Insights from the Future for Continual Learning

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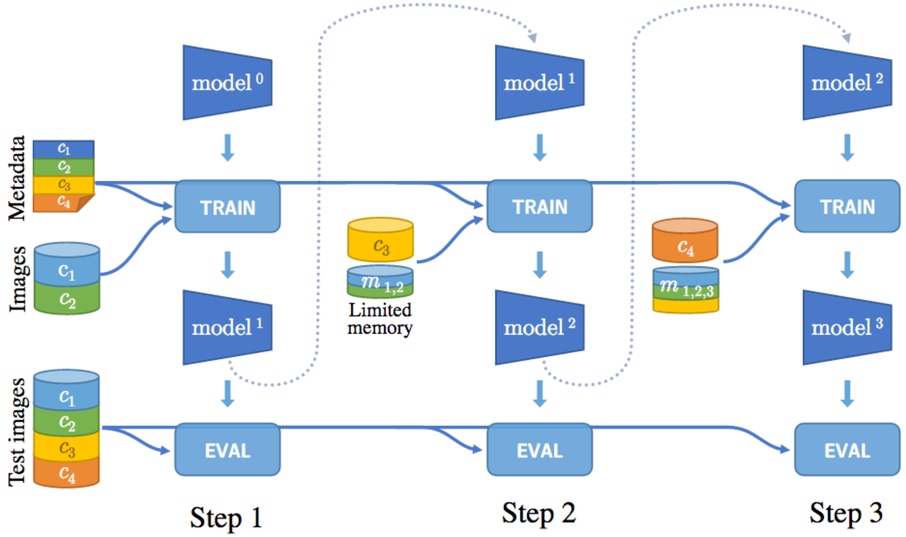
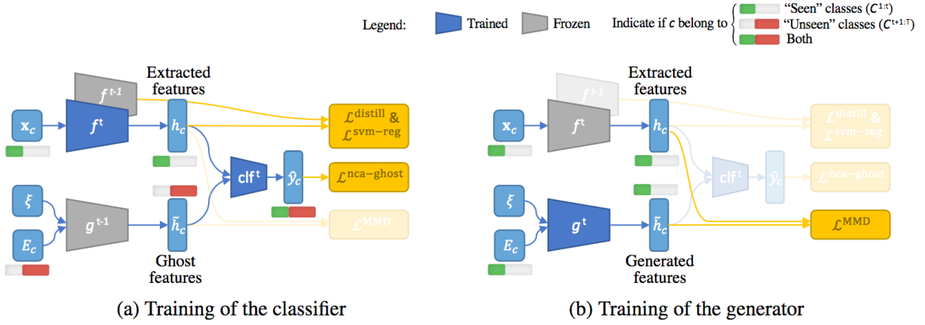
1. Context

- **Incrementally learn new classes**
- **A Selfless Network** should leave capacity for the future classes
- Can be done explicitely with a **prior on the future**

2. Prescient Continual Learning

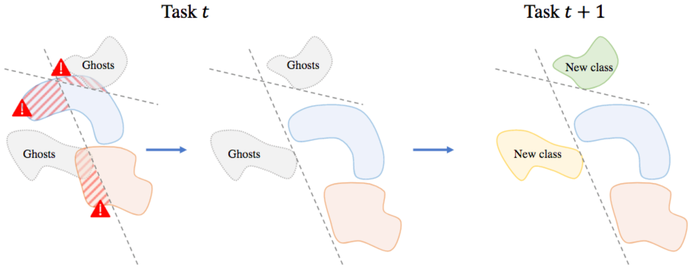
- **Training**: only seen current classes data and rehearsal data
- **Inference**: seen past, current, and future classes
- Related to **Generalized Zero-Shot**
- At any point in time, access to all classes **metadata**
  - Attributes, word embeddings, phylogenetic tree





3. Two phases

- **Generator training,** after every task
  - Input: their class metadata, and noise vectors
  - Output: generated features
  - Loss: Minimize MMD between real and generated features
- **Classifier training**, during each incremental task:
  - Online generation of future classes features based on their metadata
  - Train classifier on real features of current classes and fake features of future classes



4. Results

	AwA2			
	Continual Accuracy		Final Accuracy	
	PODNet	UCIR	PODNet	UCIR
Baseline	62.92	54.80	77.63	67.07
+NCA Ghost	68.31	57.88	78.70	67.43
+ SVM Reg	**68.46**	**58.08**	**79.08**	**67.53**

	aP&Y			
	Continual Accuracy		Final Accuracy	
	PODNet	UCIR	PODNet	UCIR
Baseline	58.64	43.42	57.80	42.23
+NCA Ghost	62.08	50.23	62.47	44.17
+ SVM Reg	**62.73**	**50.91**	**63.30**	**45.97**