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COMPARE LEARNING: BI-ATTENTION NETWORK FOR FEW-SHOT LEARNING

ICASSP 2020

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Outline

- Introduction & Motivation
- Definition & Setup
- Different methods in Few-shot learning
- Classic methods and our improvement

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Why few-shot learning(FSL)

1.Learning quickly is a hallmark of human intelligence

2.Annotation cost

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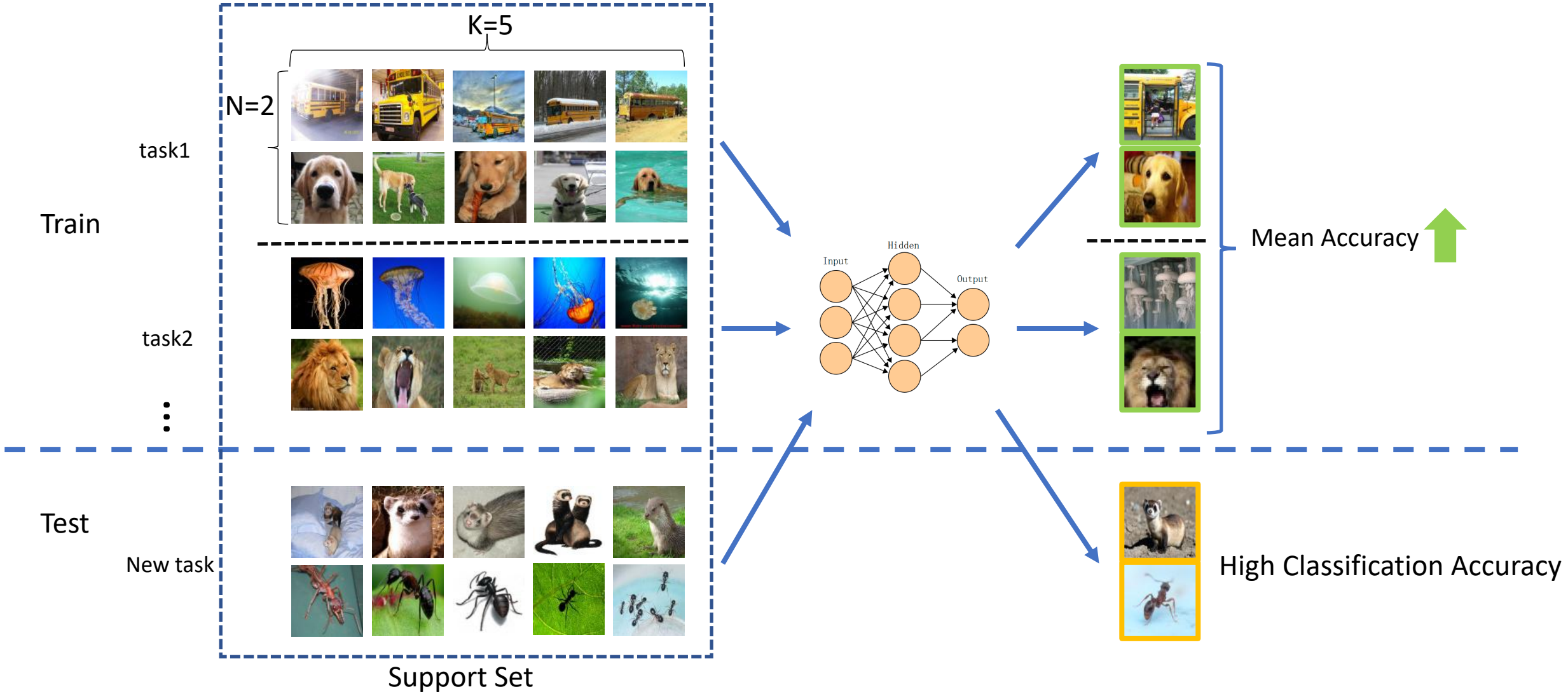
What is the N-way-K-shot problem



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Different methods in FSL

1. Data augmentation
2. Meta learning
3. Metric learning

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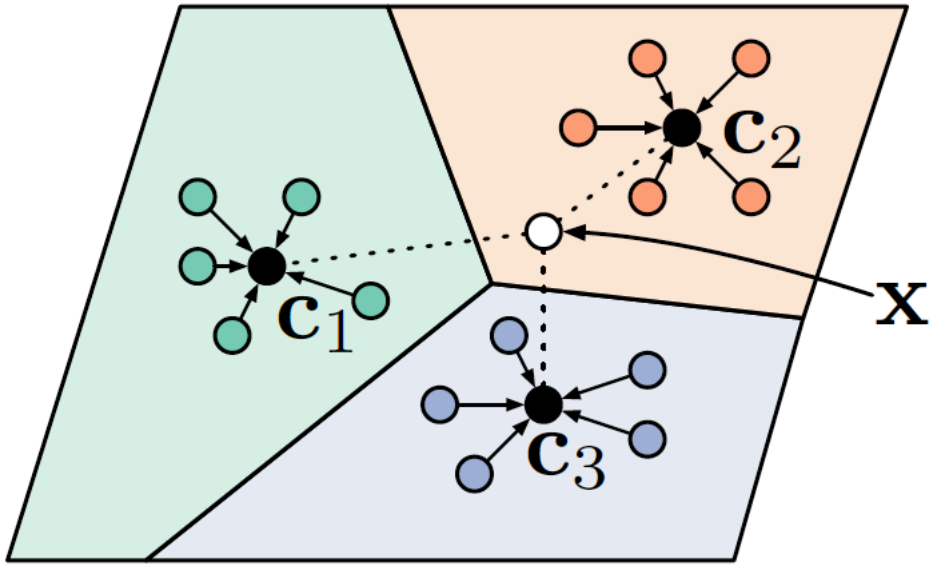
Metric learning in FSL



Prototypical networks learn a metric space in which classification can be performed by computing distances to prototype representations of each class.

Prototypical Networks for Few-shot Learning(NIPS2017)

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Deep Metric learning in FSL

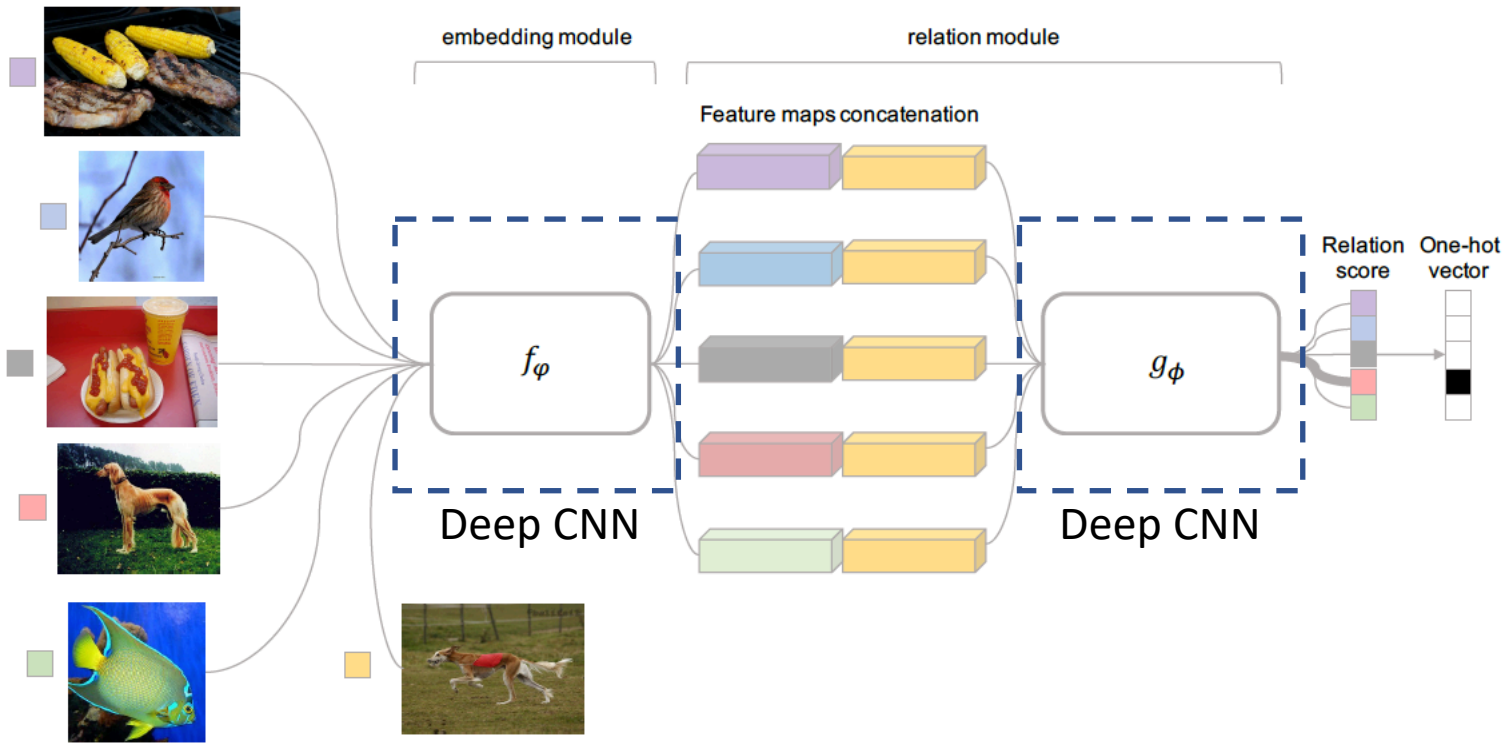

Figure 1: Relation Network architecture for a 5-way 1-shot problem with one query example.

Learning to compare: Relation network for few-shot learning (CVPR2018)

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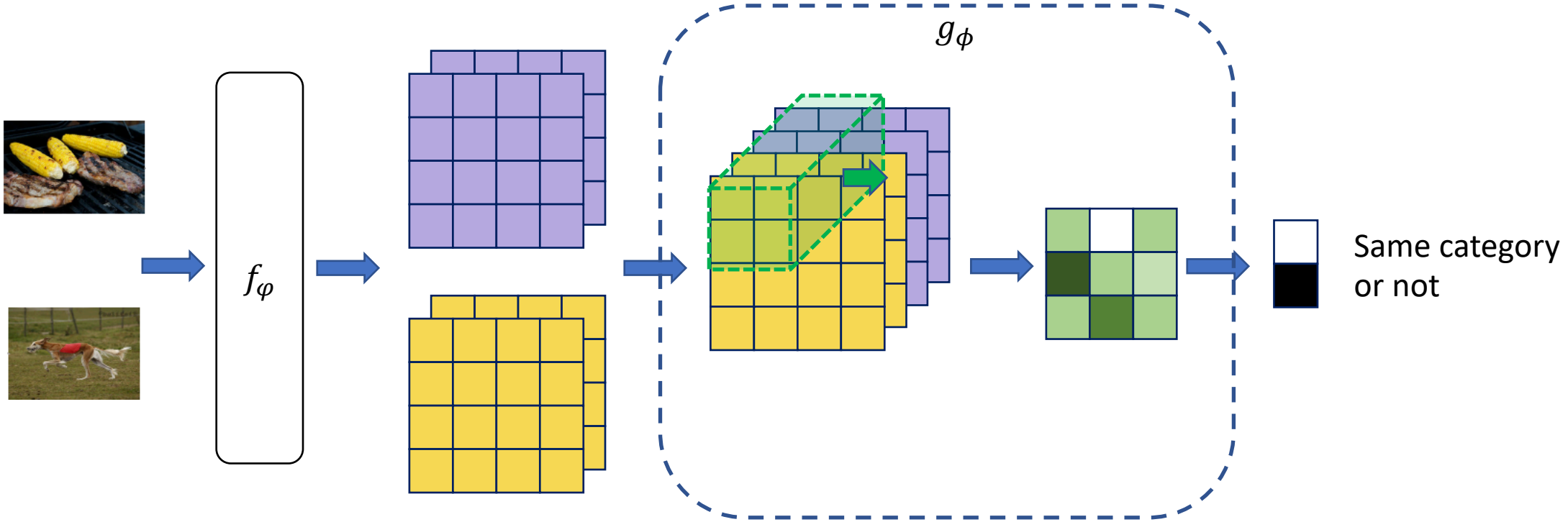
How Relation Network g_ϕ compare



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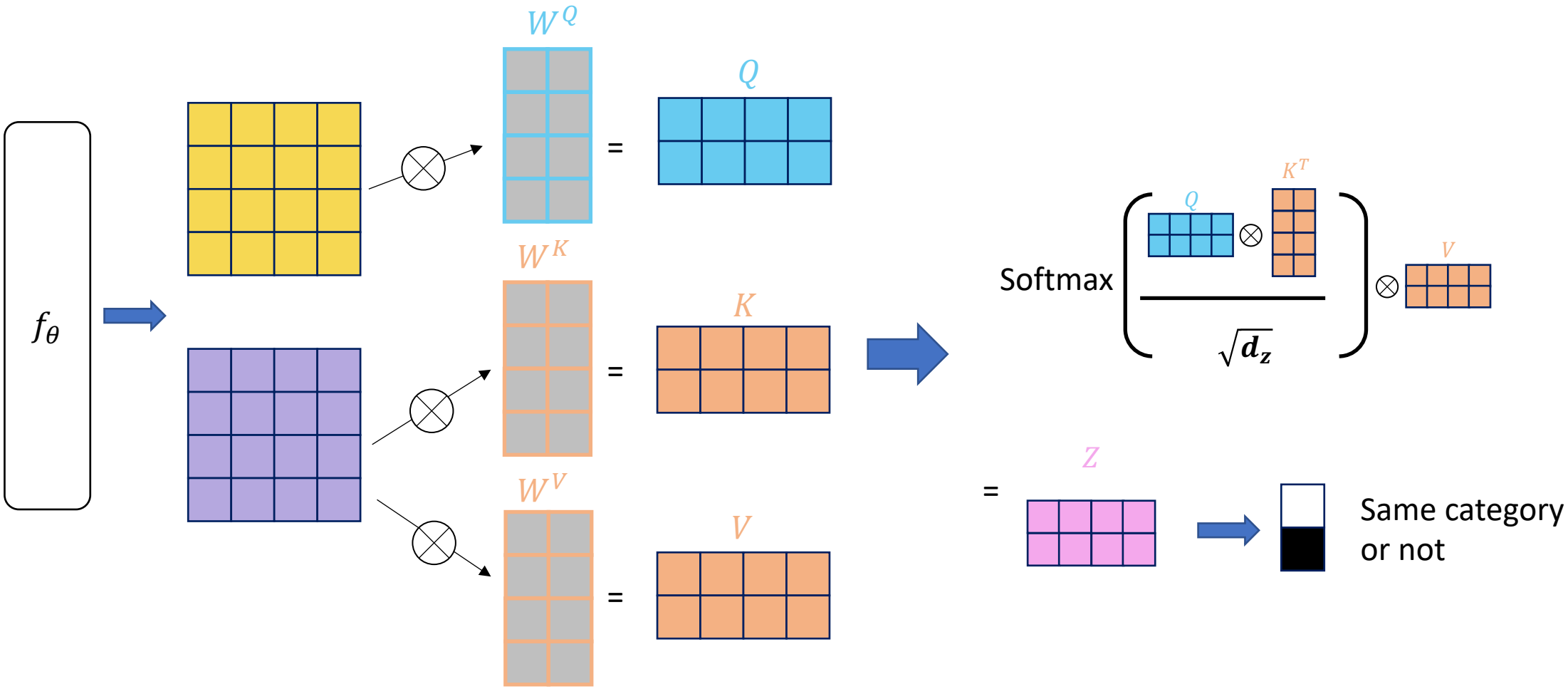
Bi-attention Compare Network



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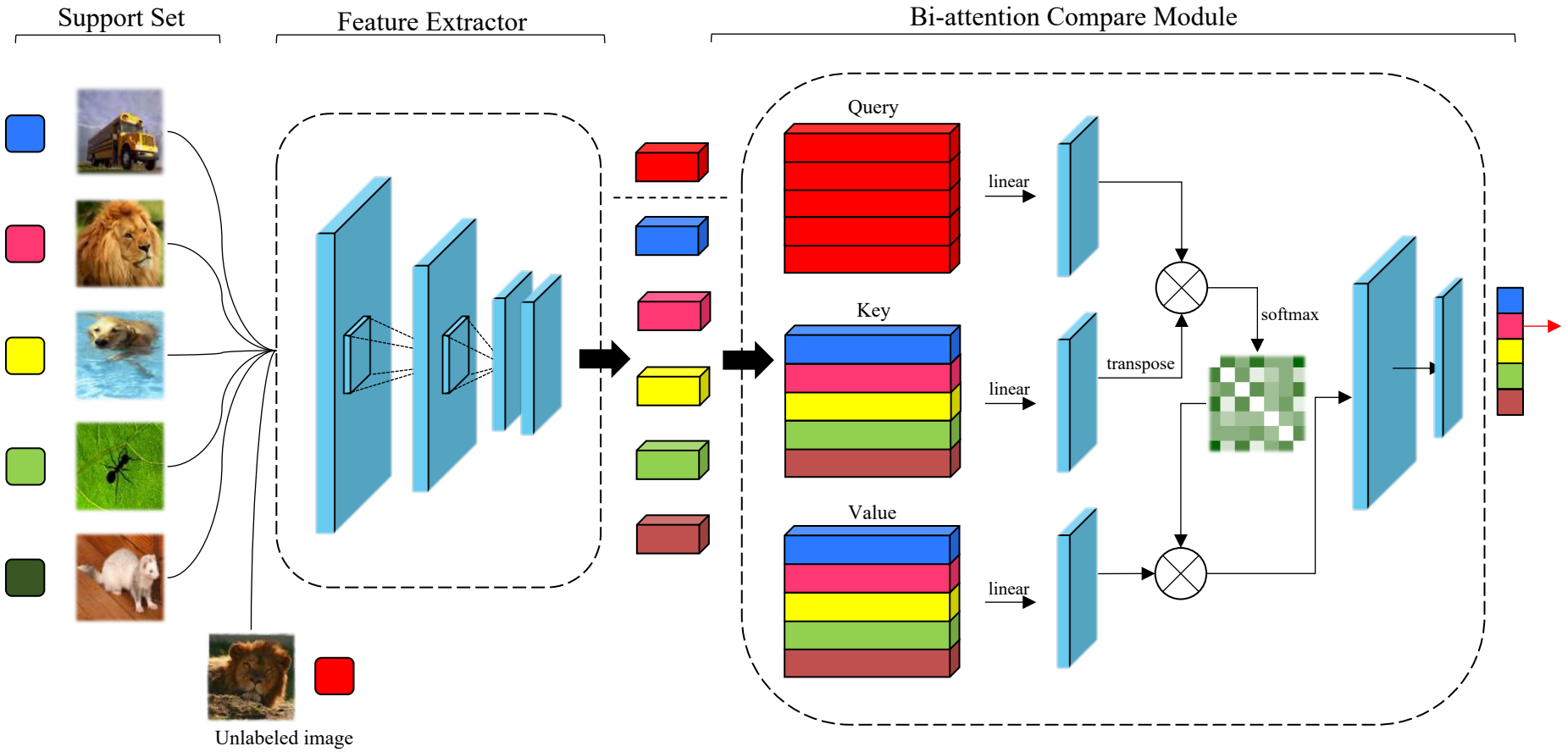
Our method



Overview of Bi-Attention Network for a 5-way-1-shot image recognition task (ICASSP2020)

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Experiments

Table 1. The 5-way, 1-shot and 5-shot classification testing accuracy(%) on miniImageNet dataset.

Few-shot method	1 shot	5 shot
MAML	48.70 ± 1.84	63.11 ± 0.92
ProtoNets	49.42 ± 0.78	68.20 ± 0.66
RelationNets	50.44 ± 0.82	65.32 ± 0.70
MetaGAN	52.71 ± 0.64	68.63 ± 0.67
Our Approach	**53.74±0.89**	**71.90±0.76**

Table 2. The 5-way, 1-shot and 5-shot classification testing accuracy(%) on CIFAR100 dataset. MetaGAN has released neither source code nor result of CIFAR100 till now, so it doesn't appear below.

Few-shot method	1 shot	5 shot
MAML	38.10 ± 1.70	50.40 ± 0.99
ProtoNets	36.70 ± 0.68	56.50 ± 0.71
RelationNets	36.56 ± 0.70	48.86 ± 0.65
Our Approach	**39.08±0.81**	**56.89±0.79**

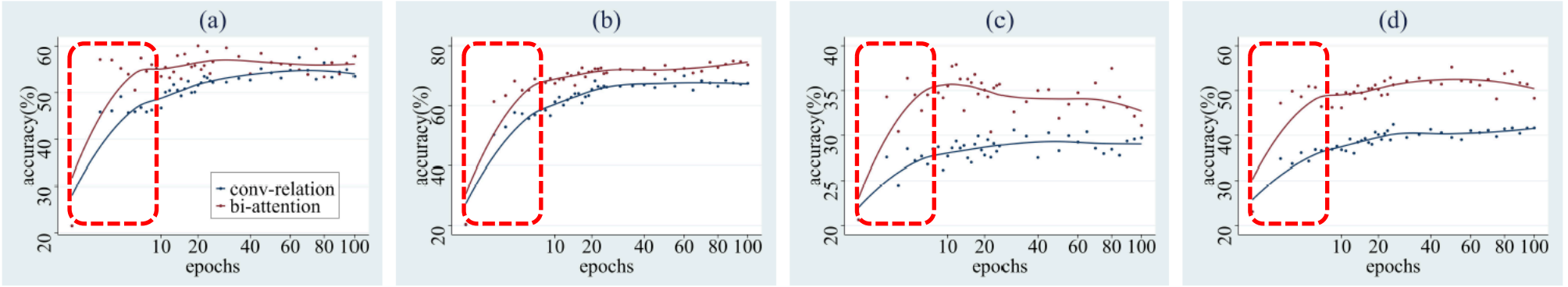

Fig. 2. (a)(b) show the results of 1-shot and 5-shot on miniImageNet; (c)(d) show the results of 1-shot and 5-shot on CIFAR100.

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Thanks

Q&A

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