall good at backward transfer, but not at forward transfer, while sequential baseline vice versa.

- Vision transformers are better at declarative knowledge, while convolution networks are better at processing procedural knowledge.

- Simple language instructions of task goals would only function as bags of words, degenerating to the case of using task ids.