

# $\Delta$ -encoder: An effective sample synthesis method for few-shot object recognition

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Joseph Shtok, Sivan Harary, Mattias Marder, Abhishek Kumar,

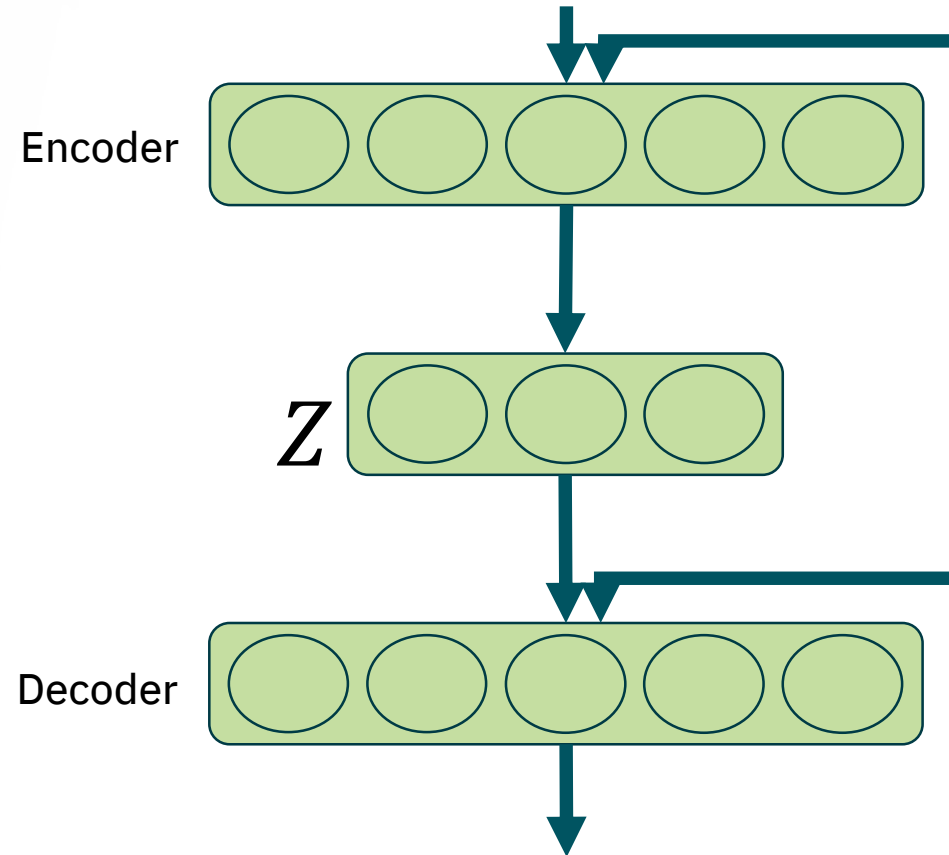
Rogério Feris, Raja Giryes, Alex M. Bronstein

# Who's that dog?



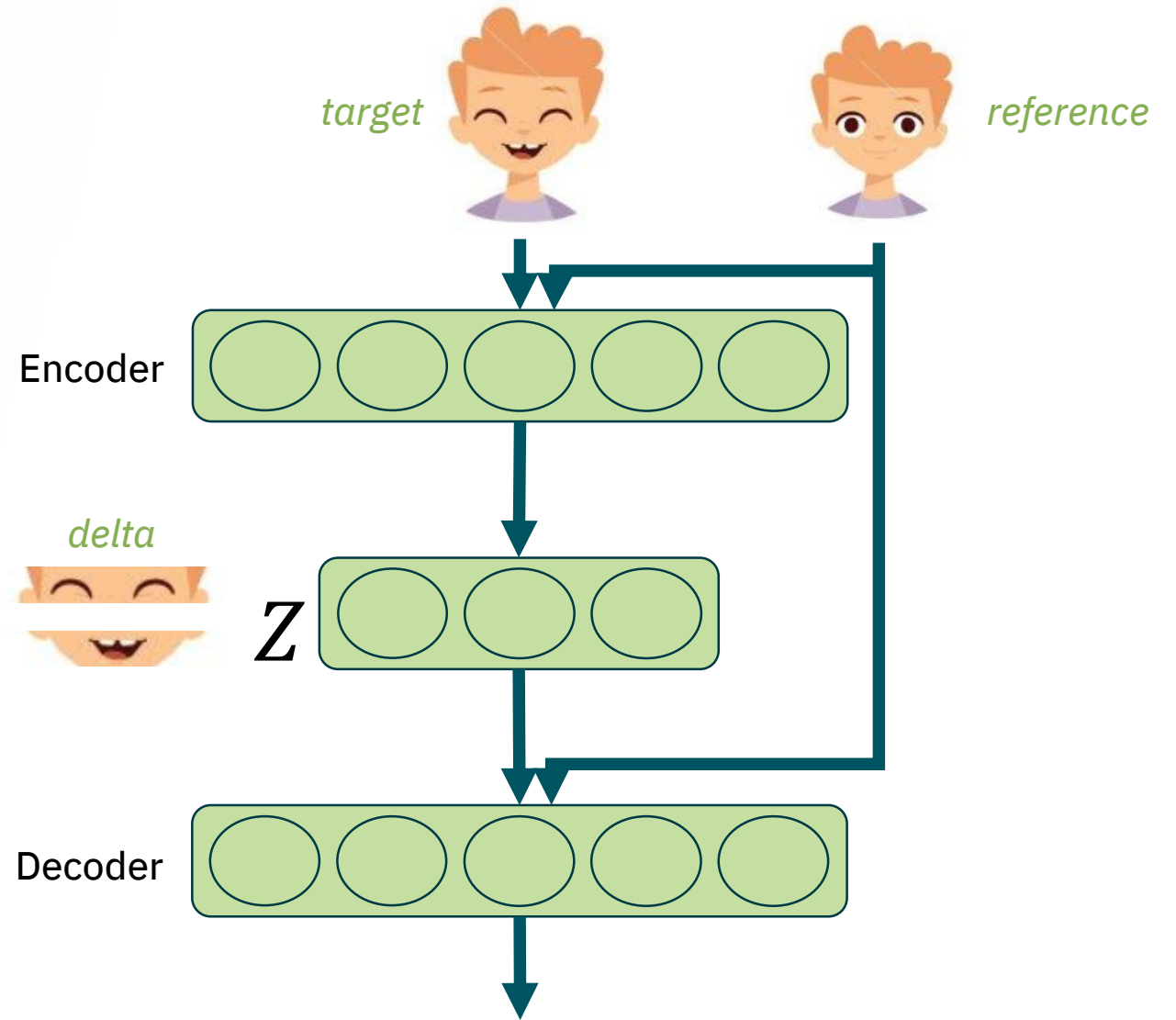
# Key idea – training

- The model is a variant of an auto-encoder operating in feature space



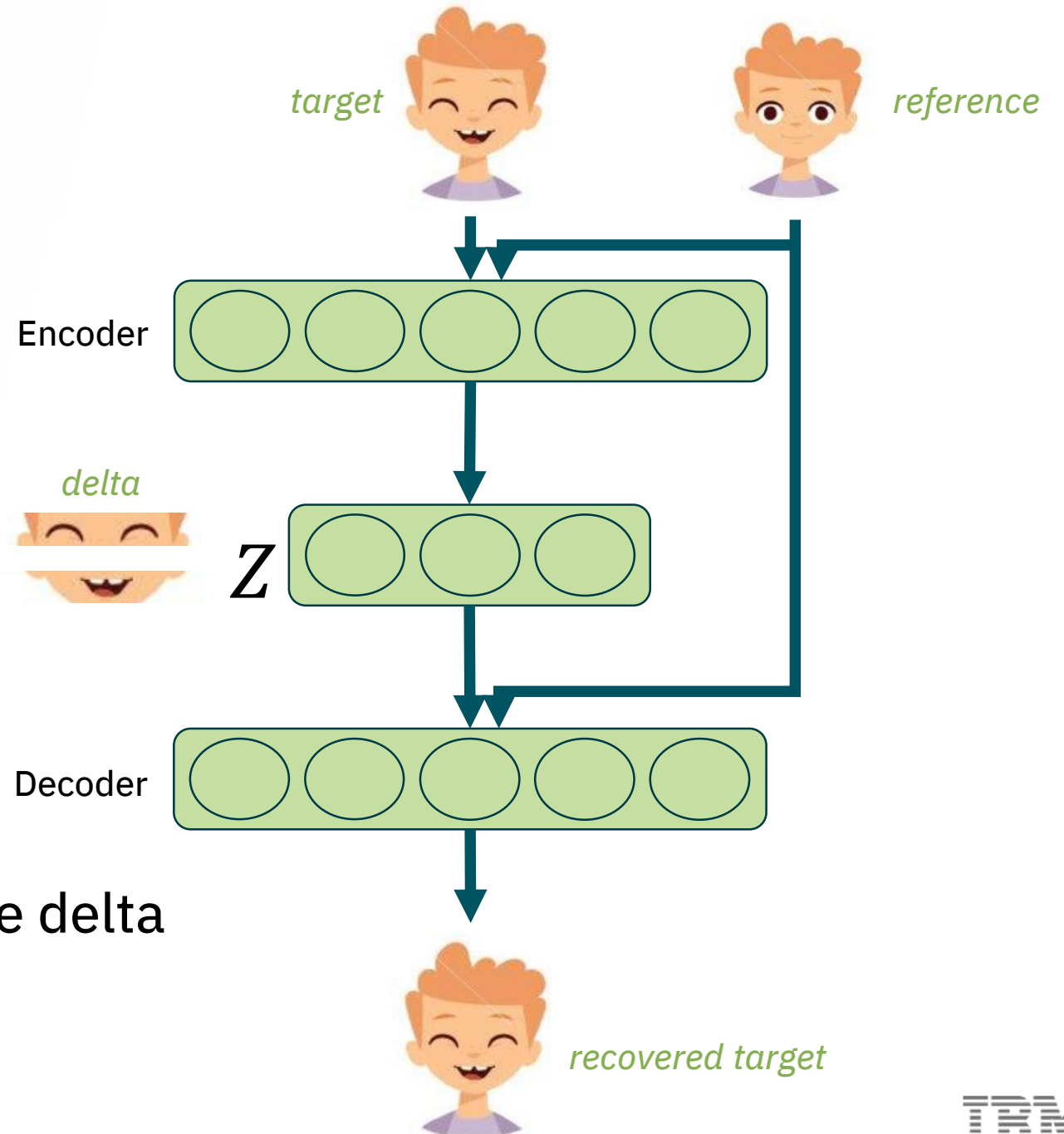
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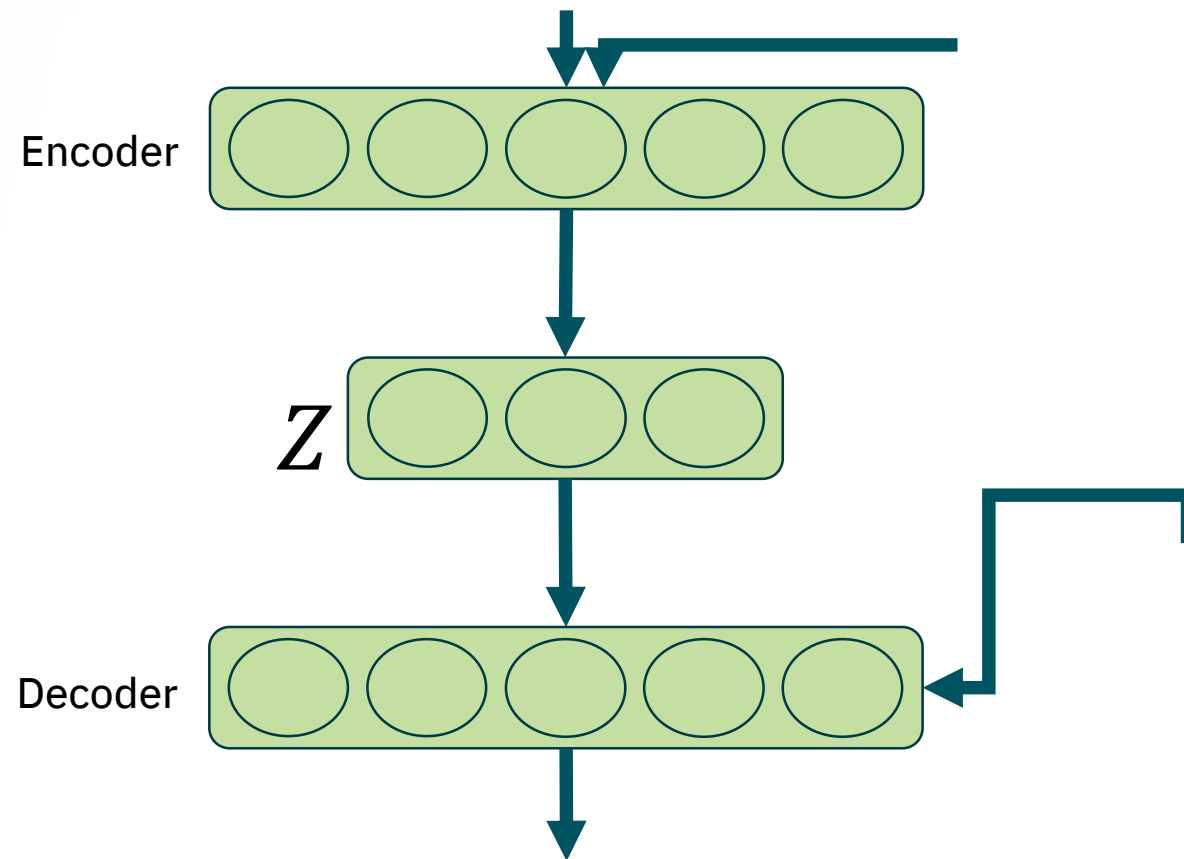


# Key idea – training

- The model is a variant of an auto-encoder operating in feature space
- The network learns to encode the delta between the reference and the target image
- This delta is used to recover the target image as a (non-linear) combination of the reference and the delta

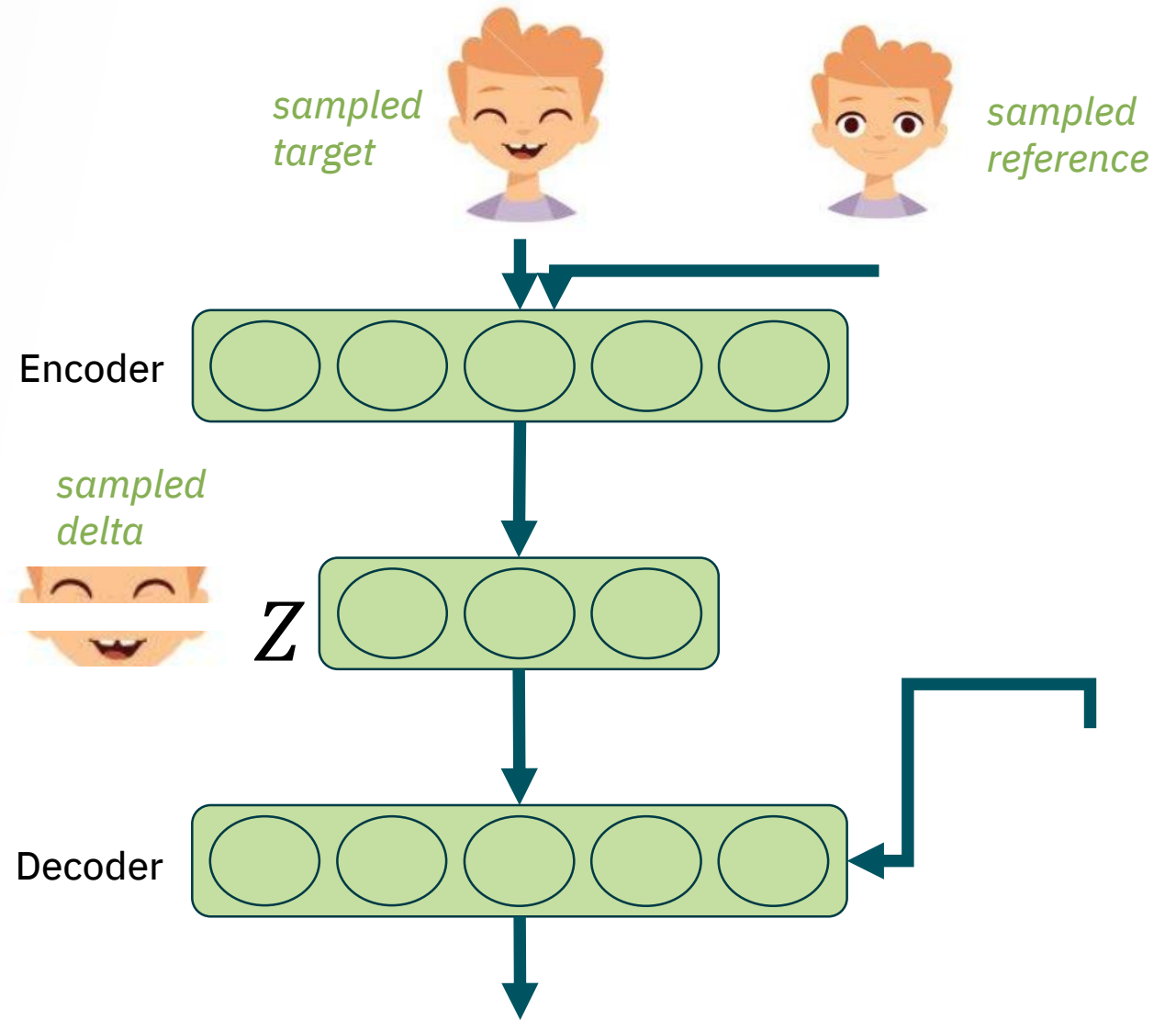


# Key idea – synthesizing



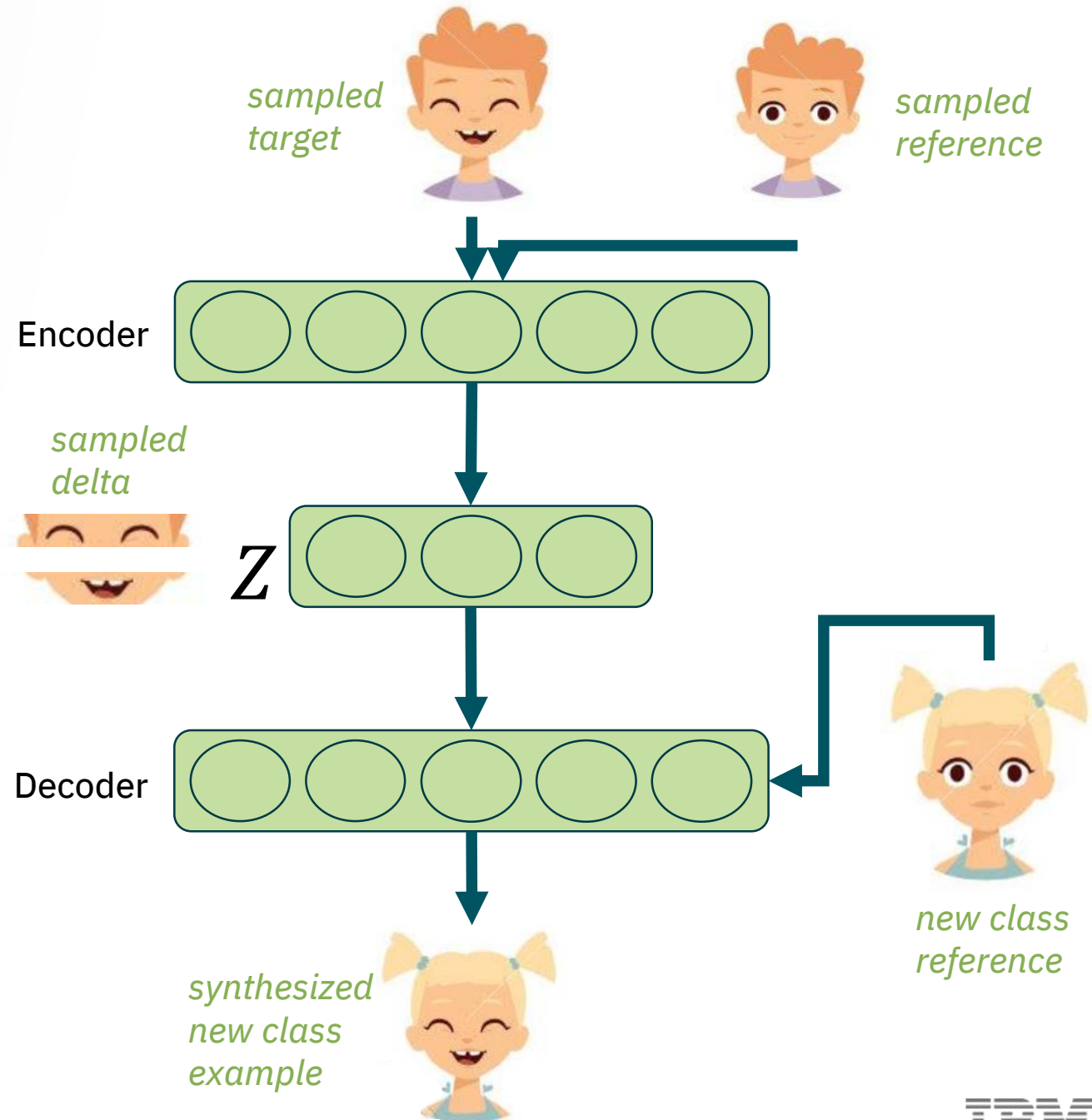
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- At test time we sample encoded deltas from random training image pairs



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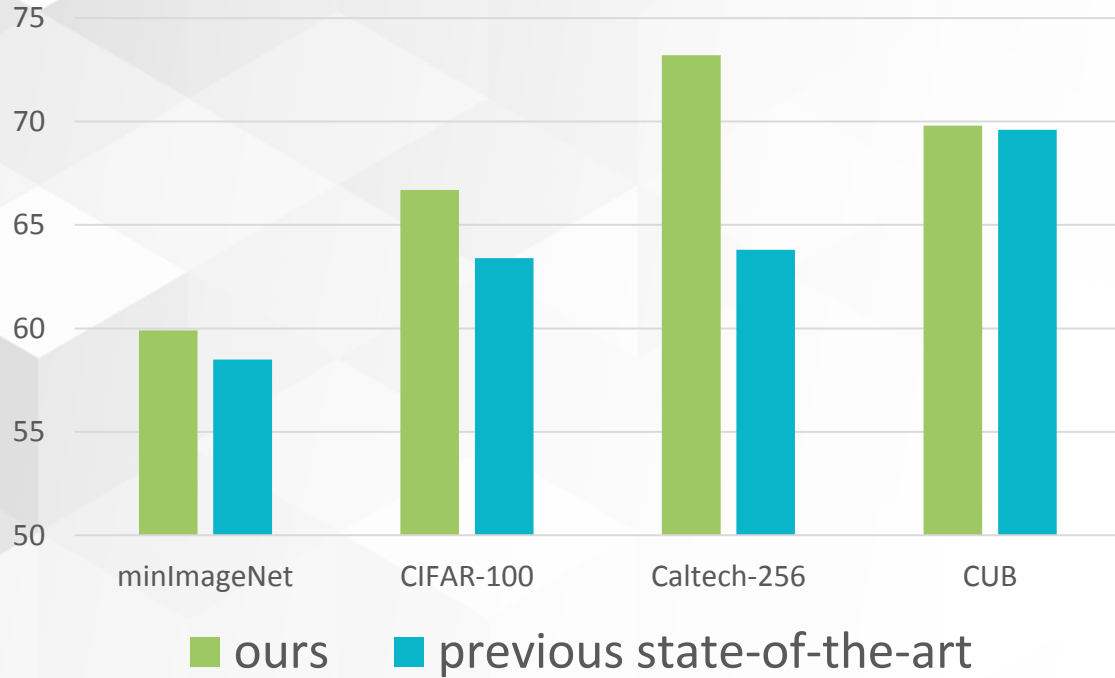
- At test time we sample encoded deltas from random training image pairs
- The sampled deltas are used to create samples for new classes by combining them with the new class reference examples
- These samples are used to train a classifier for the new category





# Few-shot classification experiments

one-shot classification benchmarks



**miniImageNet:** 58.5 (previous SOA) → 59.9 (ours)

**CIFAR-100:** 63.4 (previous SOA) → 66.7 (ours)

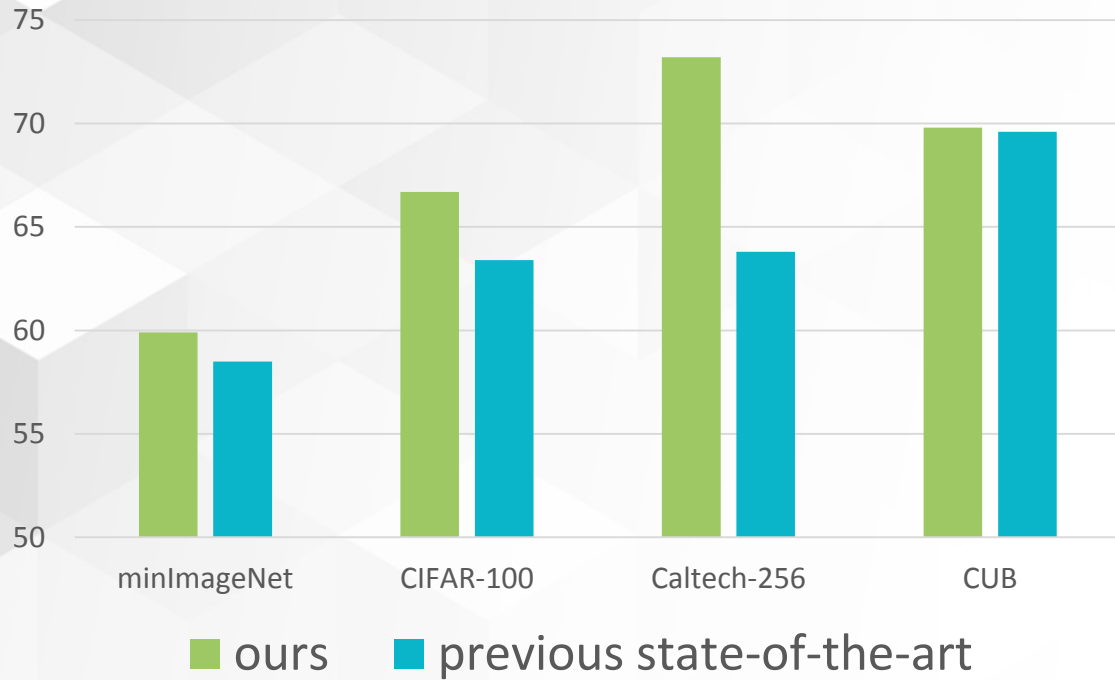
**Caltech-256:** 63.8 (previous SOA) → 73.2 (ours)

**CUB:** 69.6 (previous SOA) → 69.8 (ours)

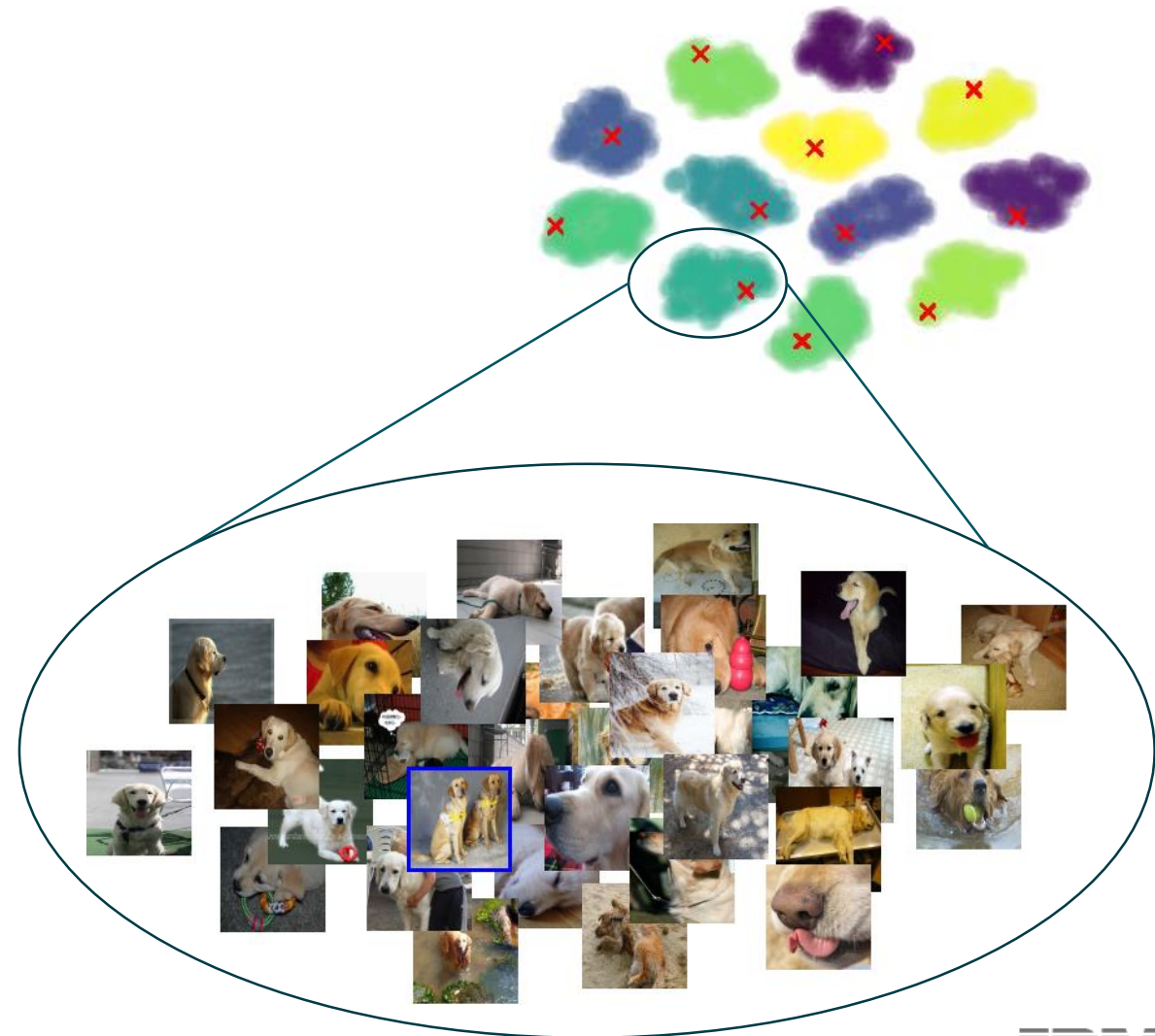


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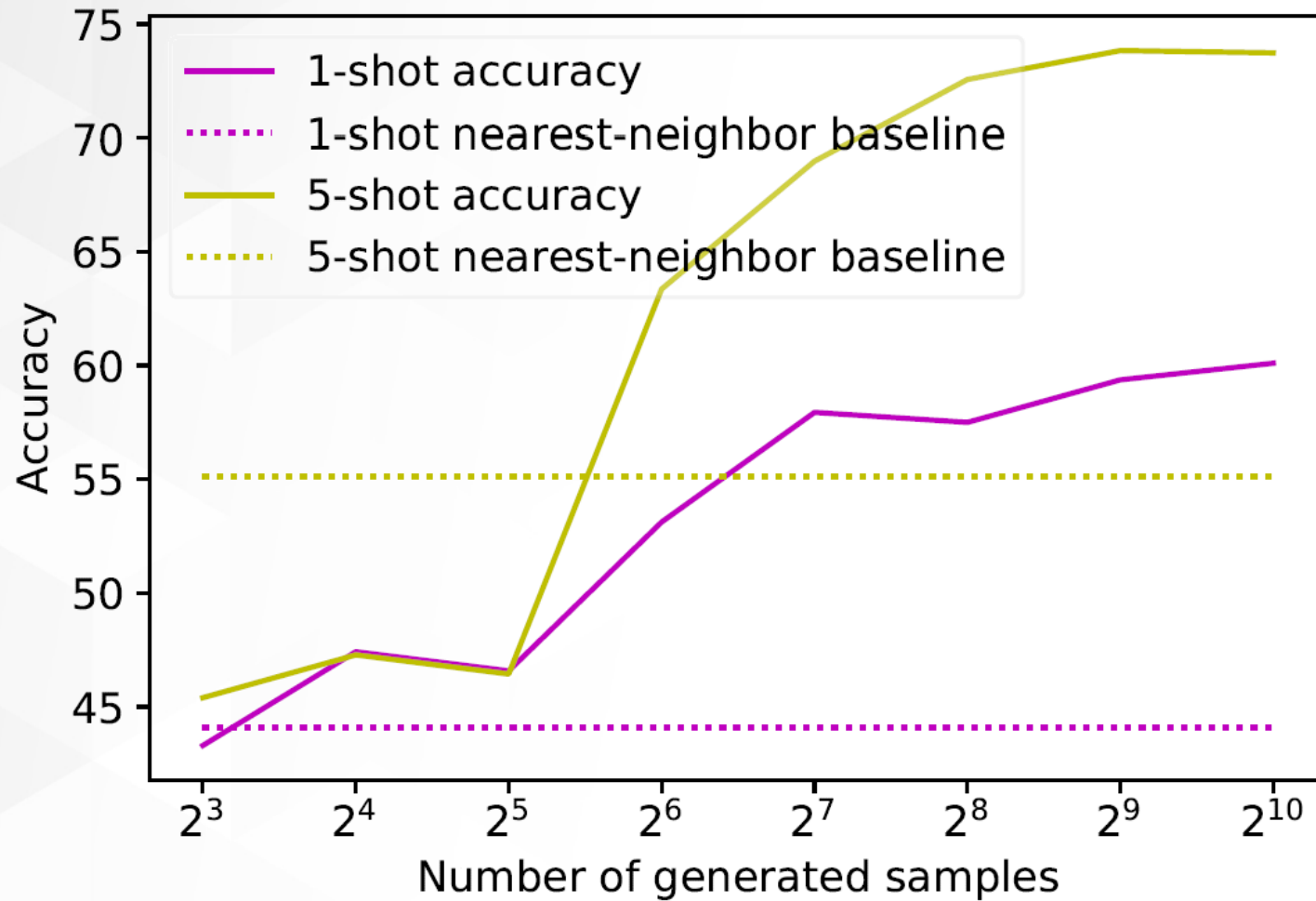
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# Real vs synthetic examples ablation study



**Thank you for listening!**

**Please meet us at our poster:**

**Poster Session A: 10:45 AM - 12:45 PM**

**@Room 210 & 230 AB #25**

