



## MOTIVATION

• **Problem statement:** *under-explored* few-shot object detection

- **Task:** learn a detector for *novel* classes with few labeled bounding box examples
- **Challenge:** classify + *localize* multiple objects + tackle distracting background
- **Key insight:** base-to-novel *meta-knowledge* transfer
- Meta-level network: operate on the space of model parameters
- Model dynamics: transform few-shot to large-sample detection models



- **Our approach:** meta-learning based object detection
- A unified framework: *jointly* address few-shot classification and localization
- A general framework: apply to region-based and proposal-free detectors
- An effective framework: deal with different *notions of novel classes*

## DISENTANGLING THE LEARNING OF DIFFERENT COMPONENTS



• Extension of shared model dynamics in classification models



- Category-agnostic components: parameters shared by base and novel classes
- **Category-specific components:** *dynamics* of parameters shared by base and novel

# **META-LEARNING TO DETECT RARE OBJECTS**

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Meta-model w/	1-layer	2-layer	3-layer	4-layer
<i>k</i> = 3	27.8	28.6	29.1	28.4
k = 10	44.5	45.0	45.6	44.9



- Setting: 80 COCO classes as base  $\rightarrow$ 50 ImageNet2015 classes as novel

