

# Continual learning on 3D point clouds with random compressed rehearsal



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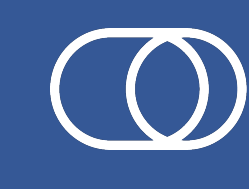


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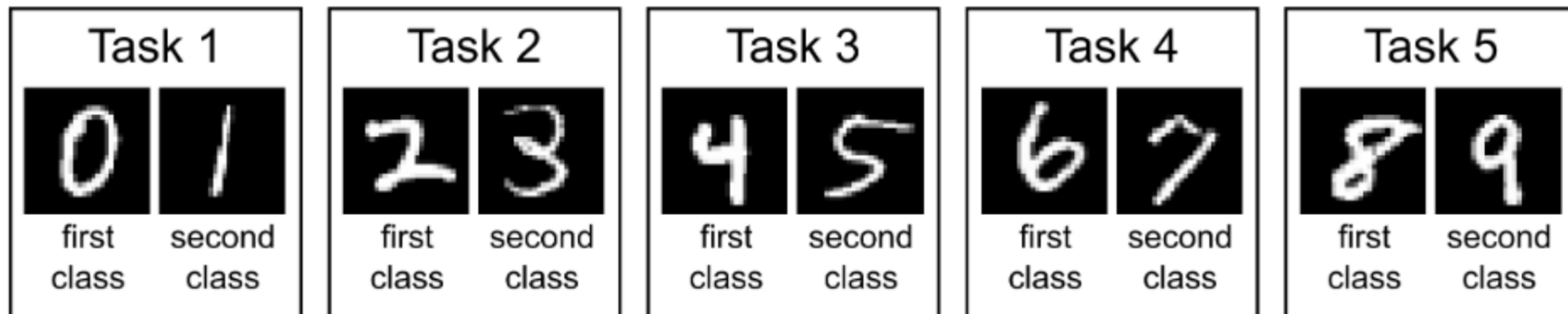
HEMOLENS



TOOPLOOX

## Continual learning scenarios

- Idea: Train model on the new dataset (task) without losing the model's performance on the data (task) it was previously trained on.
- Task-Incremental Learning: Task is given to the system - 1st or 2nd class (e.g. 0 or 1)?
- Class-Incremental Learning: Task needs to be inferred - regular classification between 0 and 9.

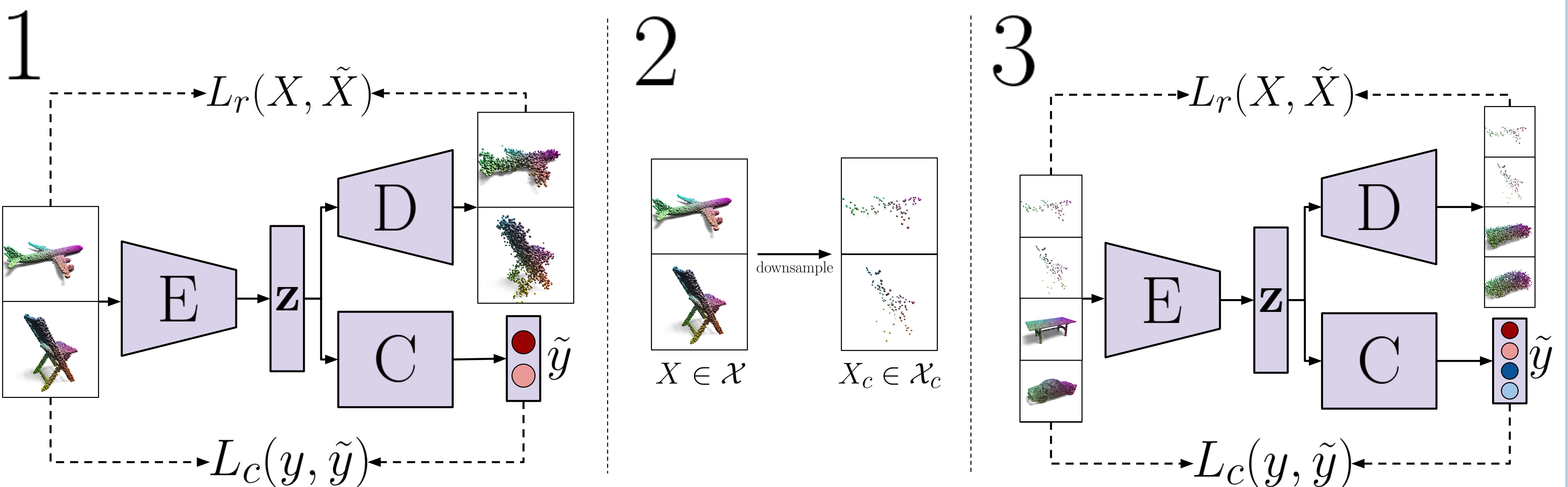


## Point Clouds

- Irregular 3-d data type
- Set of points in  $\mathbb{R}^3$
- Unstructured
- Unordered

$$= \begin{bmatrix} x_1 & y_1 & z_1 \\ x_2 & y_2 & z_2 \\ \vdots & \vdots & \vdots \\ x_K & y_K & z_K \end{bmatrix} \in \mathbb{R}^{K \times 3}$$

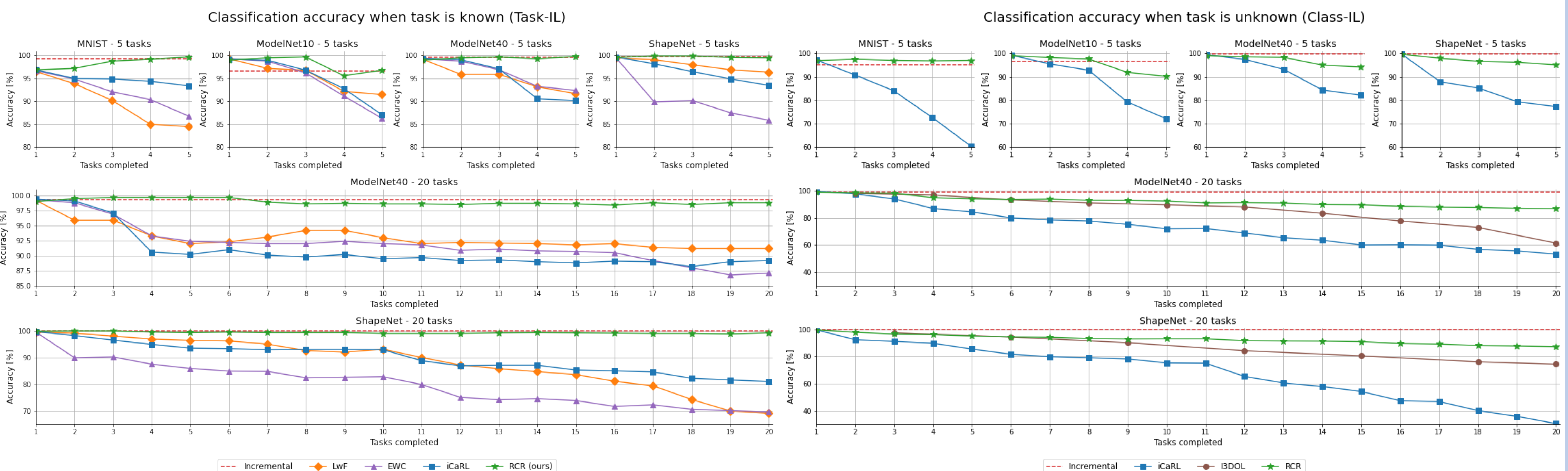
## Random Compressed Rehearsal



- $E$  – Encoder module
- $D$  – Decoder module
- $C$  – Classifier module
- $L_r$  – Chamfer Distance reconstruction loss
- $L_c$  – CrossEntropy classification loss

1. Train RCR to reconstruct and classify Task 1 samples.
2. Compress Task 1 samples using random subsampling. In our experiment we sample 100 out of 2048 points.
3. Add compressed data to the set of Task 2 samples, extend output layer of classifier  $C$  and resume training.

## Results



## References

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