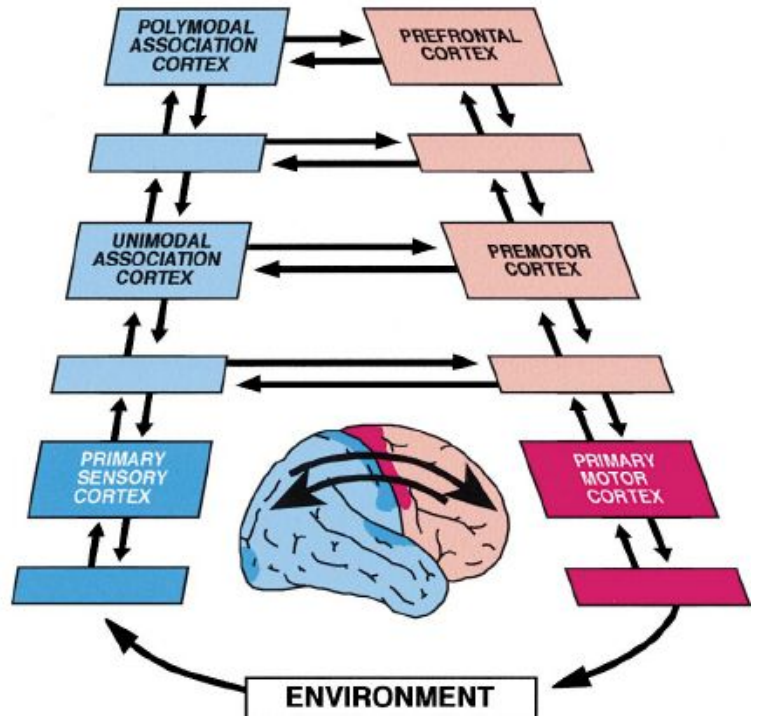


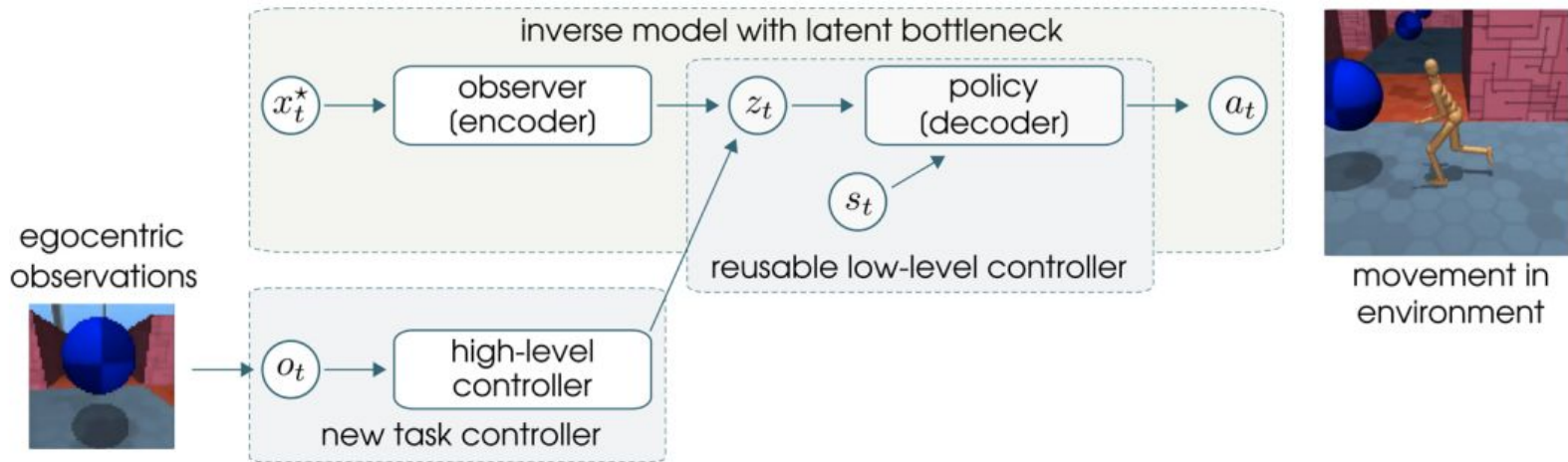
Executive Homunculus

SENSORY HIERARCHY

MOTOR HIERARCHY



(Fuster, Joaquin 2001)



(Merel et. al. 2017)

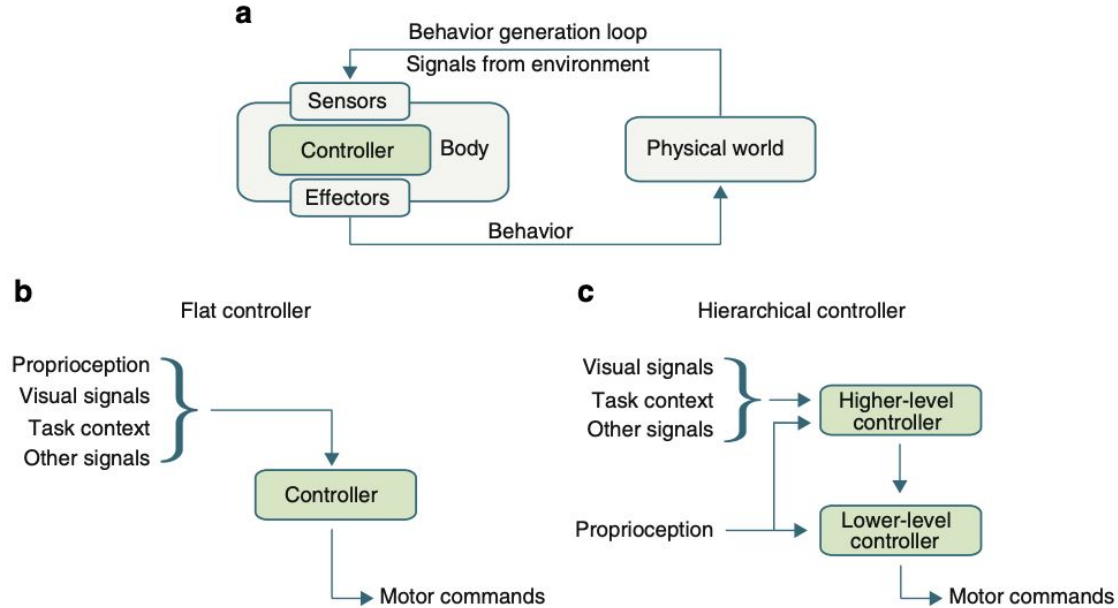


Fig. 1 **a** Interaction cycle between an embodied control system and a physical environment to generate behavior. **b** A flat controller with no architectural segregation of different inputs. **c** A basic, brain-inspired two-stage hierarchy: a lower-level motor controller directly generates motor commands to the effectors based on input from proprioceptive sensors and modulatory input from a higher-level controller, which is responsive to additional signals, including vision and task context signals.

(Merel et. al. 2017)

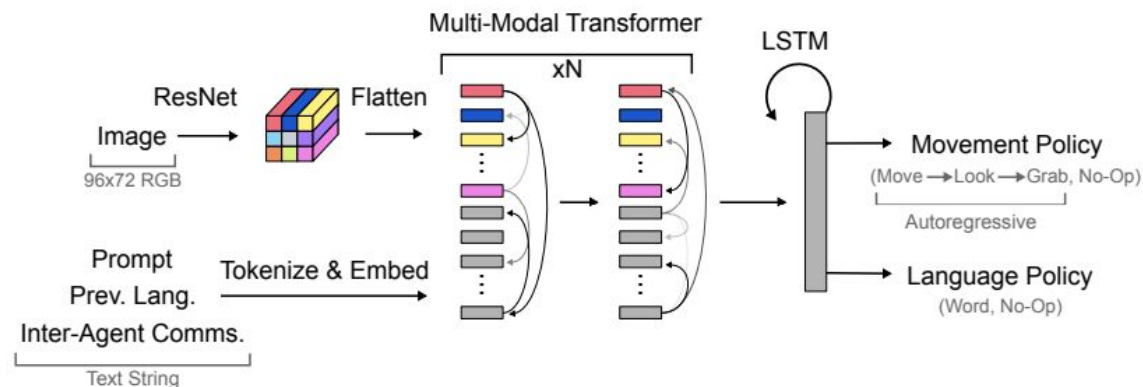
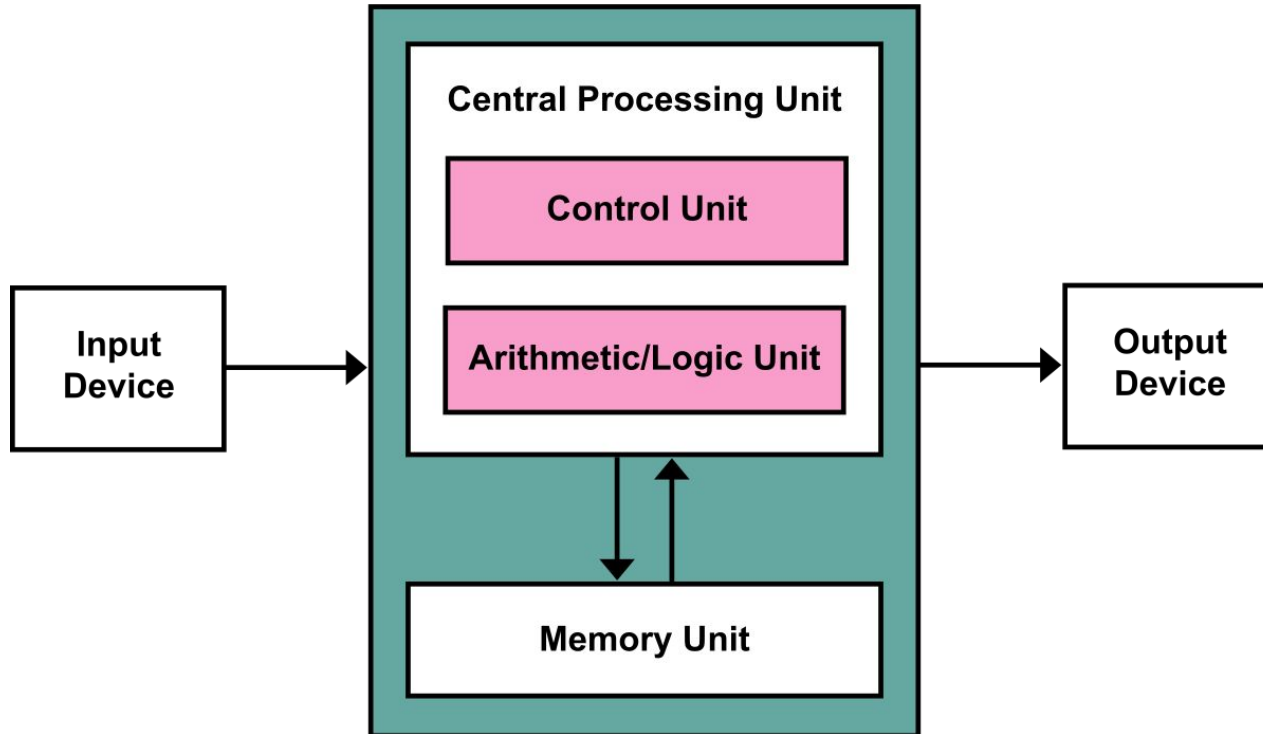
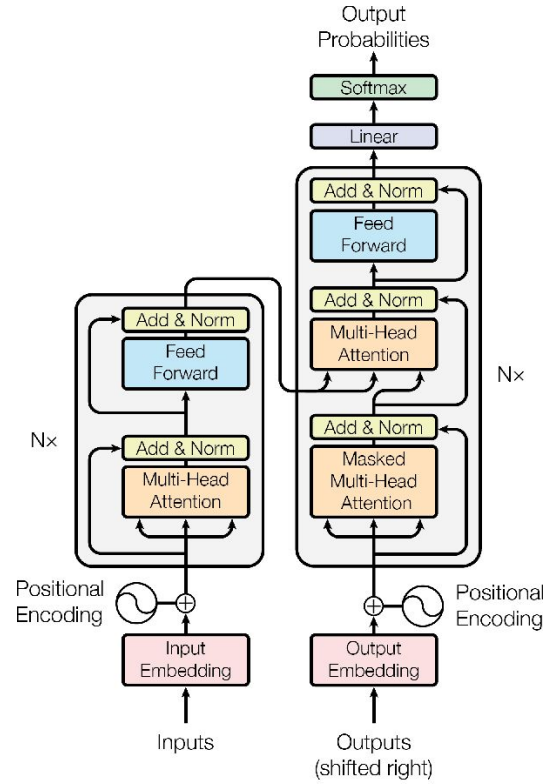


Figure 5: Agent Architecture. The agent receives both RGB images and text strings as inputs. The former gets encoded through a ResNet, and the latter are tokenized by word using a custom vocabulary, and subsequently embedded as distributed vectors. Together the ResNet “hyper-pixels” and tokenized words comprise a set of vectors that is the input to a multi-modal transformer. The transformer’s output provides the input to an LSTM, which in turn provides input to the motor and language policies.

(Abramson et. al. 2020)

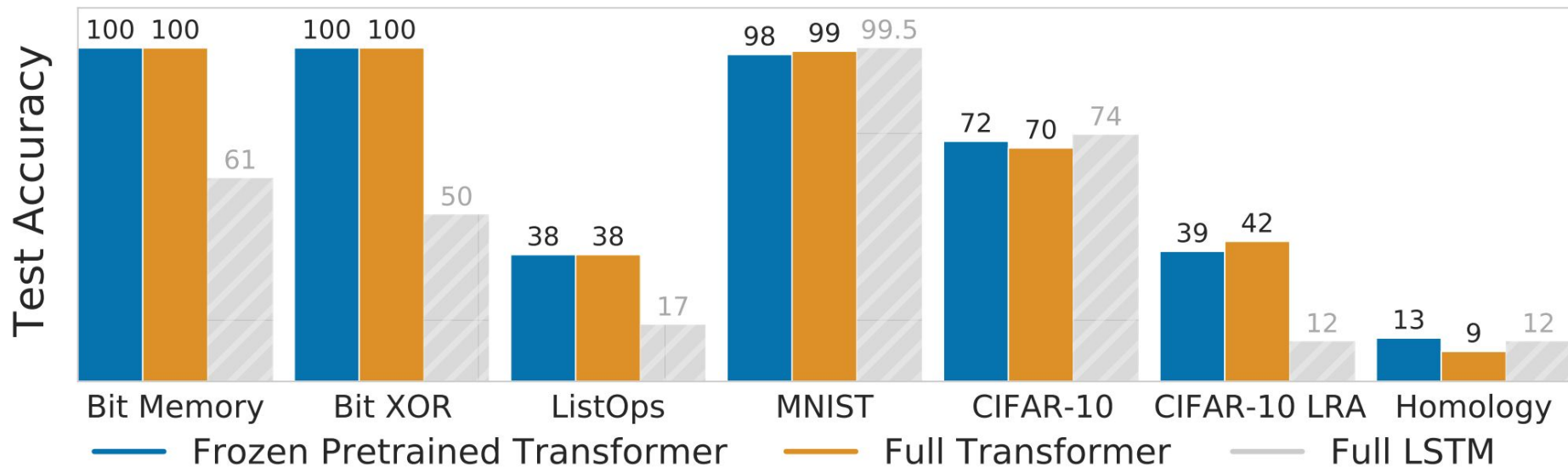
Von Neumann Architecture





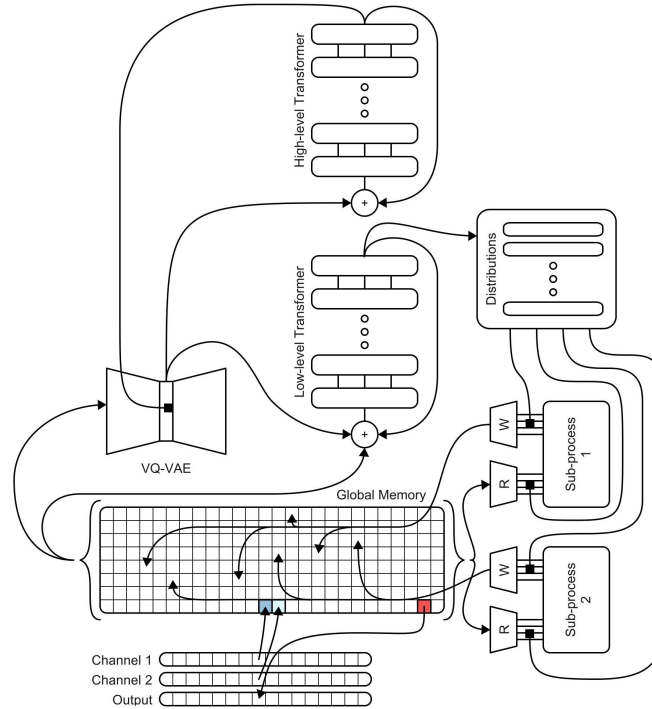
(Vaswani et. al. 2017)

Performance on Multimodal Sequence Benchmarks

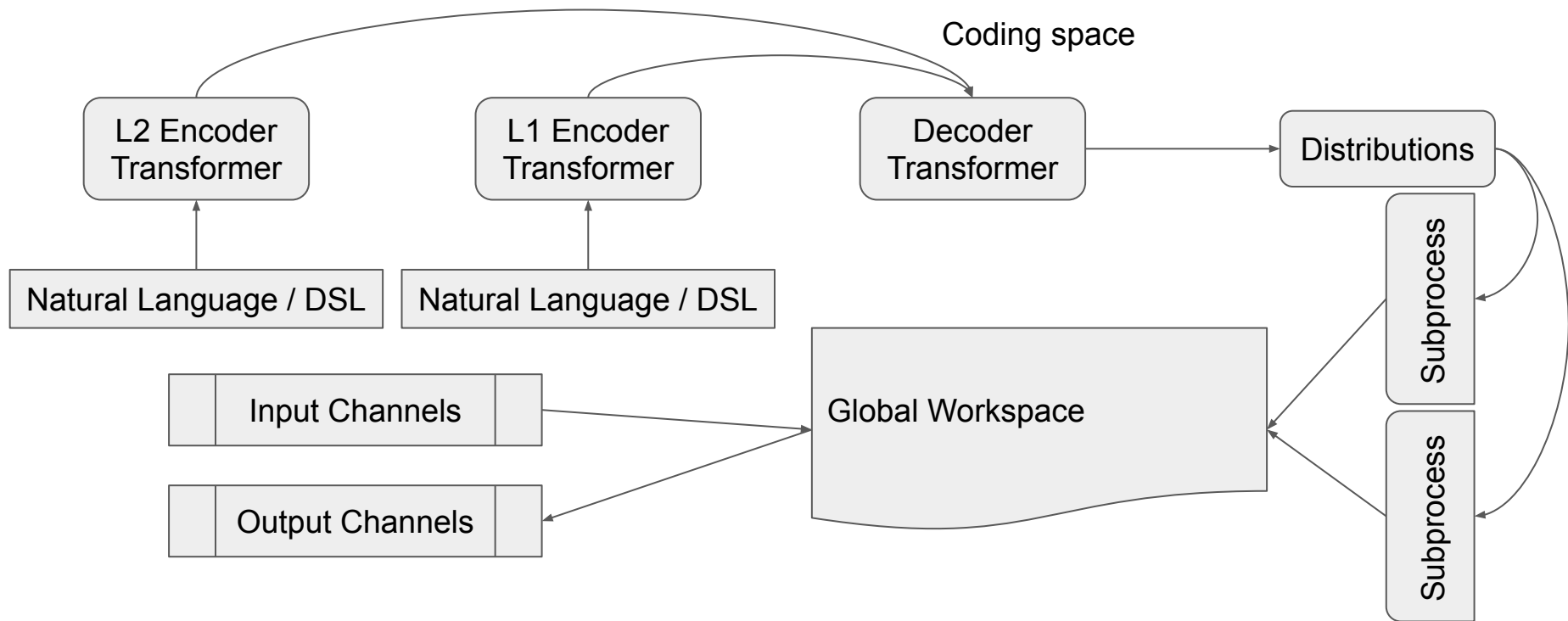


(Lu et. al. 2021)

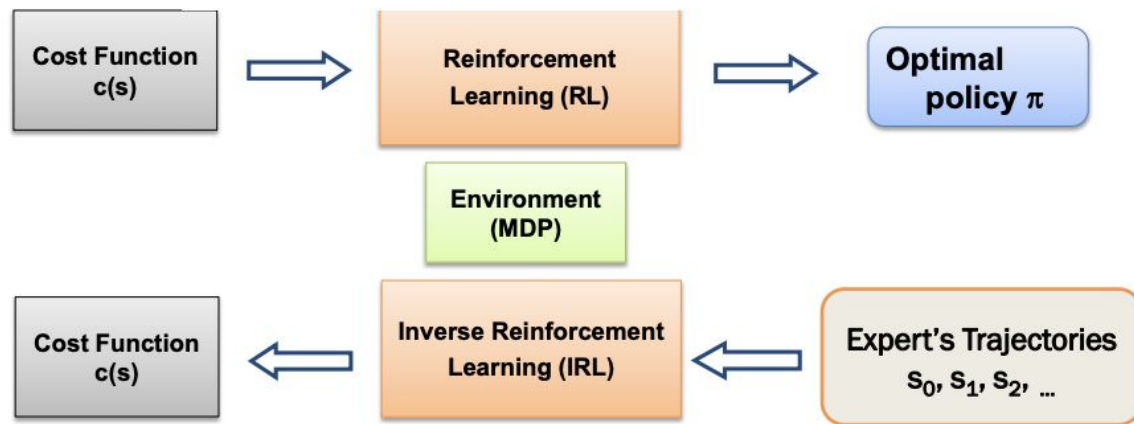
Old model



New Model



$$RL(c) = \arg \min_{\pi \in \Pi} -H(\pi) + \mathbb{E}_{\pi}[c(s, a)]$$



$$\text{maximize}_{c \in \mathcal{C}} \left(\min_{\pi \in \Pi} -H(\pi) + \mathbb{E}_{\pi}[c(s, a)] \right) - \mathbb{E}_{\pi_E}[c(s, a)]$$

(Ziebart et al., 2010;
Rust 1987)

↑ Everything else
has high cost

↓ Expert has
small cost

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(Ho, J., & Ermon, S. 2016)

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