



IFSM: A Iterative Feature Selection Mechanism for Few-Shot Image Classification

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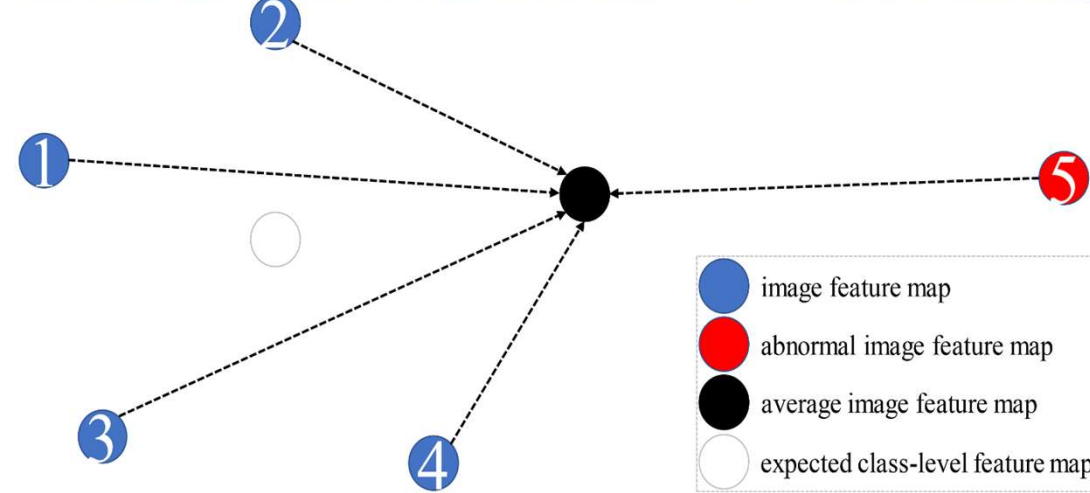
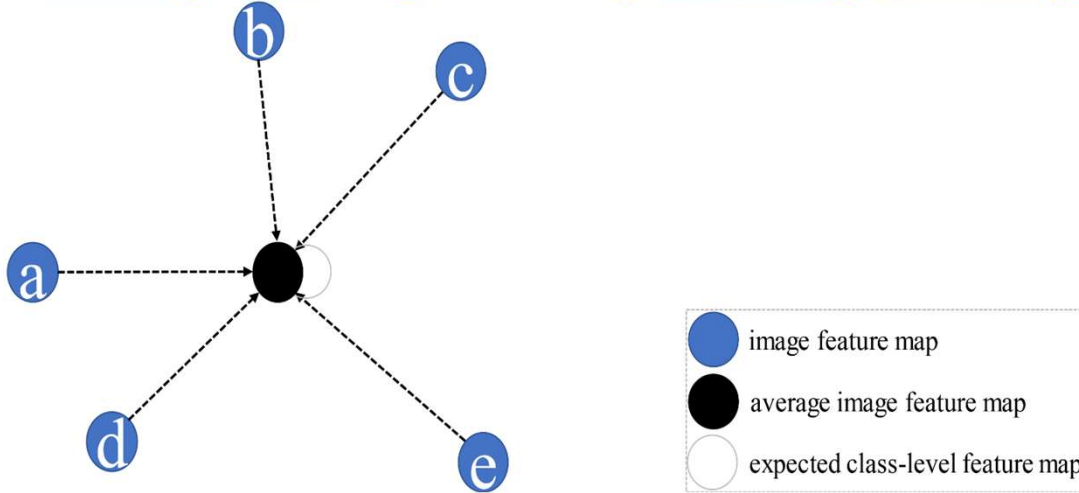
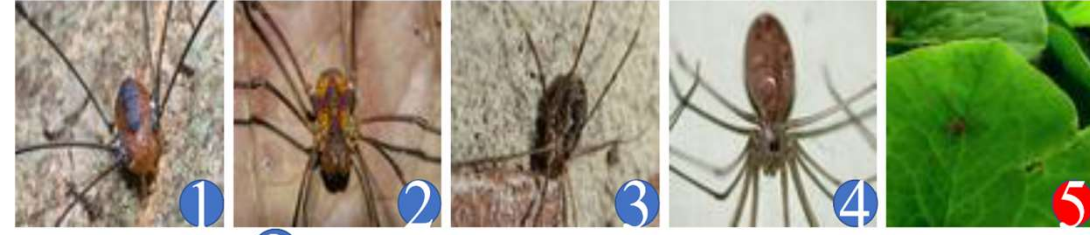
- In few-shot classification methods, it's a widely used approach to embed each class into one embedding vector (a *class-level feature*)
- In most situations this is done by an average operation on all support samples from that class.

$$\mathbf{c}'_k = \sum_{j=1}^K \mathbf{x}_{kj}$$

- This works perfectly when the quantity of samples is large. In the opposite situation, this will introduce **unavoidable bias** since a single outlier does great harm to the arithmetic mean.



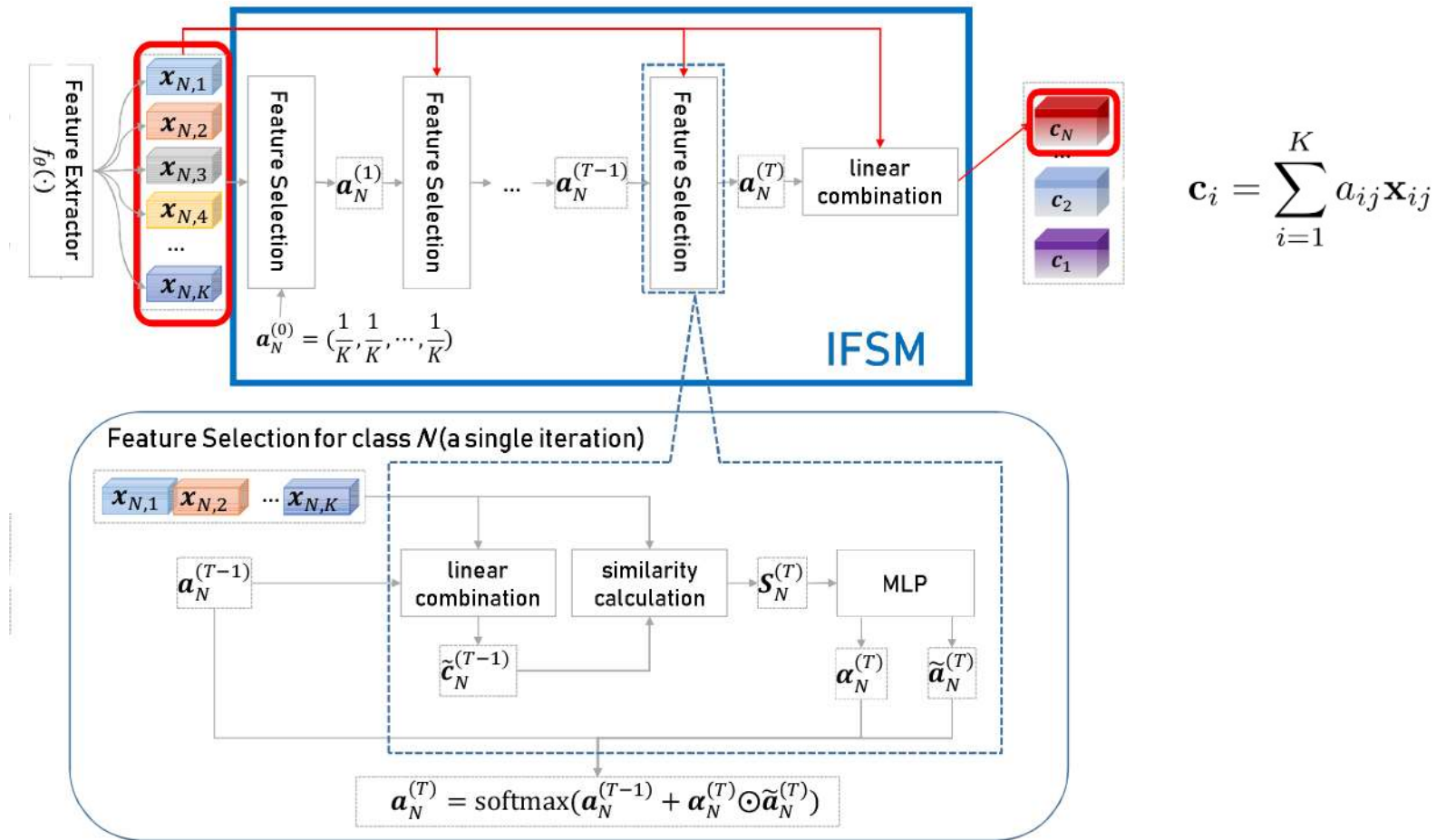
Motivation





Proposed method

- We propose to **iteratively** generate class-level features **less influenced** by outlier support samples.





Benchmark Results

- Results on *miniImageNet* and *tieredImageNet*, compared upon various backbones.

Method	Backbone	<i>miniImageNet</i>	<i>tieredImageNet</i>
Matching Network [2]	Conv4	55.31±0.73	-
Prototypical Network [1] ^a	Conv4	68.20±0.66	-
Prototypical Network ^b	Conv4	65.86±0.68	-
Relation Network [3]	Conv4	65.32±0.70	-
PSN [11]	Conv4	66.62±0.69	-
Subspace Network [9]	Conv4	66.41±0.66	-
MAML [21]	Conv4	63.11±0.92	-
MetaSGD [5]	Conv4	64.03±0.94	-
TAML [23]	Conv4	66.05±0.85	-
IFSM(ours)+PN	Conv4	66.98±0.68	-
TADAM [10]	ResNet-12	76.70±0.30	-
CAML [22]	ResNet-12	72.35±0.71	-
Predict Parameters [25]	WRN	73.74±0.19	-
DC [12]	ResNet-12	79.77±0.19	-
DC ^c	ResNet-12	81.26±0.61	83.82±0.59
FEAT [17]	ResNet-12 ^d	82.05 —	84.79±0.16
DFMN [18] ^e	ResNet-12	82.15±0.45	85.29±0.49
IFSM(ours)+DC	ResNet-12	82.29±0.56	85.50±0.63

^a5-way task results in [1] are obtained by training with 20-way episodes.

^bOur re-implementation that uses standard 5-way 5-shot settings.



- Iterative Feature Selection Mechanism
 - Filtering out the outliers in the support set to get more representative class-level features
 - More representative class-level features lead to more accurate classification
 - Adopting an iterative process to fulfill this

THANK YOU