



A Model or 603 Exemplars: Towards Memory-Efficient Class-Incremental Learning

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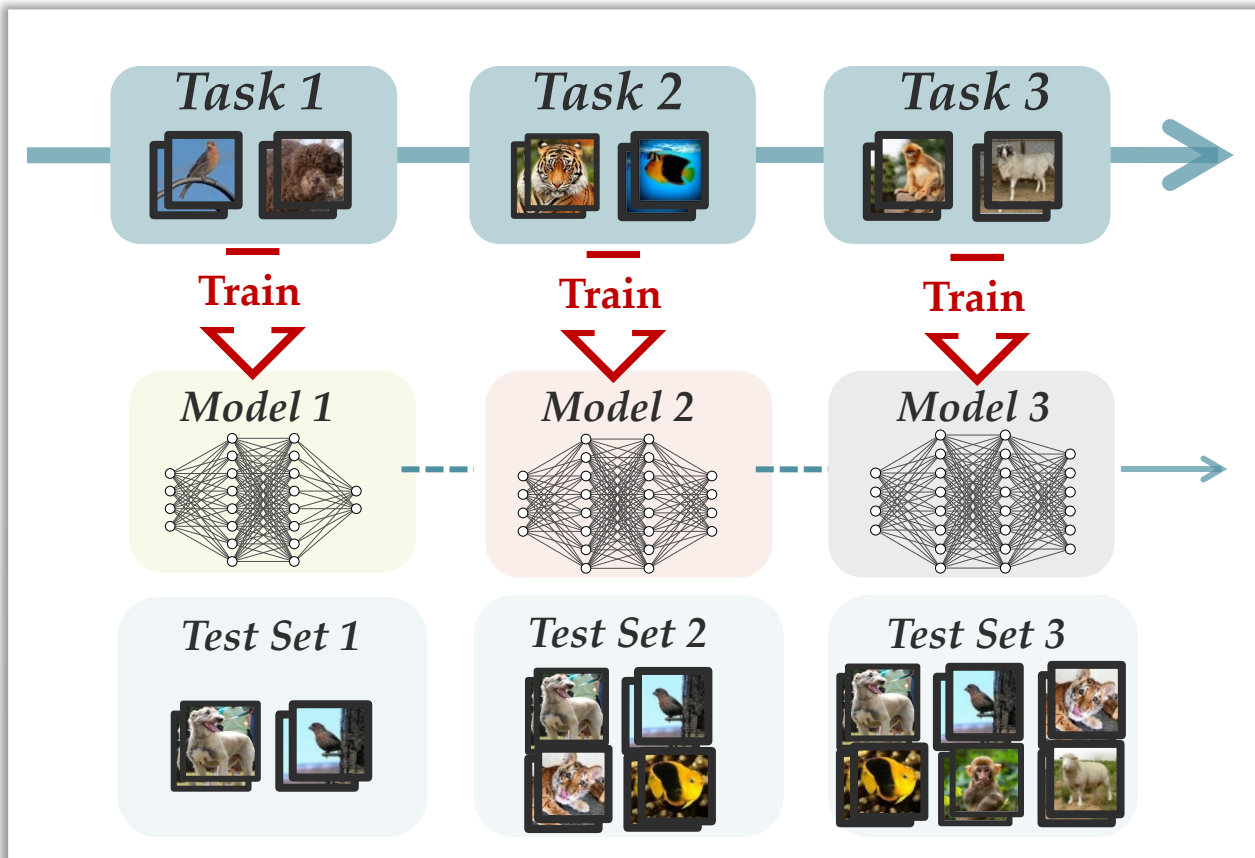
Nanjing University

ICLR 2023 Spotlight

2023-11 MLA



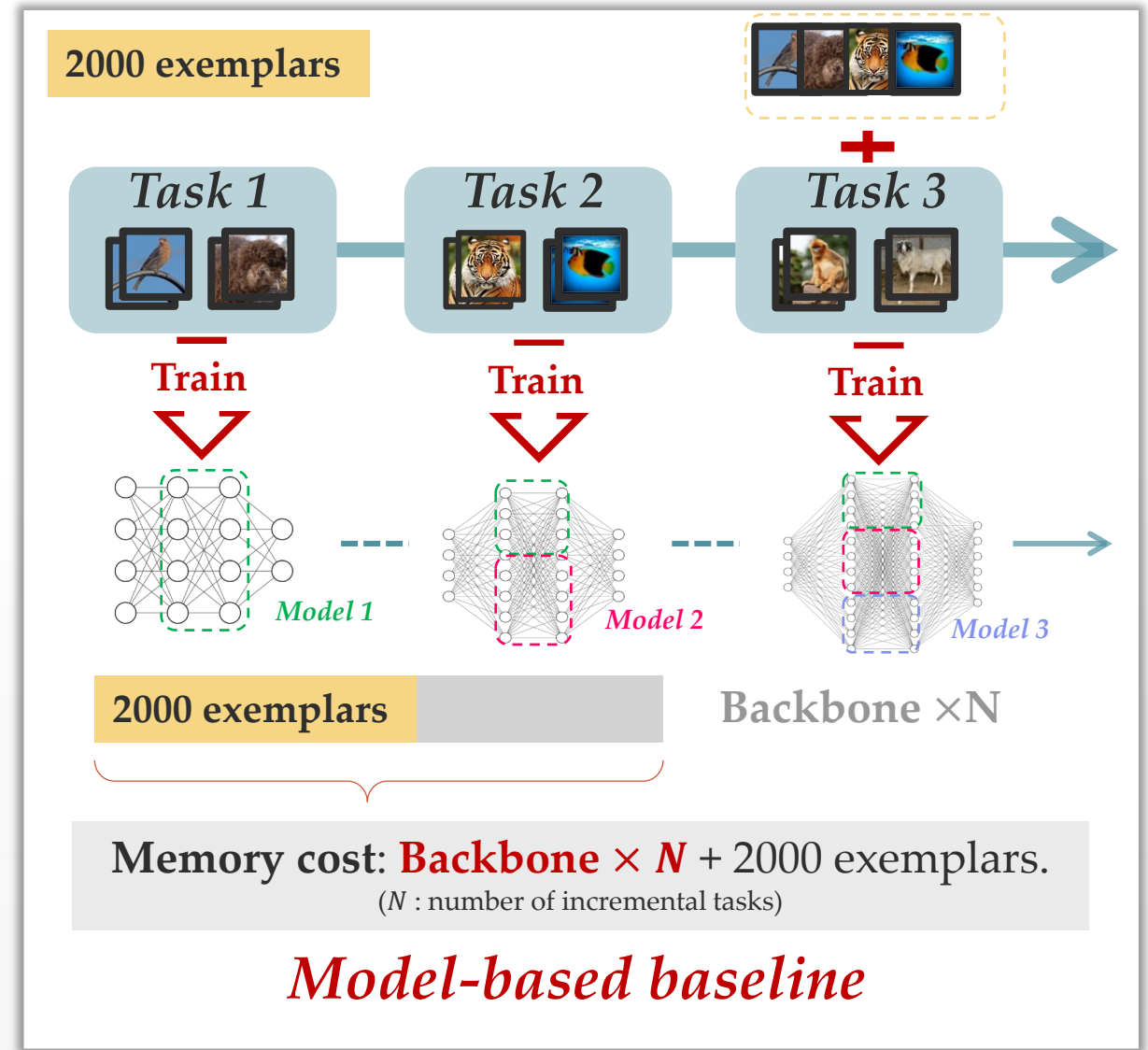
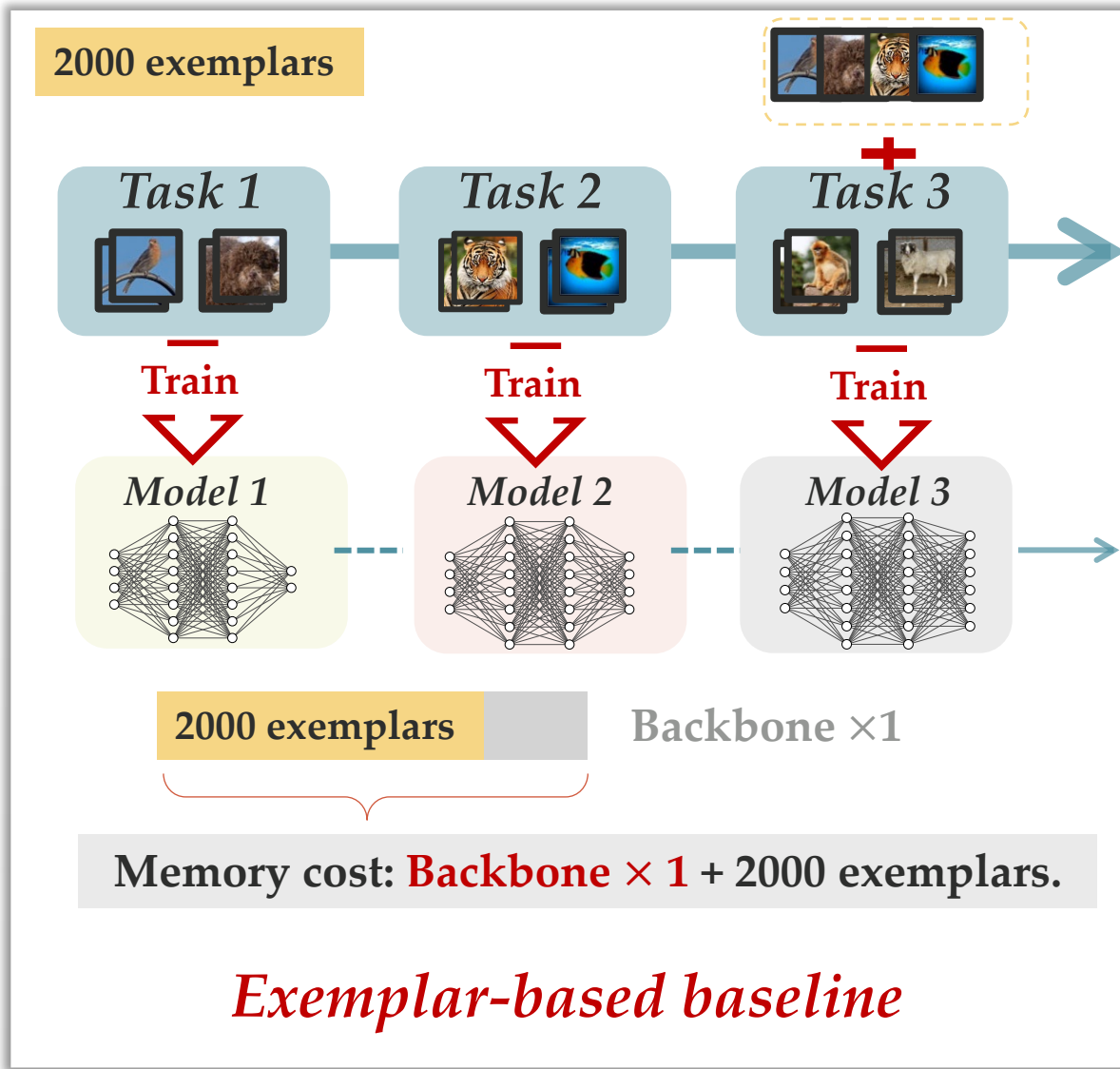
Class-Incremental Learning (CIL)



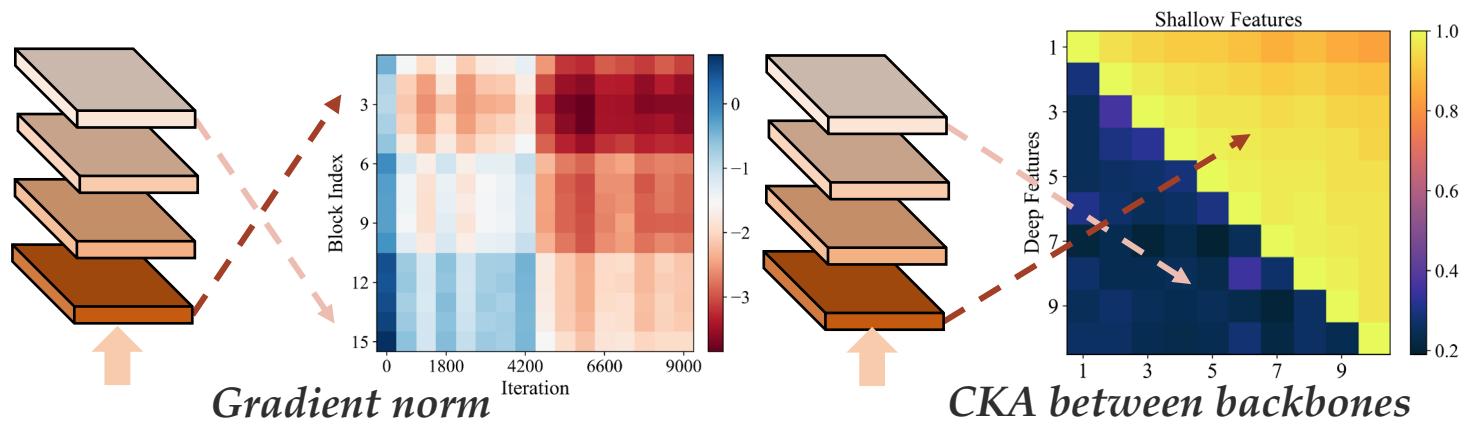
- **Classes emerge sequentially**
 - New categories emerge with time;
 - Testing with all seen classes;
 - Models only mainly have access to data of the current task.

Target: **Learn** new classes & **Remember** old classes.
Challenge: How to resist **catastrophic forgetting**?

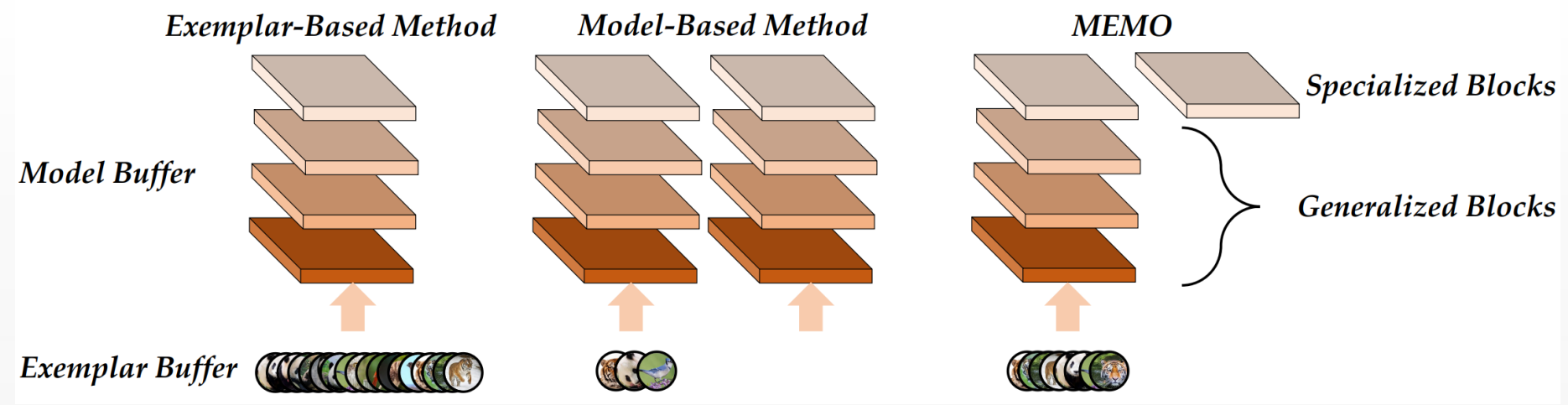
Baselines in CIL



Memory-efficient Expandable MModel

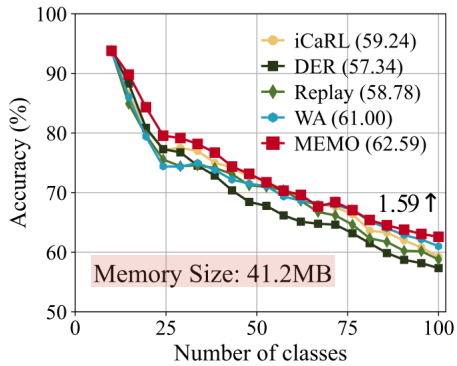


Shallow layers produce generalized features that are similar from task to task.

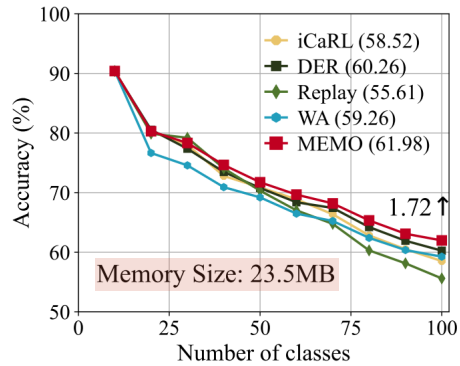


MEMO: *Share generalized blocks & extend specialized blocks for new tasks*

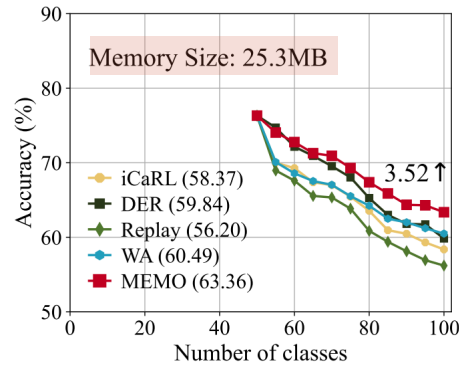
Experiments & Conclusion



(a) CIFAR100 Base0 Inc5

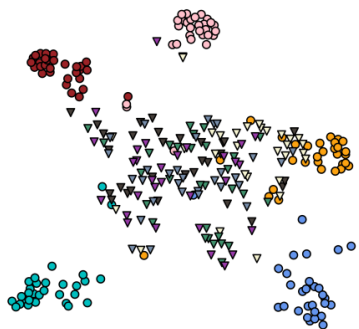
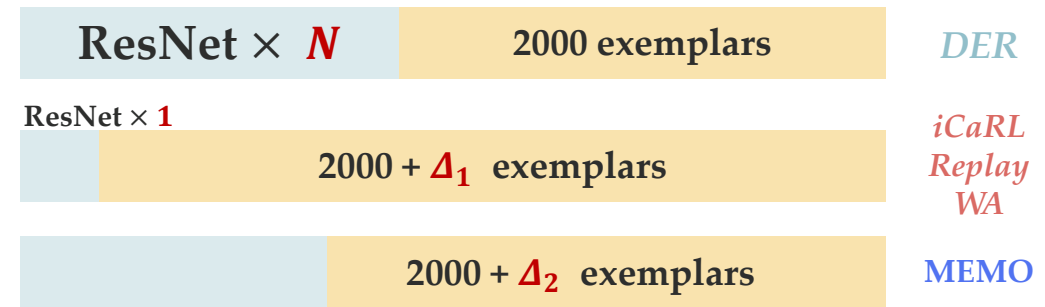


(b) CIFAR100 Base0 Inc10

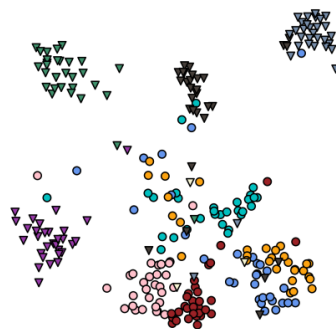


(c) CIFAR100 Base50 Inc5

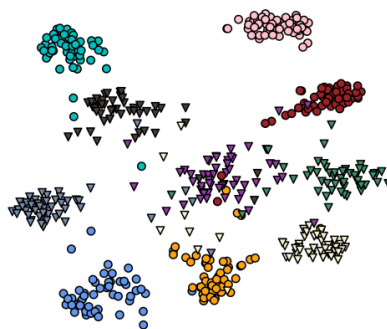
Same memory budget



(a) $\phi_{s1}(\phi_g(\mathbf{x}))$



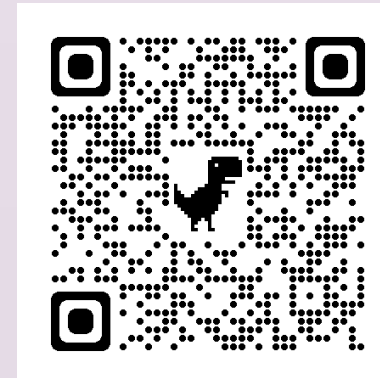
(b) $\phi_{s2}(\phi_g(\mathbf{x}))$



(c) $[\phi_{s1}(\phi_g(\mathbf{x})), \phi_{s2}(\phi_g(\mathbf{x}))]$

Specialized blocks can *discriminate* the corresponding task.

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Code



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