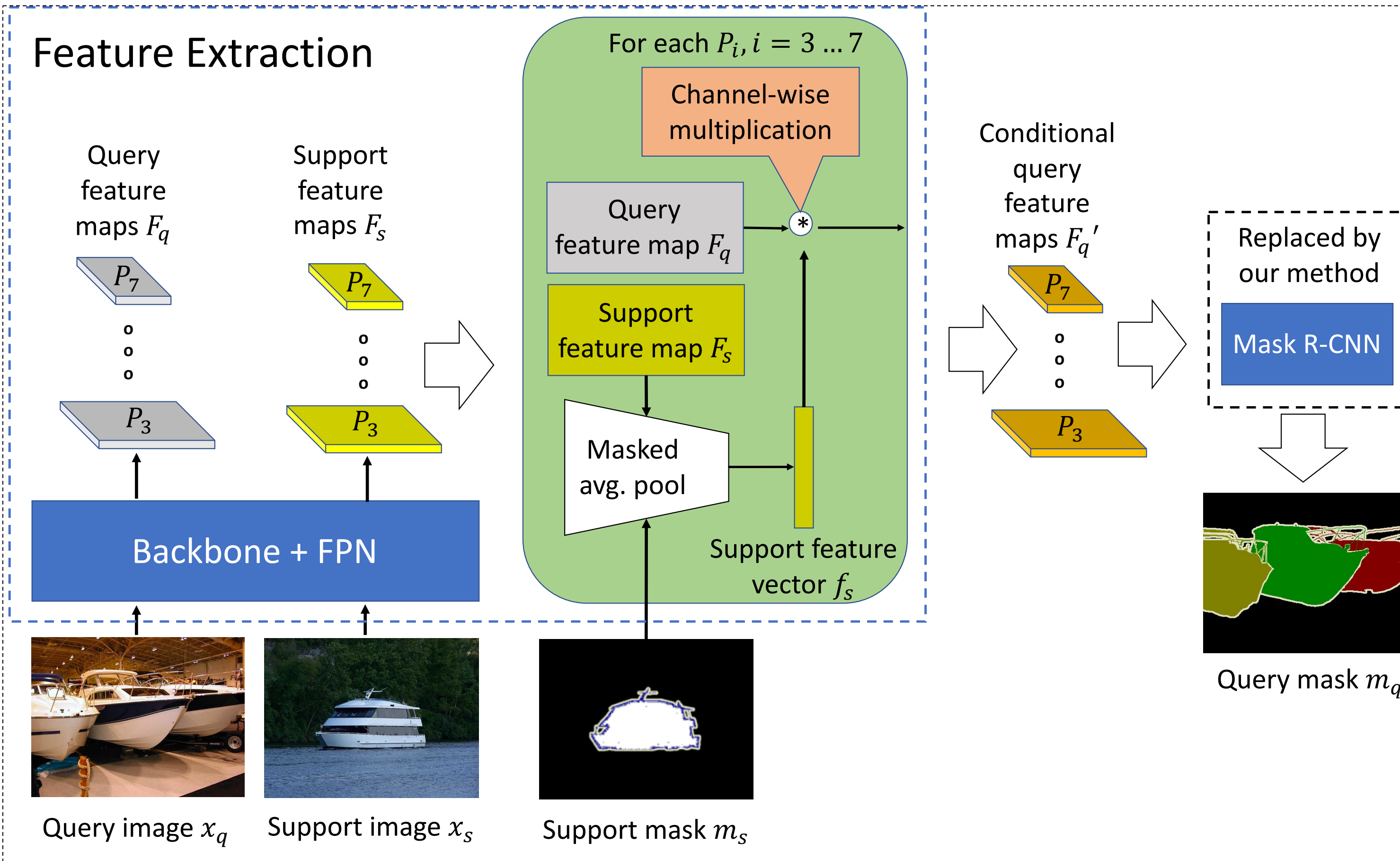


## Problem Statement

- Training: Sufficiently many images with ground-truth segmentation of base classes.
- Testing: **Few support images** with ground-truth segmentation of a target class, and a **query image**. The training and test sets **do not share the same object classes**.
- Goal: Segment the target class in a **query image**.

## A Typical Approach



## Motivation

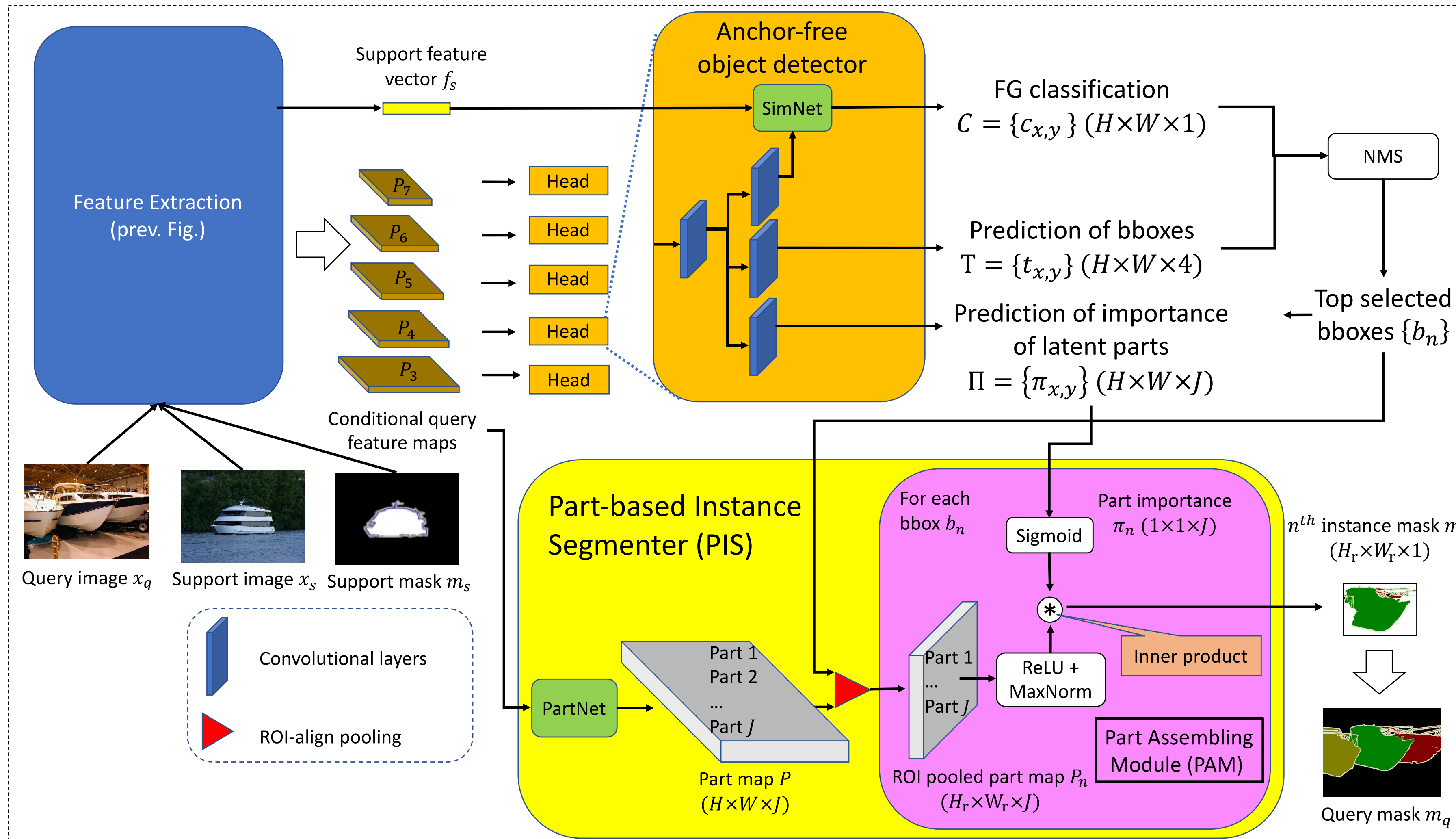
The box head of Mask-RCNN is anchor-based  
 → overfitting to **particular sizes and aspect ratios** of training classes

The mask head of Mask-RCNN learns feature prototypes capturing global outlines of objects  
 → overfitting to the **shapes** of training classes

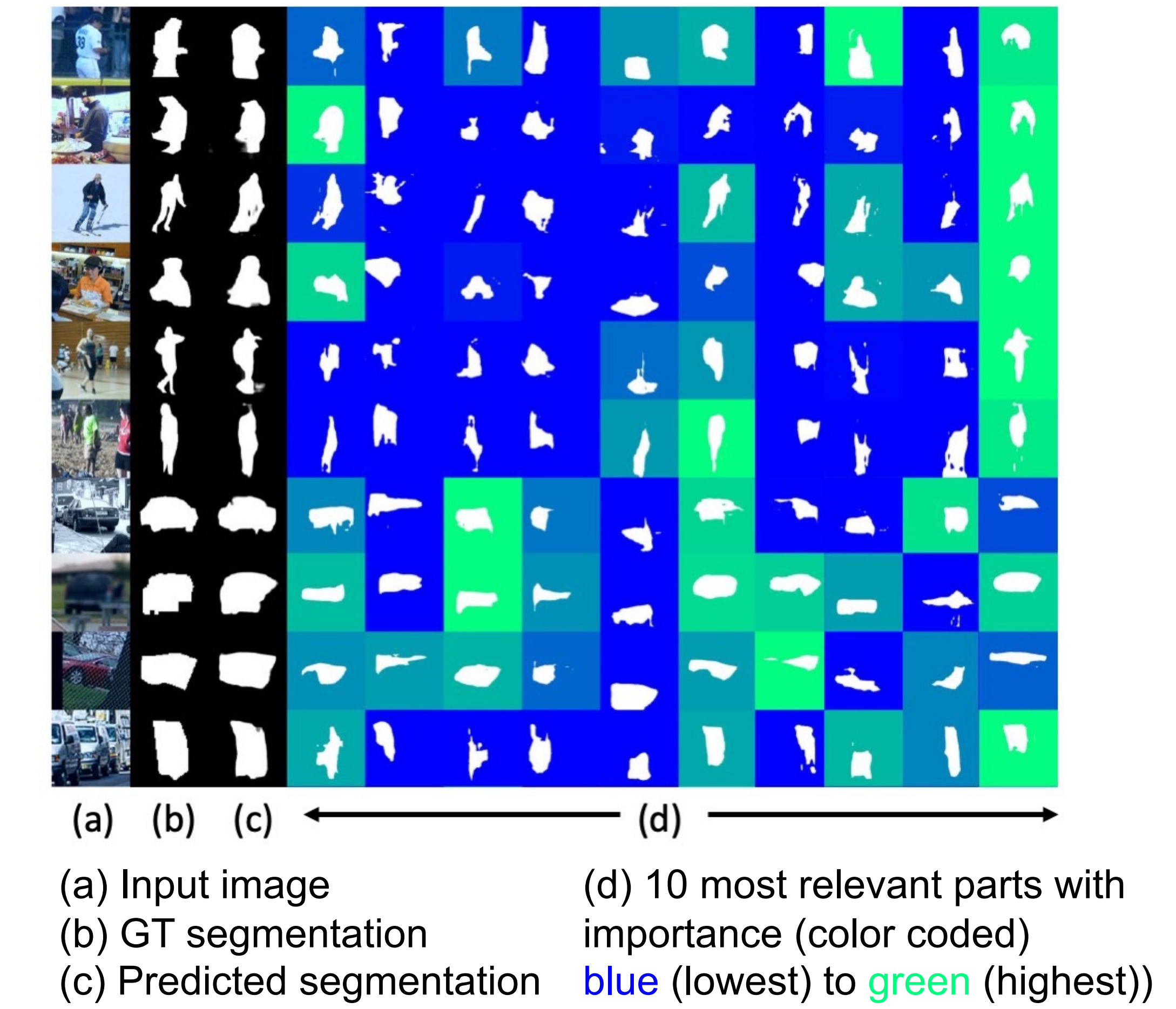
**Contribution 1:**  
Anchor-free object detector

**Contribution 2:**  
Part-based instance segmenter

## Our Approach



## Visualization of Learned Latent Parts



**Table 1.** Performance with different numbers of parts on COCO-20<sup>0</sup>

# parts	1	2	4	8	16	32	64
mAP50	16.3	17.2	17.9	18.4	<b>18.8</b>	18.5	18.0

**Table 2.** mAP50 with std of one and five-shot instance segmentation on COCO-20<sup>i</sup>

# shots	Method	COCO-20 <sup>0</sup>	COCO-20 <sup>1</sup>	COCO-20 <sup>2</sup>	COCO-20 <sup>3</sup>	mean
K=1	Meta-RCNN (Yan et al., ICCV 19)	16.0 ± 0.6	16.1 ± 0.5	15.8 ± 0.3	18.6 ± 0.4	16.6
	Siamese M-RCNN (Michaelis et al., Arxiv 18)	16.6 ± 0.8	16.6 ± 0.6	16.3 ± 0.7	19.3 ± 0.6	17.2
	YOLACT (Bolya et al., ICCV 19)	16.8 ± 0.6	16.5 ± 0.5	16.1 ± 0.4	19.0 ± 0.6	17.1
	FAPIS	<b>18.8 ± 0.3</b>	<b>17.7 ± 0.1</b>	<b>18.2 ± 0.7</b>	<b>21.4 ± 0.4</b>	<b>19.0</b>
K=5	Meta-RCNN (Yan et al., ICCV 19)	17.4 ± 0.3	17.8 ± 0.2	17.7 ± 0.7	21.3 ± 0.2	18.6
	Siamese M-RCNN (Michaelis et al., Arxiv 18)	17.5 ± 0.4	18.5 ± 0.1	18.2 ± 1.0	22.4 ± 0.2	19.2
	YOLACT (Bolya et al., ICCV 19)	17.6 ± 0.2	18.4 ± 0.2	17.9 ± 0.6	21.8 ± 0.3	18.9
	FAPIS	<b>20.2 ± 0.2</b>	<b>20.0 ± 0.1</b>	<b>20.4 ± 0.7</b>	<b>24.3 ± 0.2</b>	<b>21.2</b>

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## Qualitative Results

